

**Ministry of Transport,
The United Republic of Tanzania**

Comprehensive Transport and Trade System Development Master Plan in the United Republic of Tanzania

– Building an Integrated Freight Transport System –

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Note: In this study, the work for Master Plan Formulation and Pre-Feasibility Study was completed at the end of 2012 and a Draft Final Report was issued. This final report incorporates comments on the draft final report received from various concerned parties. In accordance with Tanzanian Laws, the process of Strategic Environmental Assessment (SEA) was carried out after the issuance of the Draft Final Report in order to allow for the study to be officially recognized as a Master Plan. The results of the one year SEA have been incorporated in this report. The report contains data and information available at the end of 2012 and does not reflect changes which have taken place since then, except for notable issues and those related to the SEA.

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Abbreviations and Acronyms

AfDB	African Development Bank
AIP	Aeronautical Information Publication
A-PAD	Assessed Pre-Arrival Documentation
ASYCUDA	Automated System for Customs Data
BADEA	Arab Bank of Economic Development in Africa
CE	Chief Executive
CIF	Cost, Insurance and Freight
CIQ	Custom, immigration and quarantine
COMESA	Common Market for Eastern and Southern Africa
DED	Detailed Engineering Design
DP	Development Partner
DRC	The Democratic Republic of Congo
DSM	Dar es Salaam
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
E. P. B	Société Concessionnaire de L'Exploitation du Port de Bujumbura
EPZ	Export Processing Zone
EPZA	Export Processing Zone Authority
EU	European Union
FCL	Full Container Load
FINIDA	Finland International Development Agency
FOB	Free on Board
FS	Feasibility Studies
FYDP	Five Year Development Plan
GBS	General Budget Support
GDP	Gross Domestic Product
GOT	Government of Tanzania
ICAO	International Civil Aviation Organization
ICD	Inland Container Depot
IDA	International Development Association

JICA	Japan International Cooperation Agency
JISR	Joint Infrastructure Sector Review
JNIA	Julius Nyerere International Airport
KADCO	Kilimanjaro Airports Development Corporation
KIA	Kilimanjaro International Airport
KOICA	Korea International Cooperation Agency
MCC	Millennium Challenge Corporation
MOF	Ministry of Finance
MOT	Ministry of Transport
MOW	Ministry of Works
MSCL	Marine Services Co., Ltd.
MT	Motor Tanker, Motor Tugboat
MTEF	Medium Term Expenditure Framework
MKUKUTA	Mkakati wa Kuondoa Umaskini Tanzania
MV	Motor Vessel
NEAC	National Environmental Advisory Committee
NEMC	National Environment Management Council
NIPP	National Investment Promotion Policy
NORAD	Norway Agency for Development
NRSP	National Road Safety Policy
NTP2003	National Transport Policy 2003
OD	Origin and Destination
OFID	Overseas Fund for International Development
OSBP	One Stop Border Post
PAD	Pre-Arrival Documentation
PCN	Pavement Classification Number
PERTS	Public Expenditure Review for the Transport Sector
PMMR	Performance based Management and Maintenance of Roads
PMORALG	Prime Minister Office – Regional Administration and Local Government
P-PAD	Pre-Assessed Pre-Arrival Documentation
PPP	Public Private Partnership

RF	Roads Fund
RFB	Roads Fund Board
RMMS	Roads Maintenance Management System
RoRo ship	Roll-on/Roll-off ship
RSA	Republic of South Africa
RSPS	Road Sector Program Support
RUSIRM	Ruvuma and Southern Iringa Road Maintenance
SADC	South African Development Community
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
SNCC	Société Nationale des Chemins de Fer du Congo
SNCZ	Société Nationale des Chemins de Fer Zaïrois
STSIP	Short Transport Sector Investment Program
SUMATRA	Surface and Marine Transport Regulatory Authority
TAA	Tanzania Airports Authority
TANROADS	Tanzania National Roads Agency
TANSAD	Tanzania Single Administration Document
TAZARA	Tanzania Zambia Railway Authority
TCAA	Tanzania Civil Aviation Authority
TDV2025	Tanzania Development Vision 2025
TEU	Twenty Equivalent Unit
TIC	Tanzania Investment Centre
TPA	Tanzania Ports Authority
TRA	Tanzania Revenue Authority
TRL	Tanzania Railway Limited
TSIP	Tanzania Transport Sector Investment Program
USA	United States of America
WB	World Bank

Chapter 1 Introduction

1.1 Study Background and Subjects

The economy of Tanzania, with a population of over 40 million, has constantly shown high growth in recent years. Particularly since 2000, the real growth rate has been hovering around 7%, which is expected to continue for the next decade. This expansion of the economy has been reflected directly on the demand for transportation. It has been demonstrated in this part and elsewhere in the world that demand for transportation grows at a rate much greater than the overall economy, at least in the early stages of economic development. Even at 8% annual growth, transport demand would more than quadruple in the next 20 years. Accommodating such an increase in transport demand is a pressing issue in Tanzania, where existing infrastructure has by no means been developed in an efficient and balanced way, and is already showing strains in dealing with the level of demand at present, thereby causing a transport cost structure that is significantly higher than the world standard.

It is also important to note that Tanzania has several “international corridors” connecting its east coast to neighbouring inland countries. The development of such infrastructure has a great impact not only on the Tanzanian economy but also on the economies in the rest of the East African region, some of which have been expanding at a rate even higher than that of Tanzania. In that sense, transport infrastructure in Tanzania (both hard and soft) needs to be designated not only as a domestic asset but also as a common asset shared with the neighbouring economies.

It is clear that the future of transport in Tanzania should not be considered as an extension of the immediate past. An approach with a clear vision is called for.

Given these circumstances, the government of Tanzania, based on the recognition of the need for a clear plan on transport development, has announced TSIP (10-Year Transport Sector Investment Programme – Phase 1) in 2007, as a concrete action plan for the National Transport Policy (2003). TSIP has adopted the concept of a “development corridor,” widely recognized as the development method for the whole continent, which lists four corridors – Dar es Salaam, Central, Tanga and Mtwara – as key corridors for development.

Since the time of formulating TSIP, many agencies related to Tanzanian transport as well as the East African Community Secretariat launched a variety of studies, recognizing the need to cope with the imminent increase in demand for transport and lowering its cost. However, those studies are conducted with a particular focus relating to the area of concern of the respective agency. A study to look at the transport sector as a whole, including various modes and interconnections among them is called for. Such a study will provide input for the formulation of the second phase of TSIP. Thus, Tanzania’s Ministry of Transport (former Ministry of Infrastructure Development) has requested the Japanese government to support in 1) preparing a comprehensive transport plan to streamline the country-wide freight transport system; and 2) conducting feasibility studies for developing necessary transport and trade systems.

This study not only benefited from all the previous studies and plans but also tried to draw hints from additional aspects. Aside from the inter-modal considerations mentioned above, an emphasis was made in understanding domestic movements of goods within Tanzania, which is a large country of widely dispersed population that cannot be viewed as a geographically-concentrated entity. Unlike smaller countries, Tanzania’s transport plan must take into consideration the geographical distribution of demand within the country that will change over time.

1.2 Study Objectives

The objectives of the study are to prepare the future vision of the corridors and other development in Tanzania in terms of freight transport strategy; to build a nation-wide freight transport master plan with a focus on the competitiveness of the cross-border corridors; and to build administrative capacity (planning and implementation) of the institutions relevant to the freight transport planning.

More specifically, the following outcomes are expected:

- 1) Constructing reliable OD (Origin and Destination) data by mode/corridor and other freight transport data, as a result of surveys focusing primarily on freight transport
- 2) Formulating a freight transport strategy centred on the corridors, and reviewing the relevant institutions, organizations and policies in line with this strategy
- 3) Preparing a master plan for facilitating the freight transport both on the hard and soft components, to identify priorities and leading projects

It is also expected that the administrative capacity of the counterpart institutions in Tanzania is to be enhanced by means of 1) – 3) above.

1.3 Study Flows and Schedule

Figure 1.1 illustrates various tasks and periods of time in which they are to be carried out, and inter-relationships among them. This volume presents results of study activities performed from mid-December 2011 to mid-October 2012, primarily in Tanzania.

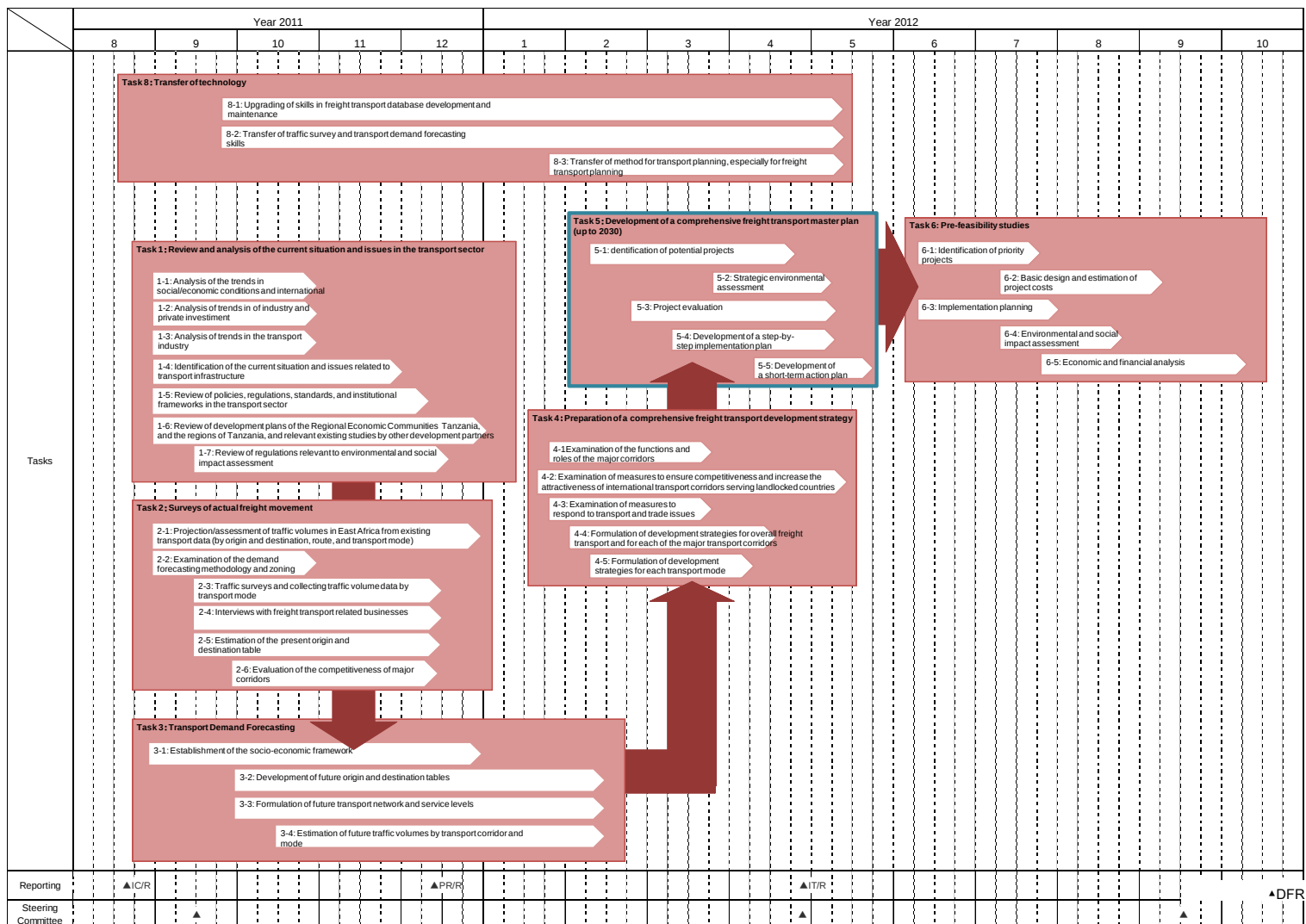


Figure 1.1: Study Flow and Schedule

1.4 Progress to Date

The Study was officially launched by JICA on 12 August 2011 and the first of study team members arrived in Tanzania on 16 August. Other members followed and by the middle of September, the team on the ground comprised of twenty team members with various areas of expertise. In addition, a Tanzanian professional and three Tanzanian assistants started working with the team.

MOT made a room available for the study team on the third floor of its headquarters building, which was adequate only for a small number of workers. An additional five office rooms were provided within the RAHCO headquarters for use by the team. Thanks to the diligence of the Director of Planning of MOT and the General Manager of RAHCO, the study team was provided with sufficient office space to work in. The study team is indeed grateful for their efforts.

Upon their arrival, each of the study team members started their own reconnaissance surveys throughout the country and some have gone to neighbouring countries for that purpose. In some cases, getting permission to make appointments was time-consuming but eventually were able to collect necessary information.

A large-scale, nation-wide road-side origin and destination survey, the first of the kind in Tanzania, was launched on 8 September 2011. This collected origin/destination of freight and other information at about 120 points spread within Tanzania. Another survey of transport businesses was initiated on 18 October, which was to cover about 150 establishments in Tanzania and in neighbouring countries. Results of both surveys were collected by the end of December, then the detailed analysis of data followed.

A weekly meeting involving all members present in Dar es Salaam and the MOT counterpart official has been held to coordinate study activities and to inform everyone concerned of the team's progress.

A Progress Report was issued in December 2011, which defined issues in the freight transport sector in Tanzania. This was prepared after an exhaustive survey of the sector done by the Study Team of 25 experts between August 2011 to early December 2011.

This Volume 2 is intended to present a draft master plan for developing the freight transport systems in Tanzania up to the year 2030, based on the findings collected by a concerted effort of 25 experts. This includes findings on the existing situation as presented in the Progress Report and the analytical future projections that have been conducted from mid-December to mid-April.

The second workshop¹ was held on 19 September 2012 to report the contents of the draft master plan to various stakeholders who have an interest in freight transport in Tanzania one way or another. Fifty people from various governmental institutions, private sector, and donors were informed through a presentation by the Study Team and many from the audience expressed their views on the draft master plan.

This volume has been prepared as a stand-alone report for easy reading. Data and analyses of various existing transport modes presented in the Progress Report are not repeated in this volume although the master plan was formulated out of the findings presented in the Progress Report. Readers are encouraged to refer to the Progress Report as needed.

¹ The first workshop was held 24 April 2012.

Chapter 2 Economic Development Scenario

2.1 Socio-Economic Development

2.1.1 Tanzania and Its Region

Tanzania is one of the largest countries in Africa both in terms of land area and population. Only the Democratic Republic of Congo (DRC), Egypt, Ethiopia, South Africa, and Sudan exceed Tanzania in both land area and population. Tanzania is larger in both land area and population than all of its neighbouring countries except the DRC (i.e., it is larger than Burundi, Kenya, Malawi, Mozambique, Rwanda, Uganda, and Zambia). Its national capital is Dodoma, while the largest city is Dar es Salaam, which has a major international port. Dar es Salaam is the sixth largest port city in Africa after Kinshasa, Alexandria, Abidjan, Casablanca, and Cape Town in terms of urban population size. Dar es Salaam serves as a gateway not only to Tanzania itself but also to six neighbouring landlocked countries (Burundi, DRC, Malawi, Rwanda, Uganda and Zambia).

Tanzania's estimated national population was 43.74 million in 2009. The country's population is increasing at an average rate of about 2.8%, which is the fourth highest in Africa after the West Sahara, Uganda, and Burundi.

The national economy grew at an annual average rate of 5%–7% over the past decade, which was higher than the average of 3.5% in the 1990s. This accelerated growth has been made possible by an expanding domestic market represented by growth in the construction, transportation, and financial sectors. Also, exports have increasingly contributed to the national economy. The proportion of exports to gross domestic product (GDP) increased from 13% to 26% from 2000 to 2010. Export growth has been especially remarkable in the tourism and mining sectors. The national economy is expected to grow at a higher rate in the foreseeable future due to mining (of gold in particular). This growth is likely to be sustained over the longer term if the country is able to keep investing in the necessary infrastructure, improving its business climate, and adapting to the changing global economic environment.

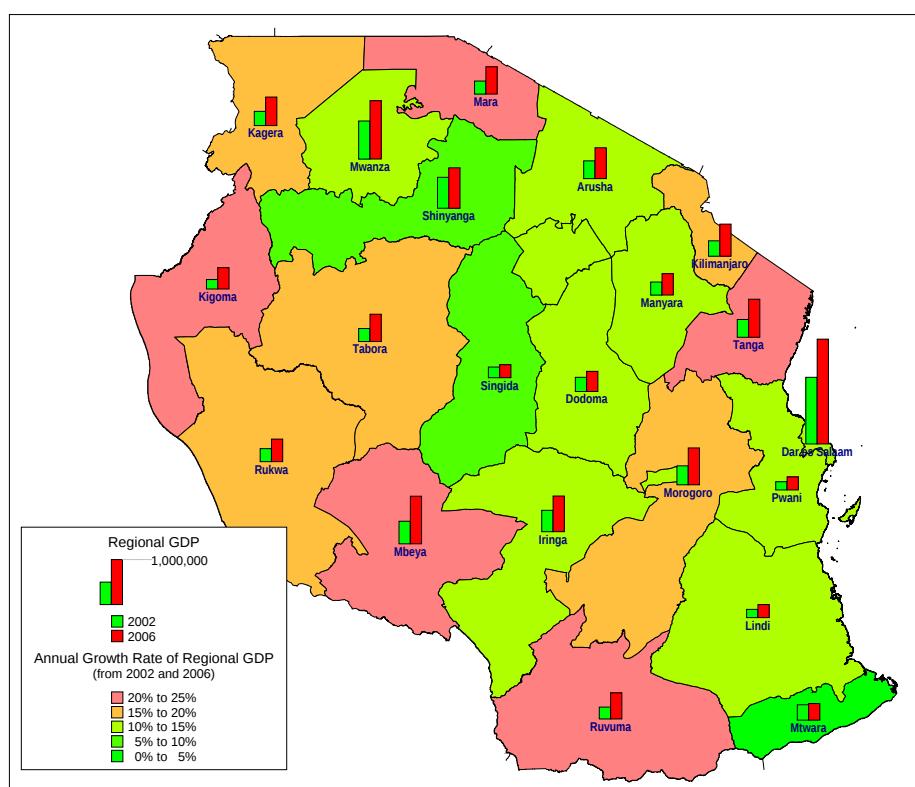
Table 2.1 presents the GDP trends in the region, while Figure 2.1 displays the regional distribution of GDP from 2002 to 2006.

Table 2.1: Trends in Regional GDP at Market Prices

Region	1998	1999	2000	2001	2002	2003	2004	2005	2006
Arusha	383,893	446,730	510,055	582,554	393,050	388,567	492,386	592,244	679,066
Dar es Salaam	916,280	1,066,259	1,158,513	1,282,449	1,473,226	1,589,174	1,715,051	1,961,505	2,323,743
Dodoma	178,947	208,237	226,254	264,197	303,905	324,953	351,998	392,726	457,376
Iringa	284,543	331,118	359,767	424,602	486,091	542,737	607,402	709,802	797,187
Kagera	192,509	224,019	261,739	289,808	327,649	467,959	488,706	526,618	623,567
Kigoma	125,560	146,112	158,754	188,712	212,940	357,088	378,528	420,755	480,876
Kilimanjaro	217,244	252,803	274,676	310,701	352,292	427,374	535,000	639,617	721,397
Lindi	113,905	132,550	144,018	158,814	178,333	229,264	238,616	257,565	295,857
Manyara					277,057	273,897	347,078	438,461	475,886
Mara	173,550	201,957	248,316	256,109	288,989	442,805	472,772	525,022	606,851
Mbeya	292,993	340,951	370,450	438,082	501,523	581,086	766,340	929,164	1,051,413
Morogoro	234,402	272,769	296,370	363,271	413,889	439,142	622,226	706,296	807,998
Mtwara	192,821	237,846	255,028	296,548	333,645	291,834	303,804	326,984	376,119
Mwanza	395,229	459,921	573,094	730,697	847,241	834,329	965,448	1,102,181	1,294,503
Pwani	111,314	129,534	140,741	155,014	174,066	226,488	235,467	253,922	291,807
Rukwa	191,944	223,362	242,688	249,370	280,838	348,625	391,931	447,846	510,746
Ruvuma	192,412	223,907	242,947	242,630	273,779	376,291	435,908	533,352	583,718
Shinyanga	369,846	430,383	520,504	589,032	677,560	667,311	695,248	744,692	884,347
Singida	153,376	178,481	193,923	202,192	225,126	227,114	236,459	239,561	285,538
Tabora	195,094	227,028	246,671	262,849	296,594	362,872	447,294	560,574	612,978
Tanga	209,450	243,734	281,873	336,986	382,095	418,456	603,977	754,432	834,274
Total	5,125,312	5,977,701	6,706,381	7,624,617	8,699,888	9,817,366	11,331,639	13,063,319	14,995,247

Unit: Tsh million

Source: National Bureau of Statistics



Unit: Tsh million

Source: National Bureau of Statistics

Figure 2.1: Regional Distribution of GDP at Market Prices (2002–2006)

Tanzania's economy is predominantly agricultural. While the sector accounted for 28% of GDP and 30% of export earnings in 2010, it employed 75% of the total labour force. In 2008, the ten largest crops and their production volumes in thousands of tonnes were cassava (5,393), maize (3,556), sugarcane (3,500), bananas (2,947), rice (1,346), sorghum (861), sunflower (418), groundnuts (397), cotton (201), and cashew nuts (99). The ten largest major crops in 2008 in terms of USD billion were coffee (105), cotton (81), cashew nuts (69), tea (43), malt (38), wheat (19), rice mill/broken (16), sisal (16), cloves (14), and maize (9).

The tourism sector started to grow rapidly after the government liberalized investment in the sector. Tourism accounts for 25% of the country's foreign exchange reserves with major international tourism spots including Mount Kilimanjaro, Serengeti National Park, Ngorongoro Reserve, and Zanzibar.

The mining sector is also growing rapidly due to the global increase of mineral prices and government policy to liberalize the sector. In 2007, the ten largest minerals and their production volumes in thousands of tonnes were copper (7,222), limestone (1,322), pozzolan (184), gypsum (53), salt (35), coal (27), silver (12), phosphate (8), bauxite (5), and calcite (2). The ten largest minerals in 2007 in terms of exports and their values in USD million were gold (889), tanzanite (49), gemstones (36), diamonds (29), copper (21), silver (5), salt (2), phosphate (1), bauxite (1), and gypsum (0.1).

The manufacturing sector in Tanzania is relatively small compared to that of many other African countries. It started to grow under an import substitution policy until the late 1980s, after which the government adopted open door and liberalization policies. However, many manufacturing industries have not been competitive against lower-cost, imported manufactured goods. At present, the major manufactured goods include cement, soft drinks, corrugated iron sheeting, processed foods, plastic products, and leather products. The processing of agricultural products has potential if better systems to collect, process, and transport agricultural products are in place.

Table 2.2 shows the changing industrial mix of GDP in Tanzania.

Table 2.2: Changing Industrial Mix of GDP

	2005	2006	2007	2008	2009	2010
GDP	100	100	100	100	100	100
Agriculture	32	30	29	29	30	29
Industry	23	23	23	23	22	23
Services	46	47	47	48	48	49

Unit: Percentage

Source: World Bank, Country Assistance Strategy for Tanzania, 9 May 2011.

In geographical terms, the national economy used to be decentralized. The ratio of Dar es Salaam's population to the total national population is now 7.4%, which is considerably lower than that of many "primate" cities in Africa. Relatively independent and self-contained economies were being maintained in zones (or regions), including the northern, lake, southern highlands, and southern zones. With limited transport accessibility, some zones are too far from Dar es Salaam to maintain intensive economic interaction. These zones tend to maintain cross-border economic linkages with parts of neighbouring countries (i.e., the northern zone with central Kenya; the lake zone with western Kenya, Rwanda, and Burundi; the southern zone with Malawi, Zambia, and eastern DRC).

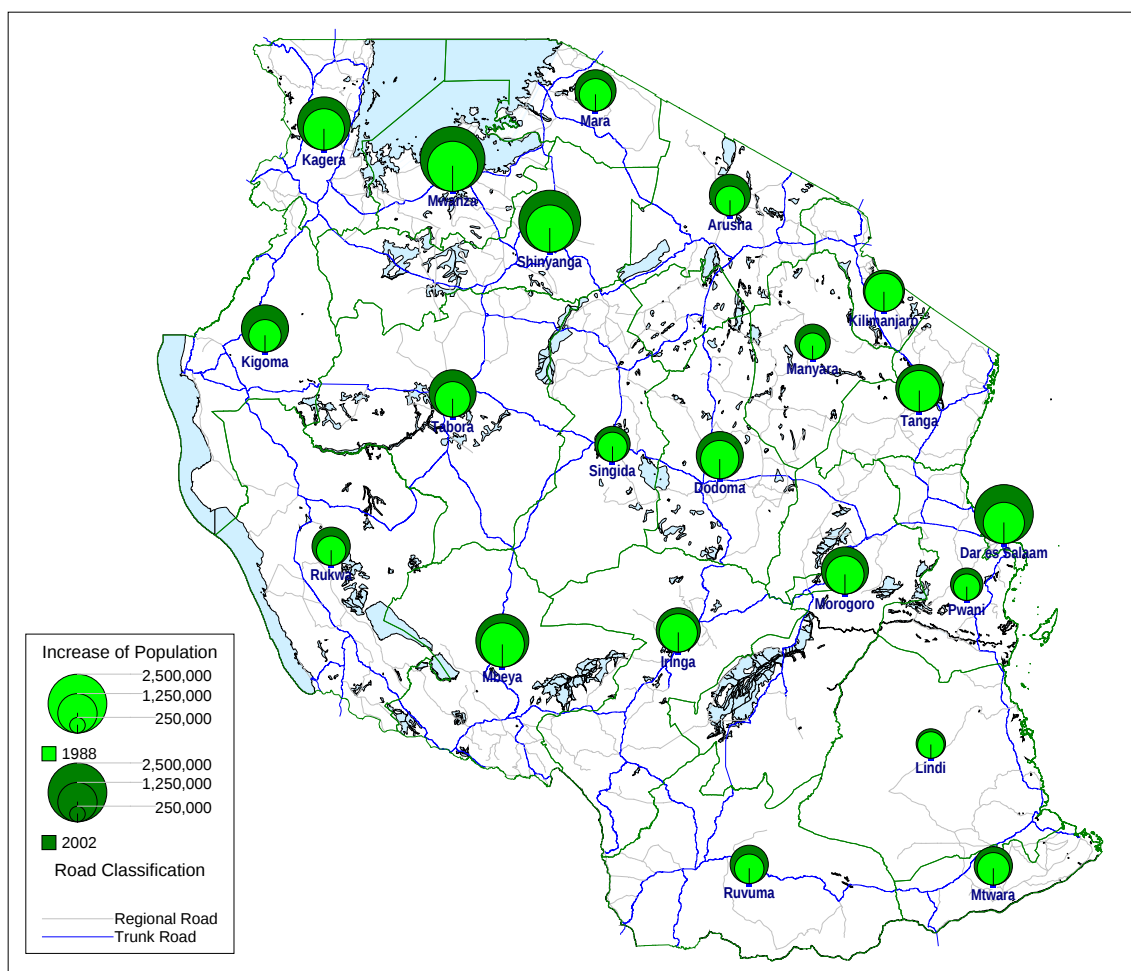
Urbanization has progressed rapidly. The proportion of urban population to total population in urban areas increased from 5.7% to 26.4% from 1967 to 2010. A major feature of this urbanization has been the concentration of people in Dar es Salaam. Table 2.3, Table 2.4 and Figure 2.2 show the population and urban concentration in Dar es Salaam and other major regions. Urbanization will continue and be accompanied by the gradual integration of different zones/regions, with an improved transport network. Also, Table 2.5 presenting the regional distribution of recent private investments clearly shows a heavy concentration of economic activities in Dar es Salaam.

Table 2.3: Census Population

Region	1967	1978	1988	2002
Arusha	610,474	926,223	744,479	1,292,973
Dar es Salaam	356,286	843,090	1,360,850	2,497,940
Dodoma	709,380	972,005	1,235,328	1,698,996
Iringa	689,905	925,044	1,193,074	1,495,333
Kagera	658,712	1,009,767	1,313,594	2,033,888
Kigoma	473,443	648,941	856,770	1,679,109
Kilimanjaro	652,722	902,437	1,104,673	1,381,149
Lindi	419,853	527,624	646,494	791,306
Manyara			603,691	1,040,607
Mara	544,125	723,827	946,418	1,368,602
Mbeya	753,765	1,079,864	1,476,278	2,070,046
Morogoro	682,700	939,264	1,220,564	1,759,809
Mtwara	621,293	771,818	889,100	1,128,523
Mwanza	1,055,883	1,443,379	1,876,635	2,942,148
Pwani	428,041	516,586	636,103	889,154
Rukwa	276,091	451,897	698,718	1,141,743
Ruvuma	395,447	561,575	779,875	1,117,166
Shinyanga	899,468	1,323,535	1,763,800	2,805,580
Singida	457,938	613,949	792,387	1,090,758
Tabora	502,068	817,907	1,036,150	1,717,908
Tanga	771,060	1,037,767	1,280,212	1,642,015
Total	11,958,654	17,036,499	22,455,193	33,584,753

Unit: Person

Source: National Bureau of Statistics



Unit: Person

Source: National Bureau of Statistics

Figure 2.2: Regional Distribution of Population, 2002–2006

Table 2.4: Population of Regional Capital Cities

BUKOB	MWANZA	MUSOMA	ARUSHA	MOSHI	TANGA
Total 59	Total 386	Total 105	Total 334	Total 144	Total 173
Growth 2.03	Growth 2.24	Growth 1.64	Growth 3.24	Growth 1.48	Growth 1.26
KIGOMA	SHINYNGA	SINGIDA	DODOMA	MOROGORO	DAR ES SALAAM
Total 132	Total 78	Total 58	Total 151	Total 209	Total 2304
Growth 1.78	Growth 1.63	Growth 1.45	Growth 1.82	Growth 1.77	Growth 1.91
	TABORA				KIBAHA
	Total 126				Total 41
	Growth 1.35				Growth n/a
SUMBAWANGA	MBEYA	IRINGA	SONGEA	LINDI	MTWARA
Total 75	Total 233	Total 102	Total 99	Total 29	Total 79
Growth 1.56	Growth 1.78	Growth 1.20	Growth 1.87	Growth 0.69	Growth 1.20

Unit: Population in thousand persons and growth in percentage

Source: National Bureau of Statistics

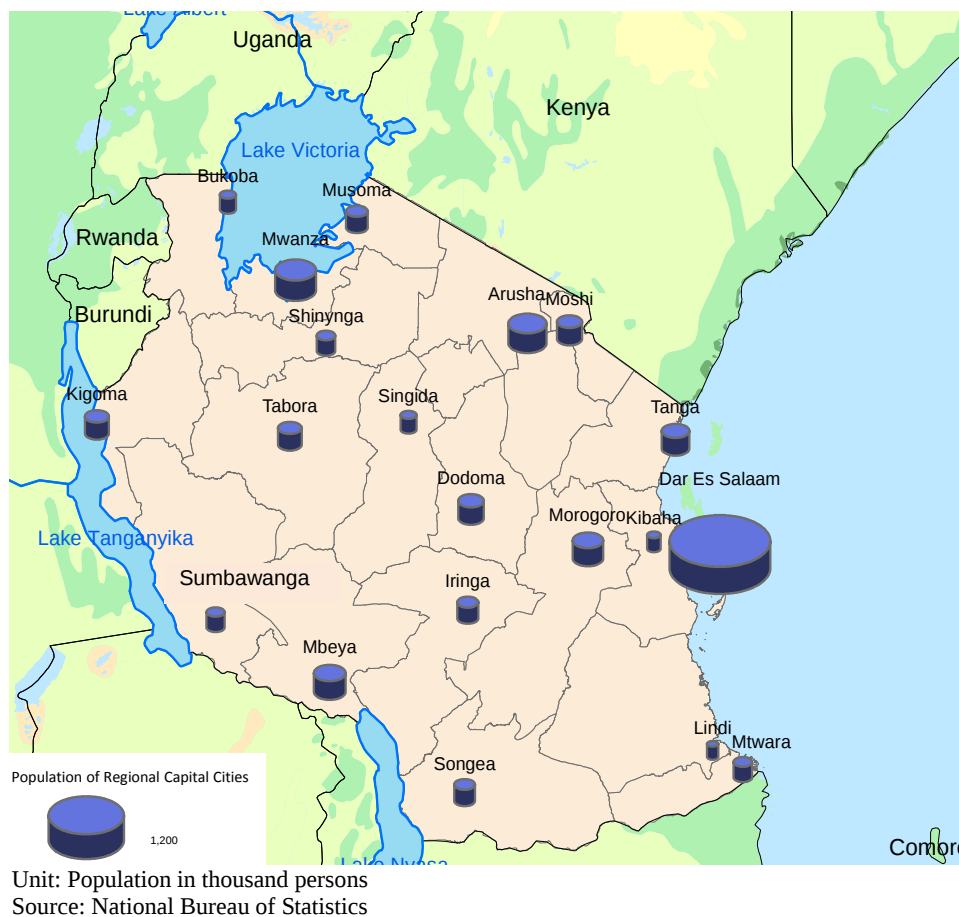
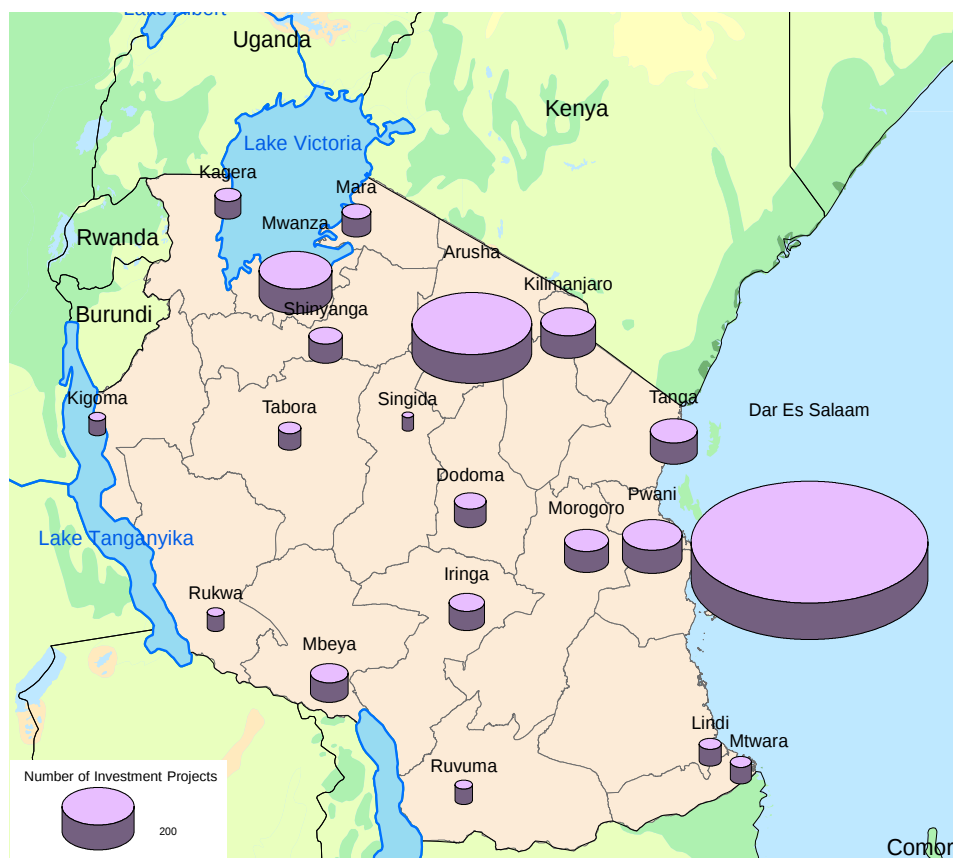


Figure 2.3: Population in Regional Capital Cities

Table 2.5: Number of Investment Projects Registered by the Tanzania Investment Centre

KAGERA 27	MWANZA 210	MARA 33	ARUSHA 569	KLMNJRO 119	TANGA 88
KIGOMA 11	SHINYNGA 44	SINGIDA 5	DODOMA 40	MOROORO 76	DAR ES SALAAM 2,214
	TABORA 20				PWANI 141
RUKWA 11		MBEYA 55	IRINGA 49	RUVUMA 12	LINDI 19
					MTWARA 18

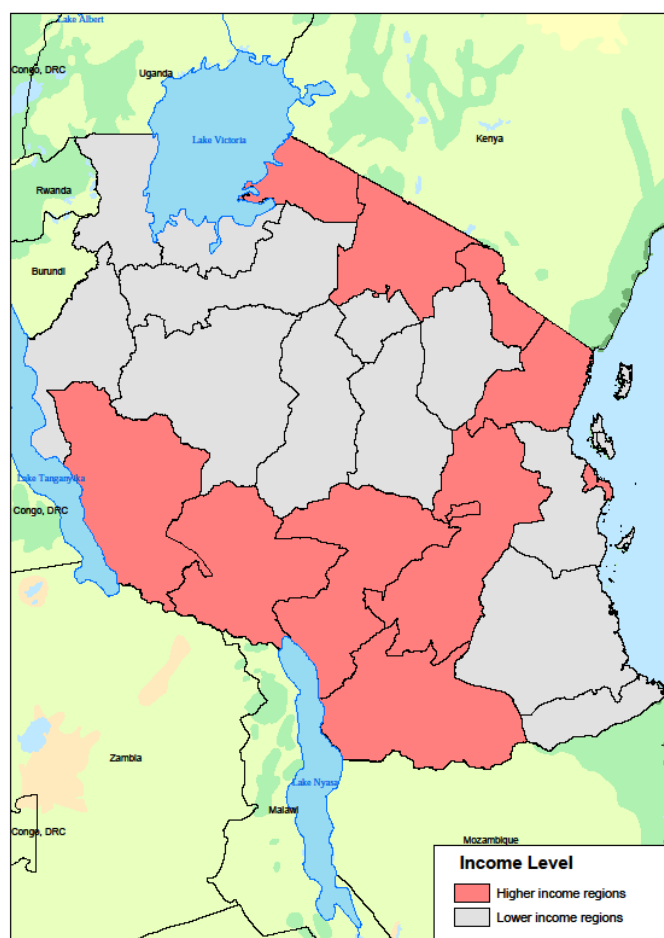
Source: Tanzania Investment Centre



Source: Tanzania Investment Centre

Figure 2.4: Number of Investment Projects Registered by Tanzania Investment Center

Urbanization and the integration of regional economies are likely to lead to greater income disparities between and among regions. Population movement from lower income regions to higher income regions will tend to reduce such income disparities. Figure 2.5 shows that regions along the national borders and coastal lines tend to be higher income, while regions in the inner part of the country tend to be lower income, especially along the Central Corridor. An improved transport network would help reduce these regional disparities.



Note: Income level is higher than the national average in the shaded part.
Source: National Bureau of Statistics, Tanzanian Government

Note: Income level is higher than the national average in the pink areas.
Source: National Bureau of Statistics, Tanzanian Government

Figure 2.5: The Regions with Income Levels Higher than the National Average (2004)

Another geographical feature of the national economy is the difference between the southern part of the country, which is endowed with vast areas with high potential for producing food and cash crops, and the northern part, which has been developed mainly for agriculture and livestock. Table 2.6 shows that the northern part of the country as well as Dar es Salaam and the surrounding area has a food deficit, while the southern part has a food surplus. An improved transport network would encourage the smooth movement of food from the food-surplus regions to the food-deficit regions.

Table 2.6: Food Surplus/Deficit Gap, 2009/2010

KAGERA 171	MWANZA 26	MARA -45	ARUSHA -85	KLMNJRO -79	TANGA 6
KIGOMA 174	SHINYNGA 68	SINGIDA -14	DODOMA -176	MOROGORO 10	DAR ES SALAAM 123
	TABORA 22				PWANI 724
RUKWA 297		MBEYA 226	IRINGA 336	RUVUMA 188	LINDI 7
					MTWARA 118

Note: Figures with minus show deficit

Unit: Kg per person

Source: Ministry of Agriculture, Food Security and Cooperatives

Table 2.7 shows the priority regions for the large-scale plantation of mainly cash crops, as identified by the Ministry of Agriculture, Food Security and Cooperatives. The regions are both in the northern and southern parts of the country, including Kagera, Arusha, Kilimanjaro, Kigoma, Mbeya, and Iringa.

Table 2.7: Priority Regions for Large-Scale Plantation as Identified by the Ministry of Agriculture, Food Security and Cooperatives

	Maize	Rice	Cotton	Sugar	Coffee	Wheat	Tea	Tobacco	Sisal	Pyrethrum	Spices	Fruits/Vegetables	Flower
Production (000t) in 2009	3,444	689	358	290	95	35	30	29	23				
Kagera													
Mwanza													
Mara													
Arusha													
Kilimanjaro													
Tanga													
Shinyanga													
Kigoma													
Tabora													
Singida													
Dodoma													
Morogoro													
Pwani													
Dar es Salaam													
Rukuwa													
Mbeya													
Iringa													
Lindi													
Ruvuma													
Mtwara													

Sources: Ministry of Agriculture, Food Security and Co-operatives (MAFSC), Investment Potential and Opportunities in Agriculture (Crop Sub-sector), January 2009, for priorities; and MAFSC, District Integrated Agricultural Survey, 2002/2003, for production volumes

2.1.2 Surrounding Countries

Tanzania borders on Burundi, DRC, Kenya, Malawi, Mozambique, Rwanda, Uganda, and Zambia. Table 2.8 shows the area, population, and population density of these countries, while Table 2.9 shows the GDP and GDP per capita of these countries.

Table 2.8: Area, Population, and Population Density of Tanzania and Surrounding Countries

Countries	Area (000 km ²)	Population (000 persons)			Population Density (persons/km ²)
		2000	2010	Annual Growth Rate: 2000–2010 (%)	
Tanzania	945	34,038	44,841	2.8	47
Kenya	580	31,254	40,513	2.6	70
Uganda	242	24,213	33,425	3.3	138
Rwanda	26	8,098	10,624	3.3	403
Burundi	28	6,374	8,383	2.8	301
DRC	2,345	49,626	65,966	2.9	28
Zambia	753	10,202	13,089	2.5	17
Malawi	118	11,229	14,901	2.9	126
Mozambique	802	18,201	23,391	2.5	29
Total	5,839	193,235	255,133	2.8	38

Source: Population Division, United Nations Department of Economic and Social Affairs

Table 2.9: GDP and GDP Per Capita (in Nominal Terms)

Unit: USD

	2000 (million)	2009 (million)	Annual Growth Rate: 2000–2009 (%)	GDP per capita
Tanzania	10,186	22,351	9.1	526
Kenya	12,604	29,412	9.9	739
Uganda	6,341	17,110	11.7	523
Rwanda	1,772	5,265	12.9	527
Burundi	955	1,251	3.0	151
DRC	5,265	11,204	8.8	170
Zambia	3,239	12,748	16.4	985
Malawi	2,402	4,860	8.1	318
Mozambique	4,310	9,579	9.3	418
Total	47,074	113,780	10.3	528

Source: UN data, National Accounts Estimates of Main Aggregates

Table 2.10 shows the trade volumes of Tanzania and its surrounding countries. Imports exceed exports in all countries except the DRC and Zambia, which have benefited from an increasing volume of mineral exports (e.g., copper) at rising prices. The largest importer is Kenya followed by Tanzania. Burundi and Rwanda show high rates of increase in imports, presumably due to the economic recovery after civil conflicts.

Table 2.10: Trade Volume of Tanzania and Its Surrounding Countries

Unit: USD thousand

	2005			2010			2005–2010		
	Imports	Exports	Total	Imports	Exports	Total	Imports	Exports	Total
Tanzania	3,247	1,672	4,919	8,013	4,051	12,064	2.47	2.42	2.45
Kenya	5,486	3,502	8,988	12,422	5,361	17,783	2.26	1.53	1.98
Uganda	2,054	654	2,708	4,661	1,619	6,280	2.27	2.48	2.32
Rwanda	412	149	561	1,255	238	1,493	3.05	1.60	2.66
Burundi	258	114	372	833	276	1,109	3.23	2.42	2.98
DRC	1,618	1,509	3,127	3,947	5,310	9,257	2.45	3.52	2.96
Zambia	2,558	1,810	4,368	5,321	7,200	12,521	2.01	3.98	2.89
Malawi	1,165	495	1,660	2,173	1,066	3,239	1.87	2.15	1.95
Mozambique	2,408	1,745	4,153	3,564	2,243	5,807	1.48	1.29	1.40

Source: International Trade Center, International Trade Statistics

As shown in Table 2.11, fuel, vehicles, machinery, electrical products, and plastics are major import items in Tanzania and the neighbouring countries.

Table 2.11: Top Five Import Commodities of Tanzania and Its Surrounding Countries

	First	Second	Third	Fourth	Fifth
Tanzania	Fuels	Vehicles	Machinery	Electrical	Plastics
Kenya	Fuels	Machinery	Electrical	Vehicles	Plastics
Uganda	Fuels	Machinery	Vehicles	Electrical	Iron/Steel
Rwanda	Vehicles	Electrical	Machinery	Medicines	Fuels
Burundi	Vehicles	Electrical	Medicines	Nonmetals	Machinery
DRC	Machinery	Fuels	Vehicles	Electrical	Iron/Steel
Zambia	Machinery	Ores	Fuels	Vehicles	Electrical
Malawi	Fuels	Fertilizers	Machinery	Vehicles	Electrical
Mozambique	Fuels	Unspecified	Vehicles	Machinery	Electrical

Source: International Trade Center, International Trade Statistics

Regarding exports, Tanzania and its neighbouring countries are commonly dependent on a number of primary commodities such as coffee/tea, fish, sugar, copper, and gemstones, as shown in Table 2.12.

Table 2.12: Top Five Export Commodities of Tanzania and Its Neighbouring Countries (2010)

	First	Second	Third	Fourth	Fifth
Tanzania	Gem stones	Ores	Coffee/Tea	Fish	Copper
Kenya	Coffee/Tea	Trees/Flowers	Vegetables	Fuels/Oils	Edible oil
Uganda	Coffee/Tea	Fish	Electrical	Fuels/Oils	Nonmetals
Rwanda	Ores	Coffee/Tea	Vehicles	Machinery	Live animals
Burundi	Coffee/Tea	Gem stones	Leathers	Ores	Fuels/Oils
DRC	Copper	Ores	Fuels/Oils	Basic metals	Chemicals
Zambia	Copper	Ores	Basic metals	Sugar	Tobacco
Malawi	Tobacco	Ores	Coffee/Tea	Sugar	Vegetables
Mozambique	Aluminium	Fuels/Oils	Tobacco	Unspecified	Fish

Source: International Trade Center, International Trade Statistics

Table 2.13 and Table 2.14 show major origins of imports and destinations of exports of Tanzania and its neighbouring countries. Generally, the coastal countries (i.e., Kenya, Mozambique, and Tanzania) import from and export to countries overseas. The landlocked countries (i.e., Burundi, DRC, Malawi, Rwanda, Uganda, and Zambia) import from and export to the coastal countries in addition to the rest of the world.

Table 2.13: Top Five Origins of Imports of Tanzania and Its Surrounding Countries (2010)

	First	Second	Third	Fourth	Fifth
Tanzania	India	China	South Africa	UAE	Japan
Kenya	China	UAE	India	South Africa	Japan
Uganda	India	Kenya	China	UAE	Japan
Rwanda	Uganda	China	Kenya	Tanzania	UAE
Burundi	China	Belgium	Japan	Zambia	Kenya
DRC	South Africa	China	Belgium	Zambia	Nigeria
Zambia	South Africa	DRC	Kuwait	China	India
Malawi	South Africa	China	India	Zambia	UAE
Mozambique	South Africa	Netherlands	India	Portugal	China

Source: International Trade Center, International Trade Statistics

Table 2.14: Top Five Destinations of Exports from Tanzania and Its Surrounding Countries (2010)

	First	Second	Third	Fourth	Fifth
Tanzania	Switzerland	China	South Africa	Kenya	India
Kenya	Uganda	UK	Tanzania	Netherlands	USA
Uganda	Sudan	Kenya	DRC	Rwanda	UAE
Rwanda	Switzerland	Kenya	Belgium	Hong Kong	DRC
Burundi	Switzerland	UK	Belgium	UAE	Kenya
DRC	China	USA	Belgium	Finland	Korea
Zambia	Switzerland	China	South Africa	DRC	UAE
Malawi	Belgium	Canada	Egypt	Germany	USA
Mozambique	Netherlands	South Africa	Portugal	Zimbabwe	Spain

Source: International Trade Center, International Trade Statistics

In 1999, the East African Community (EAC) was established with initial member countries of Kenya, Tanzania, and Uganda. The establishment of the EAC provided a major step for Tanzania to expand its export of agricultural and manufactured products to the EAC member countries.

2.2 Effects of Transport System Development

2.2.1 Economic Development Policies and Directions

Tanzania saw the following major changes in economic development policies since the late 1960s till present.

- Socialistic policies toward self-reliance during the late 1960s to the early 1980s
- Structural adjustment toward market-based economy under a belt-tightening financial policy during the early 1980s to the late 1990s
- Poverty reduction policy with an emphasis on small farmers, primary health, basic education, good governance, and accountability during the late 1990s to the late 2000s
- New Five-Year Development Plan 2011/12–2015/16 with an emphasis on investment and growth from 2010

Policymakers and planners have increasingly been aware of a backlog of major infrastructural investments, including backlogs accumulated in the transport and electric power sectors during the implementation of poverty reduction strategies. The New FYDP allocates a substantial part of financial resources to infrastructure investments. In geographical terms, it focuses not only on rural areas but also on urban areas, including Dar es Salaam.

The main objectives of the New FYDP are to improve physical infrastructural networks and human capital in order to accelerate investment for transformation of the country's production and trade supply structures (agriculture, manufacturing, and services), and foster Tanzania's international competitiveness.

The New FYDP distinguishes itself from the past policy initiatives in four major areas:

- i. A shift from needs-based planning, which is based on available resources, to embrace opportunity-based planning, which requires thinking beyond the resource constraints;
- ii. Strong emphasis on implementation effectiveness,
- iii. Strong emphasis on growth, while “grandfathering” gains in social service delivery, and at the same time gradually focusing on human resources in terms of skills development; and
- iv. Increasing the role and participation of the private sector in economic growth.

In view of the overall goals, the specific objectives, and the national development initiatives as well as the macroeconomic target, the New FYDP sets goals and targets as set out in Table 2.15. To achieve the targets in Table 2.15, the New FYDP identifies projects to be implemented during the planning period. Table 2.16 shows location-specific projects in the New FYDP.

Table 2.15: Goals and Targets for Macro-economy and Productive Sectors under the New FYDP

Target Area	Goal	Annual Growth Target by 2015/16
Macro economy	Sustain high economic growth	8%; an increase up from 7% in 2010 to 10% in 2025
Agriculture	Modernization, commercialization, and productivity enhancement.	Agriculture at least 5.6 % Fishery 7.0% Forestry 5.9% Livestock 5.0%
Manufacturing	Transformation of production and export structure commensurate with domestic, regional, and global markets.	11%
Mining	Enhance the contribution of the mining sector to the economy	5%

**Table 2.16: Location-Specific Projects in the New FYDP 2011/12–2015/16 (1)
(Excludes Road Projects and Interregional Projects)**

KAGERA Airport	MWANZA Agro-industry Gold mining Gold refining Airport Thermal power	MARA Gold mining	ARUSHA Livestock Lapidary	KLMNJRO Livestock	TANGA Forestry Building material Deep berth. Pipeline to Mombasa
KICOMA Airport	SHINYNGA Livestock Forestry	SINGIDA Livestock	DODOMA Livestock Drilling rigs Dam	MOROGORO Forestry Forestry Water for Dar es Salaam	DAR ES SALAAM Forestry Mining Corporation HRD Lapidary Real estate Water supply Housing Commuter rails Dredging Air terminal Thermal power Compressed natural gas station
	TABORA Airport				PWANI Forestry Freight Station Airport Pipeline
RUKWA		MBEYA Forestry Coal and power Airport Thermal power	IRINGA Forestry Iron/Steel Dam Dam Thermal power	RUVUMA Hydropower	LINDI Forestry Thermal power
					MTWARA Forestry Petrochemicals Building materials Port Thermal power Offshore gas Pipeline to Dar es Salaam

Note: Prepared by the study team based on the New FYDP, Planning Commission

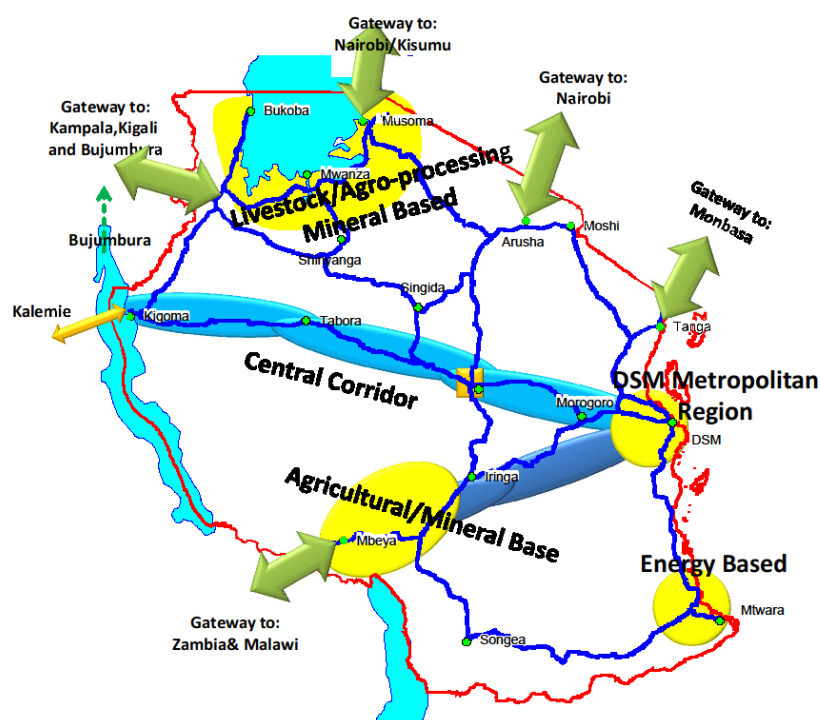
**Table 2.17: Location-Specific Projects in the New FYDP 2011/12–2015/16 (2)
Inter-Regional Projects (Excluding Road Projects)**

LAKE/NORTHERN ZONES
Isaka (Shinyanga) – Kigali (Rwanda) railway line Arusha – Musoma (Mara) railway line Kahama (Shinyanga) – Geita (Mwanza) – Nyakanazy transmission line Kigoma grid Ubungu (Dar es Salaam) – Mikocheni (Tanga) pipeline
CENTRAL CORRIDOR
Rehabilitation/Upgrading of central railway line SPM pipeline and farm tanks Silos for grains/fertilizers/cement
SOUTHERN HIGHLANDS/ZONE
Improvement of TAZARA line Mtwara – Songea (Ruvuma) – Liganga (Iringa) railway line
SUB-NATIONAL
Morogoro – Tanga – Moshi – Arusha – Singida – Mtwara transmission line

Note: Prepared by the study team based on the New FYDP, Planning Commission

Based on the tables presenting location specific-projects under the New FYDP, an illustrative map (Figure 2.6) has been prepared to show the spatial implications of the FYDP strategies. Implications include the following:

- 1) Dar es Salaam will be an increasingly important hub and gateway for the national economy as well as the economies of the neighbouring landlocked countries. Dar es Salaam together with the surrounding regions will form a metropolitan region, with new infrastructure investments including a major port, trunk roads, and special economic zones.
- 2) Intensive investment will be made for resource-based development in the following specific regions:
 - Agricultural and mineral based development in Southern Highlands;
 - Livestock-/Agro-processing-/Mineral-based development in the Great Lake Regions; and
 - Mineral and energy-based development in the Mtwara Region.
- 3) Two major corridors (the Southern and Central Corridors) will link the Dar es Salaam Metropolitan Region with other regions and with the lesser-developed parts of the country. These corridors are not only to provide international access for landlocked countries, but also to serve as centres for processing and distribution to link markets in different parts of the country.
- 4) With reduced barriers to cross-border transactions, economic interactions will intensify between regions/cities in Tanzania and regions/cities in neighbouring countries, such as:
 - Mbeya and eastern Zambia as well as northern Malawi;
 - Kigoma and Bujumbura;
 - Mwanza and Kigali as well as Kampala and Kisumu;
 - Arusha and Nairobi; and
 - Tanga and Mombasa.



Source: Prepared by the study team based on the New FYDP, Planning Commission

Figure 2.6: Areas of Intensive Project Development in the New FYDP (2011/12–2015/16)

The New FYDP estimates the financial requirements in priority areas as shown in Table 2.18.

Table 2.18: Financial Requirements in Priority Areas, 2011/2012–2015/2016

	Amount in TZS billion	Proportion in percentage
Agriculture	3,806	10.1
Manufacturing	1,496	4.0
Mining	1,199	3.2
Transport	10,077	26.6
Roads	6,236	
Railway	2,097	
Marine	716	
Airways	1,027	
Water	1,765	4.7
Land	87	0.2
Energy	14,477	38.3
Information and Communications		
Technology	1,507	4.0
Education	579	1.5
Health	1,584	4.2
Governance	1,155	3.1
Total	37,842	100.0

Source: President's Office, Planning Commission
Tanzania Five-Year Development Plan, 2011/12–2015/16

2.2.2 Economic Development and Transport Sector

Though being ambitious, the New FYDP is consistent with a series of transitions in the development policies during the past five decades. It aims at fully utilizing the potential resources of the country with an increased emphasis on the investments in infrastructure and human capital. It also gives a greater emphasis on urbanization and urban development than before. However, the aims of the New FYDP cannot fully be attained within its planning period. This plan is a first step of the continuous efforts to realize Vision 2025, which specifies a goal that Tanzania would become a middle income country with a per capita income of USD 3,000 by 2025.

These efforts depend largely on the transport sector. Firstly, the transport facilities need to substantially increase their capacity to move cargoes, as the volume of cargo movement tends to increase faster than the national economy at the early stage of economic growth. Secondly, the transport sector is expected to play a leading role in regional development. Of particular importance is the integration of regional economies and the domestic market, the development of a Dar es Salaam Metropolitan Region and the development of the border regions and cities through intensified cross-border transport. Thirdly, the efficiency of the national economic activities will largely be improved through a more streamlined and transparent management of cargo flows, such as international trade facilitation, the debottlenecking of inter-modal connections and transshipment points, safety management and the technical and managerial support of the small-scale transporters.

When the national economy was based on the supply of raw materials, the transport system was expected to carry as much cargoes as possible at the lowest possible cost. However, the carrying of cargoes is increasingly expected to be done safely, quickly, steadily and on time, even at a higher cost, in response to diversified needs of the domestic market and prevalence of international standards. Accordingly, operation and maintenance will increasingly become important relative to the investment itself.

2.3 A Possible Development Scenario

2.3.1 Economic Perspective

Domestic resources and the domestic market provide the major base of the Tanzanian economy. Domestic resources are available in wide-ranging sectors, including agriculture, livestock, fishery, mining and tourism. Some of the resources are internationally competitive. Such resources include coffee, tea, gold and tourism. However, their contribution to the national economy has been subject to the fluctuating international market.

The domestic market is sizable in terms of population size, but has not fully been integrated. The total national population will increase from 44,841,000 to 81,852,000 during the period from 2010 to 2030, according to the latest UN population projection. Population is, however, distributed in a scattered pattern in this country, compared with other African countries. The proportion of the urban population is 26% in Tanzania compared to the 40% average for African countries. The proportion of the cities with more than one million persons is 7% in Tanzania compared to the average for African countries, which is 13%.

With an improved system of domestic transport and logistics, the domestic market would increasingly be integrated and thus, gradually shift a major source of national economic growth to the domestic market which is more stable than the export market which is subject to international price fluctuation and severe competition. The domestic market integration in Tanzania is likely to be followed by more intensive trade between Tanzania and surrounding

countries, because the domestic market integration will similarly take place in surrounding countries such as Kenya and Mozambique.

In the meantime, the abundance of low cost labor led to accelerate economic growth through the process of export-oriented industrialization in a number of Asian countries. However Tanzania will grow based on an integration of regional markets together with the export of diversified agricultural and natural resources. The national economy will be led by a balanced mix of agriculture, mining, tourism, manufacturing and the service sector, including transport, trade, communication and construction. To this end, Tanzania and the Dar es Salaam Metropolitan Region, in particular, will potentially be a major center of international trade on the eastern seaboard of Africa.

In the agricultural sector, an increasing level of income and food intake especially in the urban areas, including Dar es Salaam is stimulating agricultural diversification in the advanced agricultural and livestock areas such as Arusha, Kilimanjaro and Mwanza. In the meantime, Southern Agricultural Corridor Development (SAGCOT) is launched in the southeastern part of the country, including Mbeya and Iringa. It is a long term agricultural development under the joint initiative of the Tanzanian government and international agro-businesses to supply food products to Dar es Salaam and other major food consumption centers within the country as well as to the neighboring countries and overseas. These agricultural developments in both northern and southern highlands will stimulate agro-based industries such as processing, fertilizer, agricultural machines, vehicles and repairs. Diversification of agricultural products and areas in this manner will encourage transport and logistics businesses to grow in major cities. The domestic network of transport and trade will then improve, thus increasing the resilience of traditional agricultural exports such as coffee, tea, leather and cotton in the international market.

In the mining sector, major products are conventionally gold in value and copper in quantity. Gold is a largest export commodity of Tanzania. It will keep supporting the national foreign exchange earning capacity, since the reserve, mainly in Mwanza and Mara, is fifth largest in the world after South Africa, Australia, USA and Ghana. A major potential mining product is natural gas. According to experts of British Gas International, the total volume of the confirmed reserve is increasing from time to time and will reach about 60 trillion cubic feet in the next five years. They are mostly found in the Mtwara region. The gas will mostly be exported in the form of LNG and contribute to the country's foreign exchange earnings, while a part of it may be used for downstream industries including fertilizer, in the country in the long term. Another major mining product with potential is nickel on the west of Victoria Lake. This has an estimated reserve of 25 million tons, which is one of the world's largest. It would also be an addition to the national export, when the world nickel demand justifies private investments in the mining and necessary infrastructures. In addition, there is a coal deposit of 45 million tons in Iringa. The coal will be used for thermal power generation within the nearest possible location as an important input to energy development, which will continue to be as important as transport development for the national economy in the coming decades. Many parts of Tanzania are endowed with iron ore deposits, though commercial feasibility of them is yet to be known.

In the manufacturing sector, a promising industry will be agro-based, including processing, fertilizer, agricultural machines, vehicles and repairs. Another promising industry is the production of construction materials such as cement, glass and iron bars. The domestic market integration will stimulate investments and in turn, the construction industry. Construction is already booming in Dar es Salaam under continued national economic growth. Construction materials are mostly heavy and bulky, so that domestic products are relatively competitive against those that are imported. In addition, one can expect the growth of manufacturing and export of products for the daily use in surrounding countries, especially Burundi, DRC and

Malawi. Tanzania has technical advantage over these countries in producing these articles. This also needs the improvement of transport network across Tanzania and surrounding countries.

In the service sector, commerce, the construction industry, transport business, communications, real estate and financial business will grow in an accelerated manner in response to domestic market integration, urbanization and increase in people's income. These service activities will grow first in Dar es Salaam and later in other cities all over the country. As Dar es Salaam will become more crowded, it will be necessary to expand the urban space of Dar es Salaam to form a metropolitan region. A new international port proposed at Bagamoyo would be an important magnet to form such a metropolitan region. Tourism is another important element of the service sector. Its contribution to the foreign exchange earnings is equivalent to about one-third of the total value of exports. World famous tourism spots, including Kilimanjaro, Serengeti National Park, Ngorongoro Reserve and Zanzibar, will not only continue to attract tourists from European countries but also from emerging countries such as South Africa, India and Middle Eastern countries.

2.3.2 Possible Economic Growth

Based on the economic analyses above, an attempt has been made to set a realistic estimate for the possible rate of national economic growth toward the year 2030. There have been a number of projections of national economic growth. The New FYDP sets a target rate at 8 % on average during the period from 2011/12 to 2015/16, and 10% in the year 2025. The growth rate is projected at 5% to 8% during the period from 2008 to 2018 by the East African Transport Strategy and Regional Road Sector Development Program, Final Report Part I: Study Context and Framework prepared by Africon Ltd. for EAC Secretariat in July 2011. In the Study on Program for Infrastructure Development in Africa: Africa Macroeconomic Outlook 2040, prepared by SOFRECO for AfDB in July 2011, the projected average is 7.3% during the period from 2005 to 2040.

In view of these existing projections, this study sets **the target growth rate at 8 %** on average during the period from 2010 to 2030. It is set on the assumption that the growth rate targeted by the New FYDP will be maintained under succeeding FYDPs until the year 2030. It is slightly lower than the rate assumed by the New FYDP for the year 2025 and is the same as the estimated rate under a positive scenario assumed by the EAC Transport Study. If the New FYDP and succeeding FYDP are not implemented, the current growth would lose its speed and the growth rate would be much lower. Under such case, this study sets **a conservative growth rate at 5%** on average during the period from 2010 to 2030, as a reference for additional comparison purposes. This rate is the same as the one assumed under the conservative scenario by the EAC Transport Study

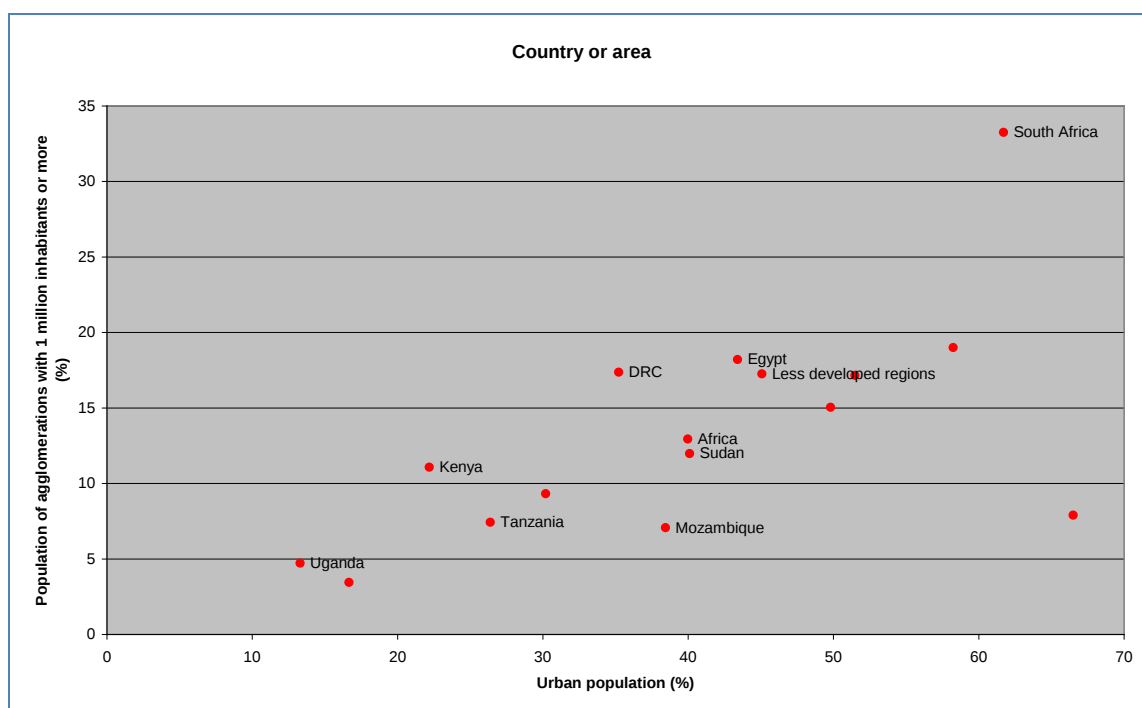
The target growth implies changes in the spatial structure of the country. Major changes would include:

- Accelerated urbanization, especially in Dar es Salaam and major regional cities
- Emergence of economic corridors along major trunk roads, especially from Dar es Salaam to Mbeya/Iringa, Victoria lake basin, Arusha and Kigoma
- Growth of border cities and their respective cross-border hinterlands such as: Mbeya, southern highlands, border regions of Malawi, Zambia and DRC, Mwanza and Victoria Lake basin, including Kampala, Arusha and Nairobi, and Kigoma, Burundi and a part of Rwanda

- Regional economic boom led by mineral resource development, possibly in Mtwara, Iringa and Mwanza.

An attempt has been made to determine possible outcomes of these developments over the changes in regional distribution of GDP, using the level of urbanization as a key indicator. “Chapter 3: Transport Network and Demand, Current and Future” in this report describes the process and the result of the estimated regional distribution of GDP, based on the following analysis of urbanization.

Level of urbanization in Tanzania is quite low compared to many African countries. As Figure 2.7 shows, the urban population represents 26% of the total population in Tanzania, while the proportion is 40% on average in Africa. The population of Dar es Salaam represents 7% of the total population, while the cities with over one million people represent 13% of the total population in Africa. A slow urbanization has been possible because of the large capacity of rural areas to absorb population in Tanzania. In addition, the limited integration of commodity exports with the domestic economy has discouraged major urban centers to attract investments and trade activities. As many countries experience, however, Tanzania will unavoidably experience an accelerated urbanization as the national economy will expand at a high rate and the domestic market will increasingly be integrated.

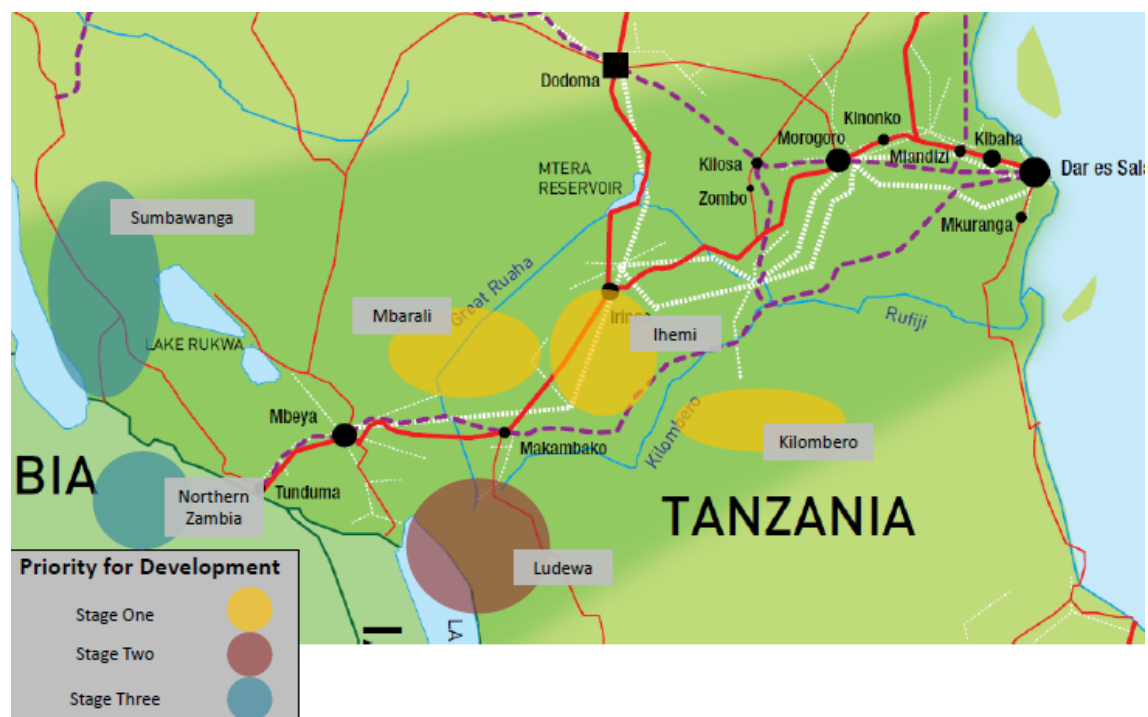


Source: UNDESA, Population Division, Urban Population, Development and Environment, 2011

**Figure 2.7: Level of Urbanization and Urban Concentration
in African Countries with More Than 20 Million Persons, 2010**

Another important aspect in the possible changes in the national spatial structure is a policy to accelerate the expansion of agricultural lands in selected potential areas. Figure 2.6 shows a government policy toward that direction. Among others, Southern Agricultural Growth Corridor of Tanzania (SAGCOT) is a major project (See Figure 2.8). It is a long-term project to convert vast unused cultivable lands into farmlands and plantations, produce and process agricultural and livestock products for consumption in major cities, including Dar es Salaam, food deficit areas in the country as well as for export. The project will cover areas along Dar es Salaam

Corridor between Dar es Salaam and Mbeya, particularly the highlands of the Mbeya region. The highlands are not only suitable for producing food and other various crops, but also easily accessible to Dar es Salaam and the overseas market through the Dar es Salaam Corridor and to surrounding countries, including DRC, Malawi and Zambia. SAGCOT is being initiated and promoted through a public and private partnership, involving major international agro-business enterprises.



Source: SAGCOT Secretariat, Field Trip Summary and Outline Cluster Proposal: Discussion Draft. September 2020

**Figure 2.8: Initial Proposed Cluster Sites
under Southern Agriculture Growth Corridor of Tanzania (SAGCOT)**

The third factor to affect the national spatial structure is intensive investments in energy and mineral resources, the natural gas production in Mtwara in particular. It will encourage Mtwara to become an energy logistics base and to be linked closely with the Dar es Salaam metropolitan region as the consumption center of the gas, provider of equipment, materials and spare parts for the gas production in Mtwara, and the center for possible downstream activities. Liquid natural gas production might be a possibility at Mtwara. However, this would require a considerable gestation period under the foreseeable circumstances regarding physical and technical conditions on the Tanzanian part and the fast changing world market for natural gas and other fuels.

Chapter 3 Port Sector

3.1 Seaports and Maritime Transport (including Port Related ICDs)

3.1.1 General

Tanzania has a population of about 40 million and is located on the east coast of Africa bordered by Kenya and Uganda to the north, Rwanda, Burundi, and the Democratic Republic of Congo (DRC) to the west, and Zambia, Malawi, and Mozambique to the south. It serves as a gateway to landlocked countries including Burundi, the DRC, Malawi, Rwanda, Uganda, and Zambia.

Tanzania has three major seaports: Dar es Salaam, Tanga, and Mtwara. There are also several minor ports along the Tanzanian coast. All such seaports are operated by the Tanzania Ports Authority (TPA).

TPA was established by the Ports Act No. 17 of 2004 as a landlord port authority. It operates a system of ports, serving the Tanzanian hinterland and the neighbouring landlocked countries. It currently performs the role of both a landlord and operator with its main functions including promoting the use of the ports, improving and developing the ports and their hinterlands, and entering into contracts for the purpose of delegating powers (e.g., through licensing and conceding port services).

3.1.2 Maritime Transport

The maritime transport network in Africa can be divided into three regions: Eastern Africa, Western Africa, and Southern Africa.

In Eastern Africa, there are a few suitable sites for great ports. There is no big river and connecting alluvial, and the mountains near the sea are steep. Along the East African coast, Mombasa in Kenya and Dar es Salaam in Tanzania have excellent sites for ports, protected from the swell and the wind, with natural breakwaters. They function as valuable gateways toward the Indian Ocean for many Central African countries.

Most of the liner service routes to these two ports are shuttle services from the Middle East, the Mediterranean, and India/Asia except for a few lines calling at Maputo. Cargo for South Africa accounts for more than half of all African cargo. Maputo is part of the Southern Africa traffic network together with Durban as it is situated in the South African economic zone.

Mombasa and Dar es Salaam are the largest ports in East Africa in terms of container throughput. However, the water depth in Dar es Salaam port is shallow for large ships such as 11.5 m vessels, and the maximum capacity of container ships that can enter the port is about 1,500 TEU. Some ships occasionally adjust their draft with cargo weight and/or water ballasting. It is difficult to expand the Dar es Salaam port area to substantially increase cargo capacity since it is surrounded by the commercial area in the capital of the country.

Table 3.1 presents container cargo throughput for major seaports on the East African coast from 2005 to 2008. The data on Dar es Salaam Port suggests that it is close to its capacity.

Table 3.1: Container Throughput in Eastern and Southern African Ports

Unit: TEUs

Port	Country	2005	2006	2007	2008
Durban	South Africa	1,712,591	2,334,999	2,511,704	2,560,366
Cape Town	South Africa	736,943	764,753	759,481	774,238
Port Elizabeth	South Africa	370,849	407,278	415,879	398,638
Mombasa	Kenya	436,671	479,355	585,367	615,733
Dar es Salaam	Tanzania	305,866	301,569	334,126	344,587

Source: Containerization International Yearbook, 2010

The reason why the difference in container throughput between Mombasa and Dar es Salaam is becoming larger is that the cargo of the landlocked countries is passing through the Kenyan corridor since cargo in Mombasa seems to be handled more efficiently. According to the 2010 edition of the Containerization Yearbook, a total of 13 container shipping lines have direct call services to Mombasa, while 6 lines offer such services at Dar es Salaam. Thus, some lines call at Mombasa only.

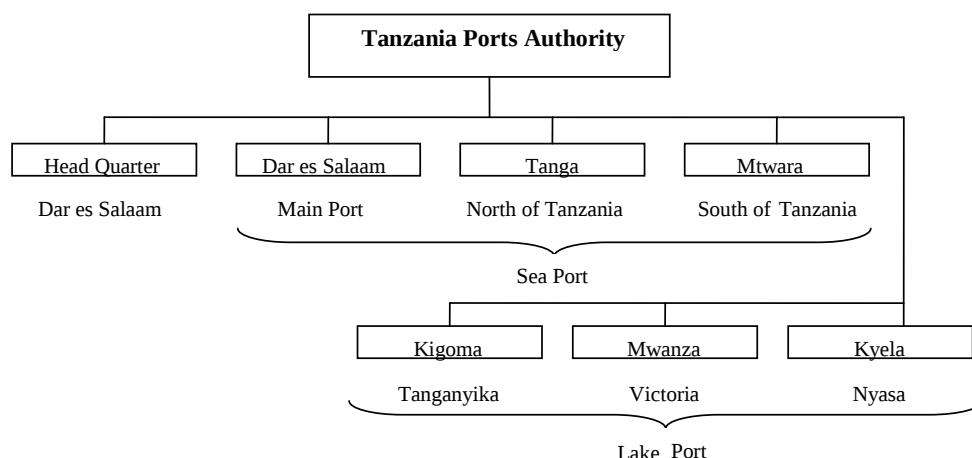
3.1.3 Management and Operation of Seaports

TPA's ports function is a mix between that of a public service port and a landlord port. While most ports (terminals) are operated by TPA, some terminals are operated by private parties (e.g., Tanzania International Container Terminal Services, TICTS). However, investment in port infrastructure by the private sector is very low. Under the Port Act of 2004, TPA was formed as a landlord port authority, implying that port operations are to be handed over to private terminal operators.

To achieve this objective, TPA would have to gradually step back its role as supervising authority and let go of operational control. Physically, terminals should then have dedicated facilities and should each be fenced and have its own access gates. All security should be in place under the International Ship and Port Security (ISPS) Code, under the responsibility of the private operator. Ownership of equipment and facilities and employment of operational staff for terminals would need to be transferred from TPA to private terminal operators under a concession agreement. A further shift is required for TPA to let go of (operational) control, in the confidence that the market forces of free competition and return on investment will drive efficiency improvements and cargo growth in the port.

TPA should therefore further focus on this shift towards the landlord port concept in order to increase efficiency, attract private capital, and increase its market share. The first step would be to give concessions to private operators for all newly developed terminals (such as planned Berths 13/14 in Dar es Salaam). The next step would be to segregate operations in the existing port areas and give terminal operation concessions to one or more private entities.

The organization of TPA is shown in Figure 3.1.



Note: Zanzibar Port no under TPA

Source: Tanzania Ports Authority

Figure 3.1: Organization of the Tanzania Ports Authority

3.1.4 Dar es Salaam Port

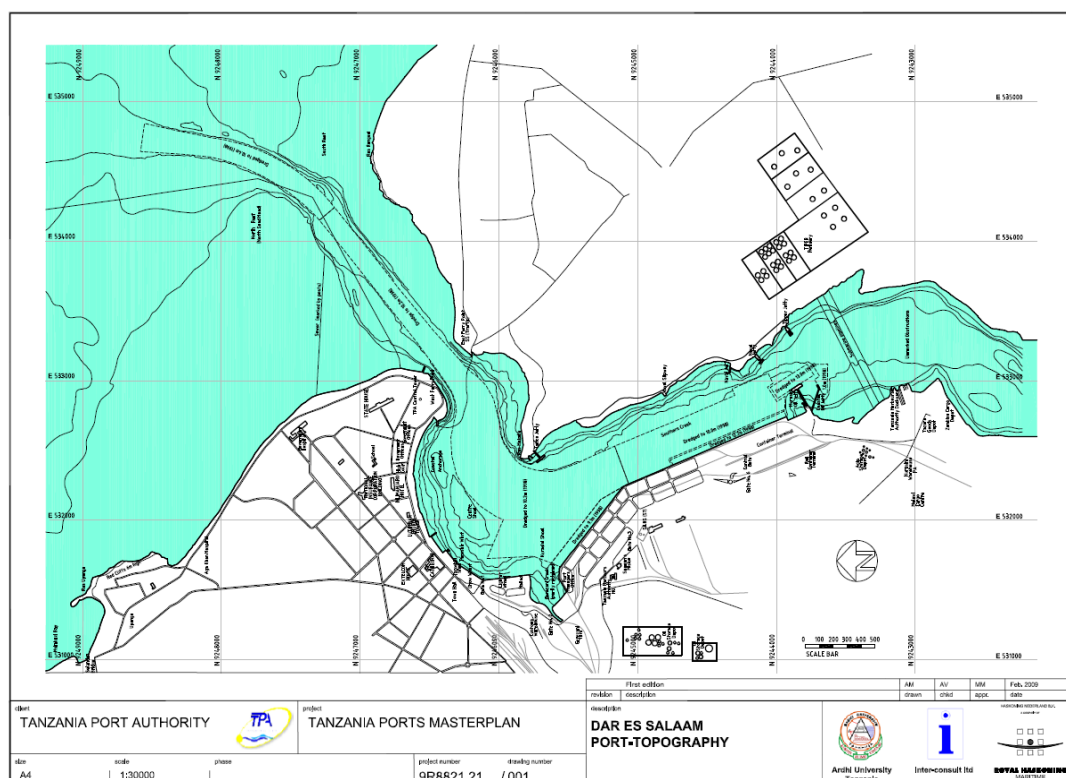
(1) General

Dar es Salaam Port, the largest seaport in Tanzania, is located at latitude south? 6.5 and longitude 39.17 east. Eleven berths and a number of jetties are operated by TPA except for Berths 8 – 11 which are operated by TICTS. It functions as the country's principal port with an annual cargo throughput of about nine million tonnes¹, corresponding to 89% of Tanzania's port traffic in 2010.

Dar es Salaam Port is strategically located to serve not only East and Central African countries but also the Middle East, the Far East, Europe, Australia, and North America. The major landlocked countries served by Dar es Salaam Port include Burundi, the DRC, Malawi, Rwanda, and Uganda. These countries are connected to the port through two railway systems (Tanzania Railway Limited or TRL – 1.0 metre gauge and the Tanzania Zambia Railway or TAZARA – 1.067 metres gauge), the road network, and the Tanzania Zambia Mafuta Pipeline (TAZAMA) pipeline.

As shown in Figure 3.2, Dar es Salaam Port is well sheltered from ocean waves. Some waves from the northeast may enter the port, but they do not hinder shipping or cargo handling operations. The entrance to Dar es Salaam Port from the sea is through a 2.8 km long, 140 m wide access channel, which was straightened, widened, and deepened in 1998. For larger vessels (with a depth of more than 9.4 m or longer than 200 m), navigation is possible during high tides. Pilotage is compulsory for all foreign flag vessels. The present depths of the access channel are reported to be about 9.5 m channel depth (CD).

¹ In 2012, the port handled more than 12 million tonnes including transshipment cargo.



Source: Ports Master Plan

Figure 3.2: Dar es Salaam Port Layout

The entry to Dar es Salaam Port is restricted to vessels with a maximum length of 234 m. The only exception is crude oil tankers calling at the Single Point Mooring (SPM) at Mbawmaji Harbour since they do not use the access channel. All larger vessels require tug assistance for port entry and departure. Two tugs are used for vessels longer than 175 m and for all Kurasini Oil Jetty (KOJ) product tankers for safety reasons. The channel is a typical one-way channel for larger vessels.

(2) Port Infrastructure and Operation

1) Berths 1–11

Dar es Salaam Port has a total of 11 berths as general cargo and container berths and two dolphin type jetties and an SPM for handling crude oil. TPA uses Berths 1–7 for handling of break-bulk, containers, RoRo, and dry bulk cargo, while TICTS, a subsidiary of Hutchison Ports Holdings, uses Berths 8–11 for container handling. Berths 1–4 form a continuous quay with a total length of 740 m. Berths 5–11 as well form a continuous quay with a total length of 1,275 m (555 m TPA and 720 m TICTS). For the handling of liquid bulk products, KOJ 1 and KOJ 2 are located south of Berth 11. There are some ferry terminals, used for passenger ferries to Zanzibar and other destinations. The dimensions of each berth are summarised in Table 3.2.

Table 3.2: Berth Dimensions

No.	Operation	Length	Depth (m)	Major Cargo
1	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
2	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
3	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
4	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
5	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
6	TPA	185	-9	Break bulk, containers, Ro-Ro, dry bulk
7	TPA	185	-12	Break bulk, containers, Ro-Ro, dry bulk
8	TICTS	170	-12	Containers
9	TICTS	183	-12	Containers
10	TICTS	183	-12	Containers
11	TICTS	183	-12	Containers
KOJ-1	TPA	200	-13	Oil products
KOJ-2	TPA	170	-7	Oil products
SPM	TPA	Pipeline	Offshore	Crude oil
Lighter	TPA, Private		-3	Passengers, small coastal cargoes

Source: JICA Study Team based on information provided by the Tanzania Ports Authority

(a) Container Terminal (Berths 8–11)

The Container Terminal comprises four Berths (No. 8 to 11) with a total quay length of 719 m. It has a paved area with modified railway tracks (TAZARA and TRL). Cargo handling equipment includes ship-to-shore (STS) gantry cranes, rubber-tyred gantry cranes (RTGs), rail-mounted gantry cranes servicing two railway lines, and mobile harbour cranes.

At the TICTS Terminal, container vessels are loaded/unloaded by three STS gantry cranes that can operate at Berths 9–11 (total length some 550 m). In addition, TICTS has two modern mobile harbour cranes (MHCs) to expand the quayside handling capacity for containers.² TPA started container operations in 2007, when it became obvious that additional container handling capacity was needed. At that time container volumes drastically exceeded the forecasts on which the TICTS lease agreement was based.

(b) General Cargo Terminal (Berths 1–7)

The repaved General Cargo Terminal has eight berths to cater for dry, break-bulk, and containerised cargo. There are eight sheds behind the existing berths with a total floor area of 81,040 m². The terminal has an annual capacity of 2.5 million tonnes, with handling equipment of 28 portal cranes (5–7 tonne capacity), 27 yard cranes (3–5 tonne capacity), 119 forklift trucks (2.5–3.5 tonne capacity), 44 tractors, and 86 trailers.³

TPA now uses Berths 5–7 for mixed general cargo and container handling with new Gottwald harbour cranes. Cars are imported by car carriers, which are generally handled at all quays since they use their own stern ramp.

Photographs of Dar es Salaam port follow.

² After two STS gantry cranes (SSGC) are delivered by the 4th quarter of 2014. TICTS will reportedly have a total of seven SSGCs and 15 RTGCs in 2014.

³ In March 2013, INROS LACKNER AG submitted the final report titled “Modernizing Berths 1 – 7.” The report proposed the development of Berths 1 – 7 from the north, as Break bulk Terminal (1 berth), Fertilizer/Cement Terminal (1 berth), Grain Terminal (1 berth) and Container Terminal (2 berths). It also proposed a RoRo Terminal be constructed at the north of Berth 1. Based on the proposal, TPA called for an EOI in April 2013 for “Strengthening and Deepening of Berth 1-7 and Construction of RoRo Berth” on EPC contract basis.



Photo 3.1:
Container Handling by TPA



Photo 3.2:
Mobile Harbour Cranes



Photo 3.3:
Dry Bulk Cargo Handling by TPA



Photo 3.4:
Car Carrier Ship

(c) Grain Terminal

The grain terminal was built in 1989 and commissioned in 1990 as an import and export facility for grains such as maize, wheat, and sorghum.⁴ The grain terminal has the following facilities:

- weighbridges of 40 metric tonnes;
- 2 dump pits with 2 intake lines of 125 tonnes/hr each;
- storage bins with a 30,000 metric tonne capacity;
- 3 outtake lines to bagging stations with capacity of 125 tonnes/hr each;
- 2 recirculation lines with a capacity of 125 tonnes/hr;
- 16 direct truck loading spouts;
- a bagging station with three bagging lines each with capacity of 30 tonnes/hr;
- one truck loading spout at each bagging station; and
- a bag warehouse with a capacity of 1,500 tonnes.

(d) Container Yard

TICTS has an 18.75 ha container stacking area paved with concrete block and designed to hold 11,500 TEUs stacked three high for an annual capacity of 400,000 TEUs. The blocks are served by 14 RTGs. There are 92 reefer plug points for refrigerated containers.

⁴ In April 2013, TPA called for an EOI for “Installation of Conveyor Belts for bulk cargo handling” on EPC contract basis.

TPA has demolished some of the warehouses at its Cargo Terminal in order to secure a yard for container stacking to cope with the increasing number of containers handled at Berths 1–8. In the container yard, forklift trucks or reach stackers are used, which reduces the stacking capacity significantly compared to the use of RTGs.

2) Kurasini Oil Jetty

The KOJ handles refined products and comprises a jetty for deep-sea vessels (KOJ-1) and other coastal vessels (KOJ-2). KOJ-1 and KOJ-2 allow vessels of a maximum size of 45,000 deadweight tonnes (DWT) and 5,000 DWT, respectively. The jetties were constructed in 1958 and upgraded in 2000.

Products handled at KOJ-1 include motor gasoline (mogas), gasoil, kerosene, furnace oil, vegetable oil, and molasses. A line for liquified petroleum gas (LPG) has been decommissioned as LPG imports will move to KOJ-2. Two additional lines for vegetable oil were installed to allow for simultaneous discharge of multiple grades.

KOJ-2 is located south of KOJ-1. The access trestle splits from KOJ-1 near the shoreline and has a length of about 170 m. Water depth at the berth is 7.0 m CD. Products handled at KOJ-2 are gasoil, mogas, and industrial diesel oil (IDO).

The liquid bulk jetties (KOJ-1 and KOJ-2) are owned and operated by TPA up to the manifold. Tanzania Italy Petroleum Refinery (TIPER), a private company, operates the manifold. After the manifold various private tank farms own and maintain pipelines and tanks. The KOJ supplies BP, Oil Com, Gapco, Total, Natoil, Camel Oil, Oryx, Engine, and TIPER.

3) Single Point Mooring

The SPM is located southeast of the port entrance, about 3 km offshore in Mjimwema Bay. The SPM is an exclusive facility for unloading crude oil to Zambia through the TAZAMA pipeline to a refinery in Zambia with a pumping rate of 5,000 m³ per hour, allowing ships with a maximum size of 120,000 DWT.

The SPM has two 12” hoses connected to a 36” submarine pipeline. The pipeline connects the SPM to the TAZAMA tank farm located near the TIPER tank farm. The contract for replacing the SMP pipeline was signed in September 2010 and the expected replacement work has been completed.⁵

(3) Cargo Handling System

Dar es Salaam port, the “entrance to Tanzania”, handles about 90% of volume of export and import cargo of the country. There are many kinds of facilities to serve many kinds of cargo such as silos for dry bulk cargo, container terminals for containers, sheds for break-bulk cargo, parking for used vehicles, and tanks for liquid cargo. The handling of many kinds of cargo in the same port at the same time is a factor that results in heavy congestion. While total cargo volume has increased exponentially recently, port functions including associated hard and soft facilities cannot keep up with demand. Accordingly, considerable time is spent by ships waiting offshore and for cargo handling inside the port.

Cargo handling at Dar es Salaam Port may be categorized as follows:

⁵ In April 2013, TPA called for an EOI for “Development of Bulk Liquid Custody Transfer Tank Farm at Ras Mjimwema” on EPC contract basis. The project consists of construction of storage tanks LPG spheres, pumping stations, etc.

- 1) Container terminal in Berths 8 to 11;
- 2) Dry bulk cargo in Berths 5 to 7;
- 3) Break-bulk cargo (for general cargo) in Berths 1 to 7;
- 4) Motor vehicles in Berths 1 to 7;
- 5) KOJ; and
- 6) SPM.

Each is described below.

1) Containers

TICTS and TPA have a collective capacity of 5,059 TEUs, plus there is a capacity of 3,394 TEUs in six inland clearance/container depots (ICDs) situated surround Dar es Salaam Port, for a total of 8,453 TEUs. The operation of the TICTS container terminal is modern and sufficient, using STS cranes, RTGs, and special trailers in the main yard. However, there are some small yards at which TICTS handles containers with forklifts because of insufficient space to operate RTGs. Forklifts are not suitable for handling the delivery of containers to consignees and congestion results.

There are four berths with a quay length of 720 m. However, only three berths are available because Berth 8 is being rehabilitated at present⁶, and only two container ships can berth at the same time with three STS cranes. One solution to the port congestion problem is to add one more shore crane on the quay.⁷

The efficiency of container handling was 20.1 containers per hour in 2009 according to TPA statistics.

2) Dry Bulk Cargo

Ships usually use Berths 5 to 7 for dry bulk cargo handling and dry bulk cargo is transferred to the grain terminal using special trucks after unloading with shore cranes. After storing the dry bulk cargo in silos in the grain terminal, grains and fertilizer are mainly packed in bags and shipped to consignees. Cement clinker is transported directly to the factories through Gate No. 4 using the dump trucks of private companies.

Efficiency varies to some extent depending on the type of cargo, but the average cargo efficiency for dry bulk cargo is 50 tonnes per shore crane per hour according to TPA statistics.

3) Break-Bulk Cargo

There are three portal cranes on the quay, but they are usually unusable because they are over 30 years old. Two large mobile cranes are used for handling instead.

Cargo handling is undertaken with the ship's gear or the large mobile cranes. At Berths 1 to 7, containers are transferred to the container yard by trailer after the containers are loaded on them using reach stackers or forklifts. Cargo such as construction materials is stored outside near the warehouses or in a warehouse with the use of forklifts. The space outside is always occupied with containers because of the lack of a container storage yard. This lack of space for storing general cargo exacerbates the poor cargo handling efficiency because the apron for storing cargo is far from the shipside. The handling efficiency for general cargo is 40 tonnes per hour per gang.

⁶ Rehabilitation of Berth 8 has been completed. The berth is being used as a part of the container terminal of TICTS.

⁷ An additional container crane will have been installed and operational as of April 2014.

4) Motor Vehicles

Car carrier ships may call at Berths 1 to 7 and cars are transported to Shed 3 and then shifted to the car park behind Berth 1. The handling efficiency is 40 cars per hour per gang.

5) KOJ

TPA operates the KOJ-1 berth for main tankers and KOJ-2 for small tankers for the import and export of liquid cargo including refined products. The cargo handling efficiency at KOJ-1 and KOJ-2 is 750 tonnes per hour and 350 tonnes per hour, respectively.

6) SPM

The SPM functions to transport crude oil to Zambia through TAZAMA pipeline. Its cargo handling efficiency is 5,000 m³ per hour.

(4) Shipping Traffic

The maximum draft of vessels calling at Dar es Salaam Port varies between 10.6 m and 13.2 m. Liquid bulk vessels berthing outside of Dar es Salaam Port at the SPM have a maximum draft of 16.1 m, while container vessels and RoRo carriers have a maximum draft of 11.6 m and 10.6 m, respectively.

As shown in Table 3.3, a total of 836 vessels including 410 container vessels called at Dar es Salaam Port in 2010 (828 vessels including 357 container vessels in 2012). The number of container vessels calling at the TICTS Terminal was 582 in 2006, but this decreased by 58% to 330 by 2010 (further decreased to 236 in 2012).

Table 3.3: Ship Traffic at Dar es Salaam Port⁸

Unit: number of vessels

TYPE OF SHIP	2006	2007	2008	2009	2010	2011	2012
(1) DEEP SEA VESSELS							
(a) Dry Cargo Vessels							
(i) Break bulk vessels	147	160	99	98	77	91	74
(ii) Dry bulk vessels	53	55	50	59	50	55	67
(iii) RO-RO Vessels	0	0	0	0	0	0	0
- Container carrier	27	41	40	36	38	42	35
- Car carrier	96	93	136	157	136	148	144
Sub-total	123	134	176	193	174	190	179
(iv) Container vessels	0	0	0	0			
TICTS	582	530	313	275	339	362	236
TPA	0	0	65	49	71	115	121
Sub-total	582	530	378	324	410	477	357
Sub-total	905	879	703	674	711	813	677
(b) Liquid Cargo Vessels:	0	0	0	0	0	0	0
(i) Crude oil (SPM-TAZAMA)	7	8	5	5	8	8	8
(ii) Refined oil (SPM)							
(ii) LPP (KOJ)	100	115	111	79	80	89	100
(iii) Edible oil (KOJ)	21	10	13	19	20	22	26
Sub-total	128	133	129	103	108	119	134
(c) Other Vessels(Int.passenger, Navy, Research, etc.)	27	1	127	31	17	38	17
Total (a + b + c)	1060	1013	959	808	836	970	828
(2) COASTAL VESSELS:	0	0	0	0			
(a) Dry Cargo Vessels	0	0	0	0			
(i) Break bulk	213	104	201	249	215	333	251
(ii) Passenger/Cargo	447	476	367	182	171	238	200
Sub-total	607	535	568	431	333	531	408
(b) Liquid Vessels (LPPC)	49	28	25	40	59	66	62
(c) Passenger ferry boats	1630	2087	2041	2114	2322	1916	3030
(d) Other Vessels	0	0	0	0	0	0	0
(i) Schooners & Dhows	536	547	653	491	681	955	913
(ii) Fishing, Yachts, Tugs, etc.	276	125	79	102	140	97	165
Sub-total	812	672	732	593	821	1052	1078
Total (a + b + c + d)	3098	3322	3366	3178	3535	3565	4578
Grandtotal	4158	4335	4325	3986	4371	4535	5406

Source: Tanzania Ports Authority

(5) Cargo Traffic

1) Cargo Throughput

As shown in Table 3.4, cargo handled at Dar es Salaam Port over the last five years (2006–2010) has been growing despite a slight decrease in 2008. The increases have mainly been in imported vehicles, bulk liquid, containerised cargo, and dry bulk fertilizer. Dar es Salaam Port continued to maintain its lead over other Tanzanian ports by handling about 89% of the country's total seaborne cargo traffic in 2010. (Cargo continued to increase in 2012).

In 2010, a total of 9.085 million tonnes were handled at Dar es Salaam Port, equivalent to 83% of port capacity. This was an increase of 0.982 million tonnes or 12.1% over the 8.103 million tonnes handled in 2009. (In 2012, the cargo increased to 12.051 million tonnes, which is an increase of 2.966 million tonnes within 2 years from 2010.)

⁸ The table is updated to 2012 statistics.

Imports in 2010 totalled 7.527 million tonnes or equivalent 83% of the total cargo. This was 0.897 million tonnes or 13% higher than the 6.630 million tonnes handled in 2009. (Import cargo increased to 9.976 tonnes in 2012, which is an increase of 2,450 million tonnes since 2010.)

Exports in 2010 totalled 1.454 million tonnes, an increase of 0.195 million tonnes in 2009. On the other hand, transshipment volume (0.103 million tonnes) in 2010 decreased over the last five years due to congestion in the yard. (In 2012, export cargo increased to 1.987 tonnes, an increase of 0.534 million tonnes since 2010 while transshipment decreased to 0.087 million tonnes, which is a decline in 0.016 million tonnes since 2010.)

Imports were dominated by break-bulk cargo (3.223 million tonnes or 43% of the total) and liquid bulk (2.941 million tonnes or 39% of the total).

Table 3.4: Cargo Traffic at Dar es Salaam Port⁹

Unit: tonnes

	2006	2007	2008	2009	2010	2011	2012
C. CARGO TRAFFIC (in Metric Tons)							
1. Dry Cargo							
1.1 Imports: Dry Bulk	978,071	1,129,423	904,341	1,270,115	1,120,327	1,231,006	1,595,196
Break bulk	2,186,701	2,472,681	2,760,503	2,713,908	3,222,717	3,614,827	4,459,878
Total imports	3,164,772	3,602,104	3,664,844	3,984,023	4,343,044	4,845,833	6,055,074
1.2 Exports	962,587	1,269,790	1,190,129	1,215,604	1,387,935	1,704,898	1,923,838
Total imports & exports	4,127,359	4,871,894	4,854,973	5,199,627	5,730,979	6,550,731	7,978,912
1.3 Transshipments: Deep Sea	380,679	366,048	354,543	213,016	103,422	138,598	87,244
Total dry cargo	4,508,038	5,237,942	5,209,516	5,412,643	5,834,401	6,689,329	8,066,156
2. Liquid Cargo							
2.1 Crude & Refined petroleum products							
2.1.1 Imports: TIPPER - Tanzania							261,021
TAZAMA - Zambia	399,836	536,707	452,973	546,542	635,893	603,340	641,570
Kurasini Oil Jetty	1,441,897	1,354,361	1,539,424	1,911,353	2,271,538	2,684,013	2,784,291
Sub-total	1,841,733	1,891,068	1,992,397	2,457,895	2,907,430	3,287,353	3,686,882
2.1.2 Exports (Transit)*							
2.1.2 Exports (Local)	31,679	16,864	23,210	12,514	34,426	44,483	35,307
Total	1,873,412	1,907,932	2,015,606	2,470,409	2,941,856	3,331,836	3,722,189
2.2 Other Bulk Liquids							
2.3.1 Imports	218,943	183,316	149,912	187,704	276,067	336,462	234,054
2.3.2 Exports (Local/Overseas)	41,387	30,338	29,360	31,265	32,117	32,508	28,283
Total	260,330	213,654	179,272	218,969	308,184	368,971	262,337
Total liquid imports	2,060,676	2,074,385	2,142,309	2,645,599	3,183,497	3,623,815	3,920,936
Total liquid exports	73,066	47,202	52,570	43,779	66,543	76,991	63,589
Total liquid imports & exports	2,133,742	2,121,587	2,194,879	2,689,378	3,250,040	3,700,807	3,984,526
2.3 Transshipment (IN)	47,395	67,746					
2.4 Bunkers loaded					414		
Grand total liquid cargo	2,181,137	2,189,332	2,211,688	2,690,313	3,250,455	3,700,807	3,984,526
Cargo Traffic summary:							
Overall imports	5,225,448	5,676,489	5,807,153	6,629,622	7,526,541	8,469,648	9,976,010
Overall exports	1,035,653	1,316,992	1,242,699	1,259,383	1,454,478	1,781,889	1,987,427
Transshipment (Deep sea)	428,074	433,794	354,543	213,016	103,422	138,598	87,244
Bunkers Loaded			16,809	935	414		
Grand Total	6,689,175	7,427,274	7,421,204	8,102,956	9,084,856	10,390,136	12,050,682

Source: Tanzania Ports Authority

2) Transit Cargo

Table 3.5 shows transit cargo traffic by country from 2001 to 2010. Over the last five years about 33%–38% of the cargo handled at Dar es Salaam Port was transit cargo. Despite the steady decline in the capacity of the TAZARA and TRL railway lines, transit cargo traffic through Dar es Salaam Port has been increasing. From 2001 to 2010 period, transit cargo traffic handled at Dar es Salaam Port increased by almost 400%, from 778,000 tonnes in 2001 to 3,078,000 tonnes in 2010.

⁹ The table is updated to 2012 statistics.

Table 3.5: Transit Cargo Traffic by Country¹⁰

Unit: 1,000 metric tonnes

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Zambia	177	475	587	942	735	805	1021	1019	1100	1342	1,546	2,375
D. R. Congo	102	101	118	184	227	414	556	632	506	711	838	1,047
Burundi	89	65	74	97	155	112	156	193	275	341	356	553
Rwanda	71	48	51	64	84	87	88	177	230	272	357	547
Malawi	41	116	73	70	122	134	118	107	106	132	113	128
Uganda	112	40	90	139	88	54	38	67	30	33	66	74
Others	186	275	322	494	546	579	613	605	432	247	318	358
Total	778	1120	1315	1990	1957	2185	2590	2800	2679	3078	3,595	5,082

Source: Tanzania Ports Authority

Transit cargo to/from Zambia handled in 2010 totalled 1,342,000 tonnes, which represented almost 44% of total transit cargo. Zambia and the DRC transit cargo showed a substantial increase between 2001 and 2010, with an equivalent average annual average rate of increase of about 25%.

3) Import/Export Commodities

Commodities imported/exported at Dar es Salaam Port during 2005–2010 are presented in Table 3.6 and Table 3.7, respectively.

The main commodities categories were dry bulk were wheat, fertilizer, and cement/clinker/gypsum. There were also smaller and less regular imports of maize, coal, and sulphur.

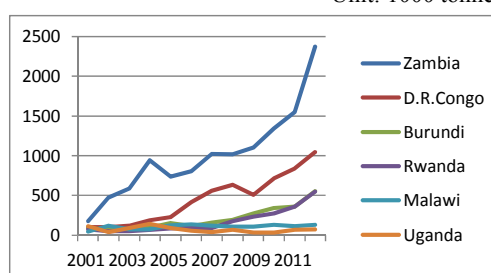
Wheat imports recovered from a sharp fall in 2008 that was due to high world wheat prices, changes in stock levels, and the diversion of the remaining Ugandan wheat imports to Mombasa. Wheat imports are now at roughly the same level as in 2007, but are expected to increase sharply in 2011 with the opening of new flour mills in Rwanda and Burundi supplied through Dar es Salaam.

Fertilizer imports have grown strongly in the last two years, and in 2010 were 35% above the midpoint of the ports master plan forecasts. Most of the transit country governments, as well as Tanzania, have made a strong commitment to increasing fertilizer use. The increase in imports for Zambia has been particularly noticeable.

Clinker and gypsum imports for cement manufacturing, which were expected to decrease substantially due to expansion of local production, have been partially replaced by imports of manufactured cement following the suspension of the import duty in July 2008.

¹⁰ The table is updated to 2012 statistics. The transit cargo to/from Zambia and DRC has rapidly increased as shown below.

Unit: 1000 tonnes



Other imports, mainly of coal and sulphur, increased sharply in 2008. Coal imports are sensitive to the price of oil and supplies of locally produced gas, and have declined. Sulphur is now shipped in containers, making it difficult to detect; sulphur volumes are believed to be growing strongly even though this is no longer reflected in the data on bulk imports.

Break-bulk cargo may be divided into three categories – bagged cargo, metals, and other. Vehicles are sometimes included in TPA’s statistics on break-bulk cargo.

Bagged imports have remained low, but bagged exports – which were expected to decline gradually – have decreased faster than expected due to containerisation.

Table 3.6: Commodities Imported at Dar es Salaam Port

Unit: metric tonnes

IMPORTS	2005	2006	2007	2008	2009	2010
Dry Bulk						
Clinkers	108,218	77,438	207,517	238,576	157,121	150,701
Maize	48,998	246,999	16,516	22,029	0	0
Wheat	635,443	612,298	690,570	377,861	484,765	652,351
Fertilizer	102,920	139,154	207,302	208,874	160,628	349,655
Gypsum	30,036	32,996	19,997	0	0	0
Others	0	7,000	17,753	118,459	68,704	43,681
Sub-Total	925,615	1,115,885	1,159,655	965,799	871,218	1,196,388
Bagged cargo						
Rice	26,567	72,788	14,024	20,705		68,872
Maize	9,365	2,610	832	4,680	37,067	7,911
Peas/Beans	1,550	1,154	1,602		998	12,093
Fertilizer	145,936	47,357	3,797	20,944	12,603	15,049
Corn soya	3,569	1,363	2,382	5,778	12,996	0
Sugar	28,947	31,253	51,000		14,492	8,200
Cement	0	733	5,147		8,604	0
Wheat Flour						3
Empty Bags						3,806
Sub-Total	215,934	157,258	78,784	52,107	86,760	115,934
General cargo						
Vegetable oil	1,189	216	817	1,316		0
Iron,steel,metals	213,388	243,182	145,109	161,294	141,838	182,214
Motor vehicle and parts	65,756	108,255	84,527	109,912	86,610	0
Rail & railway materials	0	5,538	845	4,126		1,765
Tractor and tractor parts	0	140	269	20	5	36
Trailers & Parts	0	1,845	954	1,581	725	464
Electrical equipments	0	364	12,643	1,481	210	605
Tin & Tin Plates	0	528	341	102		0
Pipes & fittings	0	1,193	3,661	5,931	203	272
Building materials	0	65	153	86	1,823	0
Chemical products	0	46	4,059	3,164	251	67
Wood products	0	127	0	4,857	87	0
Machinery & parts	2,468	6,464	11,105	14,557	8,693	67
Other general cargo	11,826	59,963	20,882	20,305	8,221	3,981
Motor vehicles	0	0	0	0	0	135,319
Railway Vehicles	0	0	0	0	0	1,310
Explosives	0	0	0	0	0	2,294
Machinery	0	0	0	0	0	19,332
Sub-Total	294,627	427,926	285,365	328,732	248,666	189,471
Containerized cargo	11,332	56,824	157,587	135,830	97,701	
Grand total	1,447,508	1,757,893	1,681,391	1,482,468	1,304,345	1,501,793

Source: Tanzania Ports Authority

Table 3.7: Commodities Exported at Dar es Salaam Port

Unit: metric tonnes

EXPORT	2005	2006	2007	2008	2009	2010
Bagged cargo						
Fertilizer	12,427	2,289	34	0	0	1,938
Wheat flour	0	1,289	2,146	2,106	1,990	18
Wheat bran	29,918	52,590	39,337	8,349	2,032	4,626
Maize	0	7,494	49,534	18,337	0	0
Sugar	20,044	0	39,960	0	0	
Sub-Total	62,389	63,662	131,011	28,792	4,022	6,582
General cargo						
Iron, steel & Metals	1,250	35,301	49	0	0	18
Motor vehicles	11,235	1,037	1,621	585	2,342	1,591
Machinery	1,254	656	616	621	363	300
Copper	20,308	62	2,292		0	0
Other general cargo	12,536	19	13,639	250	42,773	68
Trailers and Parts	0	0	0	0	0	9
Sub-Totals	46,583	37,075	18,217	1,456	45,478	1,986
Containerized cargo	4,323	34,152	133,571	64,528	50,072	772,908
Total export	113,295	134,889	282,799	94,776	99,572	781,476
Total imports & exports	1,560,803	1,892,782	1,964,190	1,577,244	1,403,917	2,283,269

Source: Tanzania Ports Authority

4) Containers

Table 3.8 shows statistics on containerised cargo for 2006–2010. There was a slight decrease in containerised traffic in 2009, followed by a recovery in 2010, which left throughput at about 410,000 TEUs. (The throughput increased to 547,364 TEUs in 2012.)

As shown, transshipment traffic at Dar es Salaam Port in 2010 virtually collapsed as a result of terminal congestion.

Since 2007, containers have also been handled at Berths 1 to 7 under the operation of TPA to relieve congestion at the TICTS Terminal. TICTS handled a total of 307,986 TEUs in 2009 while the TPA Terminal handled 45,752 TEUs.

The number of TEUs per box for both import and export containers was in the range of 1.36–1.40 during 2006–2010.

Table 3.8: Containerised Cargo Traffic by Country¹¹

Unit: as indicated

COUNTRY	2006		2007		2008		2009		2010		2011		2012	
IMPORTS	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons
Tanzania	73,826	1,774,023	95,754	1,214,932	114,718	1,435,563	118,293	1,500,534	138,849	1,785,196	153,072	2,011,509	182,064	2,462,310
Zambia	10,395	113,955	17,930	192,237	14,838	160,068	11,133	120,303	17,017	184,886	23,792	261,110	26,974	316,198
D.R. Congo	5,459	71,241	5,676	73,933	6,137	79,760	7,948	102,399	26,856	322,966	30,268	358,245	28,653	444,284
Burundi	5,513	68,394	5,977	72,157	7,398	87,475	8,006	95,265	9,575	120,204	9,567	123,800	10,748	127,939
Rwanda	12,230	142,675	16,791	194,306	18,862	217,441	13,196	152,375	11,552	125,332	13,519	151,225	22,373	276,884
Malawi	2,223	28,158	2,513	29,376	2,005	21,478	1,391	16,340	2,599	34,203	2,948	35,905	3,122	45,427
Uganda	3,422	65,959	2,543	29,645	2,126	24,899	1,282	15,312	1,758	20,148	1,087	12,672	2,008	26,538
Others	606	7,095	479	5,616	336	3,556	183	1,926	151	1,473	420	6,482	410	6,311
Empties	3,257	7,680	3,922	8,608	2,086	4,500	1,662	3,583	1,203	2,533	880	1,841	4,949	10,799
Total imports	121,471	2,331,736	160,100	1,915,714	180,654	2,171,699	167,578	2,056,040	206,667	2,552,721	235,553	2,962,789	281,301	3,716,690
20'	0	0	0	0	0	0	0	0	548	7114	0	0	0	0
40'	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transshipment	30,453	380,606	28,815	355,926	19,195	237,012	16,416	212,943	7,946	102,881	10,128	138,388	6,498	87,244
Port/Port														
EXPORTS	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons	TEUs	Tons
Tanzania	33,088	390,016	41,731	529,848	42,982	521,151	44,732	553,137	47,479	596,534	49,836	653,506	65,322	841,928
Zambia	9,282	142,529	10,639	168,767	12,323	197,421	10,578	177,310	15,546	271,509	17,757	302,103	15,385	287,118
D.R. Congo	675	9,503	1,611	23,494	982	14,547	1,322	19,332	10,311	167,776	11,485	199,574	14,037	262,007
Burundi	432	6,316	1,135	16,790	816	12,322	1,234	18,357	1,041	15,291	1,199	17,863	1,250	18,215
Rwanda	4,007	56,146	2,822	40,297	3,618	52,559	3,298	47,946	744	12,071	864	13,453	2,371	32,712
Malawi	241	2,300	497	5,342	231	2,473	78	1,043	68	678	25	240	572	12,508
Uganda	51	846	80	1,363	267	3,218	178	2,722	9	96	5	74	71	1,257
Others	398	4,967	8	85	3	33	865	10,601	5	64	6	66	2	20
Empties	70,584	144,237	84,313	169,775	109,610	223,265	106,010	216,918	119,701	245,354	149,928	302,232	160,555	334,621
Total exports	120,776	786,213	145,065	987,375	173,699	1,068,129	169,744	1,067,392	194,904	1,309,373	231,105	1,489,111	259,565	1,790,386
20'	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40'	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total imports & exports	242,247	3,117,949	305,165	2,903,089	354,353	3,239,828	337,322	3,123,432	401,571	3,862,094	466,658	4,451,900	540,866	5,507,076
Transshipment	30,453	380,606	28,815	355,926	19,195	237,012	16,416	212,943	7,946	102,881	10,128	138,388	6,498	87,244
Grand Total	272,700	3,498,555	333,980	3,259,015	373,548	3,476,840	353,738	3,336,375	409,517	3,964,975	476,786	4,590,288	547,364	5,594,320
20'														
40'														

Source: Tanzania Ports Authority

(6) Port Productivity

According to TPA, the time spent in the container yard by full import containers after being discharged from ships and before delivery (container dwell time) was reduced to 10 days in June 2011 from 13 days in June 2010. The effective operation system to be implemented by 2012 under the Port Community System project is expected to further reduce dwell time.

Operational improvements plus the removal of the exclusivity clause that gave TICTS a monopoly resulted in no change in the time taken by deep sea ships between their arrival at anchorage and their departure from the port (ship turnaround time) despite the increase in shipping activities and cargo handled at the port. This indicator was 5.1 days in both June 2010 and June 2011.

Dar es Salaam Port now can handle five vessels at one time compared to three before removal of the exclusivity clause. Also, critical container handling equipment was acquired and the use of private ICDs was increased. Completion of the SPM replacement and development of Berths 13–14 will also help solve the problem of vessel queuing.

The vessel handling capacity at a berth is generally expressed by the berth occupancy factor (BOF), which is calculated as the total time the berths are occupied divided by the annual available time. High berth occupancy indicates that the quay is working at its limits and will therefore result in long waiting times for the vessels and consequently in high demurrage costs.

Actual ship turnaround time, dwell time for import containers, container traffic, berth occupancy factors, and transport mode split at Dar es Salaam Port are presented in Table 3.9.

¹¹ The table is updated to 2012 statistics but deleting the numbers of boxes for proper appearance.

Table 3.9: Performance in Terms of Key Indicators 2008/09–2010/2011

Indicator	Actual 2008/2009	Actual 2009/2010	Actual 2010/2011
1 Ship Turnaround Time (day)			
i) Container	5.2	4.4	5.5
ii) Tankers	7	16	37.2
iii) Conversional	3.7	2.4	3.5
2 Dwell Time, Import Container (full) (day)	21.8	13	10
3 Total Containerised Traffic ('000 TEUs)			
i) General Cargo (TPA)	35	66	94
ii) TICTS Terminal	341	294	353
4 Berth Occupancy (%) at DSM Port			
i) General Cargo Terminal	40.2	45	26.3
ii) Container Terminal	67.5	84	62.1
iii) KOJ (1)	92	99	90.0
5 Transport Model Split: (% Containers (TEUs) delivered)			
i) Road	92.7	94.5	99.1
ii) Rail	7.3	5.5	0.9

Abbreviations: DSM = Dar es Salaam, KOJ = Kurashini Oil Jetty, TEU = twenty-foot equivalent unit, TICTS = Tanzania International Container Terminal Services, TPA = Tanzania Ports Authority
Source: Tanzania Ports Authority

(7) Inland Container Depots

1) Ubungo ICD

The Ubungo Inland Container Depot (UICD), which is located 16 km from the TICTS Terminal, is operated by TICTS. UICD has a specialized container freight station with a warehouse, yard, and handling equipment to provide reliable services for a range of less than container load (LCL) cargo. The services rendered include stripping of import containers in the warehouse, direct stripping of cargo onto trucks, and providing a storage area for long-staying containers and executing auctions for over-staying containers. Photographs of the Ubungo ICD are presented below.



Photo 3.5: Ubungo ICD

2) Kurasini ICD

Kurasini Inland Container Depot (KICD), which is located 1.6 km from the TICTS Terminal, has an area of 6.5 ha. It includes a specialised container freight station (CFS) with a warehouse, yard, and handling equipment to provide reliable services for a range of LCL cargo. The services rendered include stripping import containers in the warehouse, direct stripping onto

trucks, stuffing of export cargo into containers, transferring export containers to the terminal, and stripping import containers onto rail wagons. Photographs of the Kurasini ICD are presented below.



Photo 3.6: Kurasini ICD

(8) Ports Master Plan

The Tanzania Ports Master Plan was prepared in February 2009 for all ports in Tanzania. It included the following.

1) Cargo Forecasts

Cargo forecasts were prepared for the individual ports for each commodity. The cargo forecasts per commodity over the 20-year master plan period (2008–2028) were carried out as a basis to determine future port requirements.

2) Quay and Area Productivity

The present situation in the ports (facilities and port equipment) was evaluated based on site visits, interviews, and a review of documents. Possibilities for improving productivity were identified and assumptions regarding future productivity were made.

3) Design Considerations

Design considerations were identified through analyses of the fleet mix, allowable berth occupancy, and market developments. The present fleet mix and parcel sizes were determined based on historic data. Assumptions on the development of vessels and parcel sizes were made on basis of developments in trade (local and global) and shipping trends.

4) Port Requirements

Cargo forecasts, productivity projections, vessel sizes, and berth occupancy were combined to determine port requirements. Requirements were determined for each commodity.

5) Port Development

The port requirements were translated into a physical development plan for the ports taking into account available port facilities and expansion possibilities within the settings of the ports. The development plan included a layout and an investment plan, resulting in recommended actions for TPA.

Implementation of the Ports Master Plan commenced in 2010/11 and will be carried out in alignment with other key government development programmes. The major projects initiated include:

Replacement of the SPM Pipeline

The new SPM handles crude and refined oil with a pumping capacity of 5,000 m³ and serves oil vessels carrying not less than 150,000 tonnes. The contract for the SPM was signed on 28 September 2010 and the contractor was on site at Ras Mjimwema. Offshore surveys and preparatory works have already been undertaken, pipes have been received, and replacement works had been progressing well.

Development of New Container Terminal Berths 13 and 14

The objective of this project is to increase the capacity of Dar es Salaam Port to handle 500,000–650,000 TEUs per annum. This will cater for full length Panamax vessels with capacities up to 4,800 TEUs. The project requires constructing a quay 750 m long, at a depth of 13 m draft, and with a yard area of about 10,000 m² designed for operation using RTGs. The detailed design and environmental impact assessment (EIA) have been completed. Construction is planned to commence in 2013 with completion in three years.¹²

Up grading o Berths 1–7

The project entails strengthening and dredging to increase the water depth along Berths 1–7 from the current depth of less than 10 m to at least 12 m to accommodate 7th generation ships. A feasibility study is planned for 2011/2012 to assess project viability, with the project expected to commence in 2012/2013.¹³

Modernization of General Cargo Operations

The aim of this project is to develop a specialized bulk cargo operation that can use the same facility as is used for fertilizer, modernize the existing grain terminal, develop additional storage area/distribution points, redesign the port entrance gates, and designate Bandari Road for port users. The study is scheduled to commence in 2011/2012.

Acquisition of critical cargo handling equipment

Critical cargo handling equipment was acquired in 2010/2011, including MGCs, RTG cranes, reach stackers, and an empty container handler.

Capacity Optimization

The capacity of Dar es Salaam Container Terminal has been increased to 310,000 TEUs from its originally designed capacity of 250,000 TEUs. The former Tanzania Electric Supply Company (TANESCO) yard has been paved for cargo handling. Paving of the former copper yard and rehabilitation of the container stacking area at the former National Shipping Agency Company (NASACO) yard is ongoing.

ICT Enhancement

The major information and communications technology (ICT) projects that have been implemented by TPA towards computerization of operational activities include: (i) installation of cables and connecting network at Dar es Salaam Port and ICD; (ii) installation of fibre optic

¹² As of February 2014, the construction of Berths 13, 14 has not yet been commenced.

¹³ In April 2013, TPA called for an EOI for “Strengthening and Deepening of Berths 1 – 7 and Construction of RoRo Berth” on EPC contract basis. As of February 2014, the contractor has still not been selected.

backbone and local area network (LAN) at Tanga, Mtwara, Mwanza, Kigoma, and Kyela Ports; (iii) installation of a wide area network (WAN) by the Tanzania Telecommunications Company (TTCL) and WiA at Tanga, Mtwara, Mwanza, Kigoma, and Kyela Ports; and (iv) and installation of a port community system (PCS), including integrated payroll/accounting/human resources/stores systems, a billing/yard stacking system, acquisition of an access point for radio data terminal operation, enterprise resource planning (ERP), and the TPA website.

Development of a New Mbegani Port at Bagamoyo

The project will provide the capacity to handle 7,000–8,000 TEU vessels, construct a quay with 13–14 m depth, and provide for container storage with a robust and flexible RTG stacking system. A modern ICT system integrating the different functions and enabling efficient management of different administrative routines will be constructed. Preliminary hydrographic surveys of water depths along the shoreline, a feasibility study, and a preliminary design have been completed and the construction of modern port facilities has been recommended. A total of 518 ha of land has been set aside, and 2,000 ha of additional land has been requested. A PPP approach has been recommended for implementation of this project. TPA is seeking interested investors that can develop and operate the port.¹⁴

3.1.5 Tanga Port

(1) General

Tanga is located on the northern coast of Tanzania at a distance of 354 km from Dar es Salaam. Tanga Port functions as a traditional agricultural export handling port in the East African region. The northwest rail network provides links to the industrial, commercial, and agricultural regions of Kilimanjaro, Arusha, and Manyara although service is currently suspended. Tanga Port has the potential to be developed for cruise tourism because of its proximity to the northern zone tourism circuit of Mt. Kilimanjaro, Lake Manyara, Ngorongoro, Serengeti National Parks, and the adjacent game reserves.

Tanga Port has the potential to promote growth in the northern region considering the potential prospects of developing large-scale mining for exports. Further opportunities are offered by the establishment of an export processing zone expected to require large quantities of inputs, to be processed into finished goods for export. The projected traffic surge surpasses the capacity of the present facility and has been the underlying driver in the development of a new deep water berth port at Mwambani¹⁵ located south of the existing facility. The major export commodities currently include sisal, timber, coffee, and tea.

Photo 3.7 presents an overview of the port area inside the bay.

¹⁴ In March 2013, Tanzania and China signed an agreement for China to finance a port and other infrastructure projects at Bagamoyo. TPA and its Chinese counterpart are reportedly discussing the development details of the port.

¹⁵ In April 2013, TPA called for an EOI for “Development of new deeper port at Mwambani bay” on BOT contract basis.



Source: Brochure of the Tanzania Ports Authority

Photo 3.7: Bird's Eye View of Tanga Port

There are two anchorage areas, one outside the port/bay and one inside the bay. Each has capacity for six vessels. Vessel sizes for the outside anchorage are limited to 180 m length, and about 11.5 m draft. The draft is limited to 3.5 m the inside anchorage areas. Liquid bulk is handled at four buoys (two inside and two outside the port) by means of a flexible hose connected to a submarine pipeline.

Seagoing vessels can navigate to the anchorage areas without tug assistance, but a tug is used at the liquid bulk buoys for mooring. A 350 m turning basin allows vessels to depart without tug assistance. Pilotage is compulsory for all vessels over 200 gross register tonnage (GRT). Regular visiting coasters may be exempted from this requirement upon a request to the port authority.

The navigation of seagoing vessels is restricted to daytime (6 am to 6 pm), but lightering operations continue round the clock if requested by the customer. Natural conditions inside the bay are calm to moderate, with waves less than one metre and no noticeable currents.

(2) Port Infrastructure

Tanga Port has two berths with a length of 220 m each. There is a small angle between both berths. The quay is a sheet pile structure with a designed water depth of 2.5 m at low tide (4.5 m during high tide). However, due to sedimentation the available depths are now estimated by TPA to be 1.5 m during low tide. No maintenance dredging has been done since the completion of the berths in 1914 (Berth 1)/1954 (Berth 2).

Rock is reported inside the port bay area below depths of 7 m and this seriously affects the development of Tanga Port.

Photographs of Tanga Port are presented below.



Photo 3.8:
Container Ship Anchoring Offshore



Photo 3.9:
Barge Used for Double Handling Operation



Photo 3.10:
Clinker in the Warehouse



Photo 3.11:
Reach Stacker System Applied

Three sheds are in use at present. Some sheds have already been demolished to allow for expansion of the container yard.

The master of an incoming ship must give the expected time of arrival to the signal station three hours in advance. The station, which is located near the Raskazone North Beacon, operates round the clock to monitor the safe manoeuvring of incoming/outgoing ships.

TPA's policy is to ensure that Tanga Port is well equipped to handle imports/exports, minimize ship delays, and provide quick and efficient cargo delivery services. The port has a modern workshop for equipment repair, port works, and maintenance. Table 3.10 lists the equipment currently at Tanga port and more is in the pipeline.

Table 3.10: List of Equipment at Tanga Port

Shore Handling Equipment	Marine Craft
2 towers/Gotwald cranes with capacities of 40 and 63 tonnes	3 towing tugs
1 mobile crane with capacity 40 tonnes	1 labour boat
4 front loaders with capacity of 40 tonnes	7 lighters
4 portal cranes with capacity of 5 tonnes	8 pontoons
5 forklifts with capacity of 7 tonnes	1 patrol boat
2 bale clamps with capacity of 7 tonnes	1 mooring boat
5 terminal tractors with capacity of 20 tonnes	
23 terminal trailers with capacity of 20 tonnes	

Source: Tanzania Ports Authority

(3) Cargo Handling System

A noteworthy characteristic of the cargo handling system at Tanga Port is that mother ships cannot come directly alongside the quay because of its shallow depth (3.0–4.5 m). Mother ships have to operate offshore using the ship's gear. The cargo handling system employed at Tanga Port is summarised below.

- As noted, cargo handling is undertaken using ship's gear to unload cargo onto pontoons in the case of containers or barges in the case of dry bulk cargo. After the pontoons or barges are fully loaded, they are towed to the quay by a tugboat and the containers and bulk cargo is unloaded onto the quay by shore cranes. Export cargo is handled in the opposite way. This port cargo operation is a double handling system with handling both offshore and on the quay.
- The pontoons are square and flat barges for carrying containers. The pontoons are of two capacities, 16 TEUs and 12 TEUs, but due to safety constraints, the pontoons are limited to 10 TEUs and 8 TEUs, respectively, even though they have been reinforced.
- Containers are transferred between the quay and the adjacent yard by trailers and the lifting operation is undertaken with reach stackers at both ends.
- Dry bulk cargo such as cement clinker is unloaded onto large barges using ship's gear offshore. After the barges are fully loaded with cargo, they are towed to the quay and the cargo is unloaded to the truck on the quay by shore cranes with shell type buckets. Cement clinker is delivered directly to a cement factory if it is in urgent, but it is usually piled in the warehouse in the port before delivery.
- The main export is sisal, which is the raw material for bags and rope. It is stocked in the warehouse in the port for stuffing into containers and export.
- Only in exceptional circumstances can two container ships berth directly alongside the quay due to the shallow draft. Feeder vessels with capacities of 61–94 TEUs are operated by the Mediterranean Shipping Company (MSC).
- The efficiency of container operation is 60 TEUs per gang per shift and the efficiency of dry bulk cargo operations is 200 tonnes per gang per shift.
- Cargo handling is operational 24 hours per day.
- Handling charges are same as those at Dar es Salaam despite the double handling operation.

(4) Vessel Traffic

Tanga Port maintains regular shipping services to a diversity of destinations, providing services to various shipping lines, including Maersk Line, MSC Line, Mitsui O.S.K. Lines, Delmas Line, Global Container Line, and CMA-CGM. They have local agents/representatives that operate under the umbrella of the Tanzania Shipping Agents Association (TASAA).

In 2010/2011, Tanga Port received a total of 77 calls of international going vessels (deep sea ships). Calls made by coastal vessels totalled 121 in 2010/2011.

(5) Cargo Traffic

Tanga Port had a capacity of 0.5 million tonnes per annum but its capacity increased to 0.7 million tonnes per annum due to investment in cargo handling equipment and the pavement of the general cargo area for improvised container stacking.

In 2010, Tanga Port handled a total of 0.509 million tonnes and attained 83% capacity utilization, as shown in Table 3.11.

Table 3.11: Cargo Throughput at Tanga Port

Unit: tonnes

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Imports										
Containerised Cargo	58,332	67,647	74,661	79,078	88,253	49,651	83,308	17,126	87,978	102,035
Conventional Cargo	18,945	10,151	22,982	21,419	38,120	107,324	96,767	224,017	105,659	255,131
Liquid Bulk Cargo	23,479	22,394	33,335	28,427	57,040	103,921	97,004	46,692	6,654	1,435
Sub Total	100,756	100,192	130,978	128,924	183,413	260,896	277,079	287,835	200,291	358,601
Exports										
Containerised Cargo	63,905	77,560	89,396	92,979	88,797	55,791	57,997	10,122	59,774	41,622
Conventional Cargo	66,860	90,704	116,244	117,410	127,306	161,999	110,408	168,094	88,672	108,798
Liquid Bulk Cargo	-	-	0	110.00	-	-	-	-	-	-
Sub Total	130,765	168,264	205,640	210,499	216,103	217,790	168,405	178,216	148,446	150,420
Grand Total	231,521	268,456	336,618	339,423	399,516	478,686	445,484	466,051	348,737	509,021

Source: Tanzania Ports Authority

Table 3.12 presents the past containerised traffic (2001–2010) at Tanga Port categorized into import/export and full/empty containers. Containerised traffic has been stagnant as container vessels cannot berth at the current quay, but rather anchor offshore to load/unload containers on/off a barge or pontoon, which requires a double handling operation.

Table 3.12: Containerised Traffic at Tanga Port

Unit: TEUs

Year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Imports	Full	3,541	4,453	4,710	4,701	5,519	4,195	4,663	6,223	6,664	5,274
	Empty	1,777	690	1,544	1,796	1,310	186	196	242	673	532
	Sub-Total	5,318	5,143	6,254	6,497	6,829	4,381	4,859	6,465	7,337	5,806
Exports	Full	3,296	3,966	4,240	4,446	4,456	2,849	2,178	2,645	3,738	3,623
	Empty	1,822	1,878	1,916	1,731	2,397	1,395	2,688	3,168	3,721	2,696
	Sub-Total	5,118	5,844	6,156	6,177	6,853	4,244	4,866	5,813	7,459	6,319
Total	Full	6,837	8,419	8,950	9,147	9,975	7,044	6,841	8,868	10,402	8,897
	Empty	3,599	2,568	3,460	3,527	3,707	1,581	2,884	3,410	4,394	3,228
	Total	10,436	10,987	12,410	12,674	13,682	8,625	9,725	12,278	14,796	12,125

Source: Tanzania Ports Authority

Table 3.13 shows commodity-based cargo volume for import/export over the last 10 years (2001–2010).

Table 3.13: Commodities Handled at Tanga Port

Unit: tonnes

IMPORTS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Petroleum Products	9,377	31,280	27,237	22,176	46,813	81,877	106,666	47,026	6,600	1,435
Clinker	0	-	-	-	-	-	44,000	43,153	60,667	189,488
Grains (wheat barley)	0	-	-	29,223	28,904	42,872	5,570	22,960	27,200	14,050
TCC Coal	0	12,080	25,215	13,038	0	36,939	38,721	79,133	20,000	62,127
Paper & Paper Bags	504	4,140	4,356	2,724	5,178	8,965	468	252	-	-
Tallow in drums	2,039	-	-	-	-	-	-	-	-	-
Sugar	-	-	-	-	2,484	360	1,764	-	-	-
Balles twills	1916	2,189	2,221	-	-	-	-	-	-	-
Essential Oils	-	-	-	-	1,026	12,682	72	108	7,524	3,999
Machinery & Parts/ Agriculture	17,099	25,599	23,777	31,356	24,119	17,224	29,885	35,483	40,123	5,460
Cotton piece goods	283	396	25,759	18,314	28,540	6,984	1,764	11,393	6,418	-
Motor Vehicles, Tractor & Trailers	227	2,852	1,906	1,542	3,965	11,637	13,179	28,870	27,823	9,156
Soda ash	1,419	1,651	2,145	5,087	1,002	1,080	180	252	-	-
Raw - Glycerine Powder	22,698	26,364	19,845	19,641	27,175	9,374	38,880	34,531	27,443	-
Raw - Sabuni Material	14637	15,937	14,697	15,647	24,487	4,481	17,084	15,319	2,760	-
Raw - Polythelene Polyform	20134	22,379	25,789	23,721	30,349	22,837	35,868	40,698	50,786	68,114
Tyres & Tubes	1327	1,954	1,296	1,224	900	180	252	36	-	-
Food Stuff	2003	2,403	3,312	12,647	972	756	252	648	576	-
Fertilizer/Sodium Sulphates	1920	1,944	5,292	6,702	4,752	15,984	5,724	7,370	3,452	-
Rice	-	-	-	-	288	288	108	-	-	-
Cashewnut-Shells	-	-	-	-	-	3,096	-	-	-	-
Personnel Effects	1338	1,526	2,851	3,464	4,320	2,232	6,128	3,248	1,410	-
Other General cargo	15072	6,693	10,685	5,121	31,053	59,008	45,193	28,070	46,831	118,231
SUB TOTAL	111,993	159,387	196,383	211,627	266,327	338,856	391,758	398,550	329,613	472,060
EXPORTS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Beans & Peas	1,761	5,095	4,375	9,593	5,175	4,608	5,076	3,903	5,004	6,228
Coffee	17,438	10,910	11,310	8,393	13,405	12,692	16,596	21,384	23,616	15,296
Sisal bales	13,837	13,880	13,133	16,530	11,493	24,314	30,020	3,145	2,736	2,216
Fish fillets/ Octopus	-	-	1,635	721	557	900	2,088	2,484	612	70
Gold Ore	-	33,012	35,753	30,588	31,024	14,073	-	-	-	-
Copper concetrate	-	-	-	-	-	31,565	8,454	-	-	-
Sisal Ropes & Twine	3,165	2,238	4,823	5,100	6,600	-	108	31,595	25,248	25,905
Cement in Bags	11,900	11,884	36,694	71,816	61,694	68,509	76,329	37,873	33,651	48,286
Hides & skins	-	-	-	-	1,248	855	4,248	1,296	-	-
Tea	90	-	-	-	1,103	-	180	0	-	-
Timber & Flooring Blocks	-	-	-	-	262	244	288	7,776	61,965	40,392
Cotton & Products	541	-	-	-	13	216	648	144	72	0
Sunflower bird Seeds	-	-	-	-	263	252	1,908	3,132	5,950	360
Wheat flour	-	-	-	-	1,070	-	-	-	-	-
Cashew nut Shells	-	-	-	-	314	36	-	18,340	-	-
Other General Cargo	53,811	35,951	4,934	5,602	839	18,289	10,326	71,045	16,067	30,880
SUB TOTAL	102,543	112,970	112,657	148,343	135,060	176,553	156,269	202,117	174,921	169,633
Dhow Exports Cargo	52,179	62,017	68,047	68,326	1,716	2,853	9,214	14,211	15,405	23,456
TOTAL EXPORTS TRAFFIC	154,722	174,987	180,704	216,669	136,776	179,406	165,483	216,328	190,326	193,089
GARND TOTAL	266,715	334,374	377,087	428,296	403,103	518,262	557,241	614,878	519,939	665,149

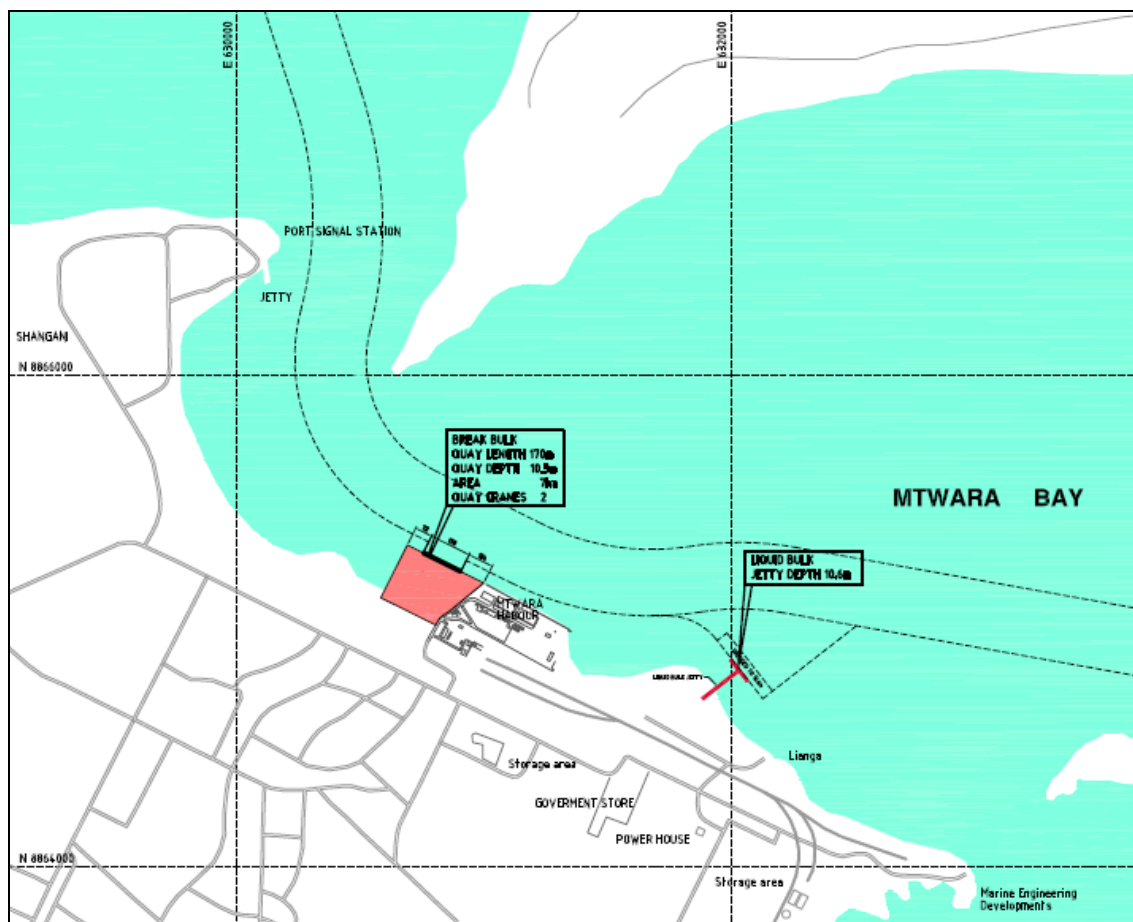
Source: Tanzania Ports Authority

3.1.6 Mtwara Port

(1) General

Mtwara Port is in southern Tanzania near the border with Mozambique about 700 km south of Dar es Salaam. Mtwara Port has a natural basin with water depths of more than –10 m (CD) in a large part of the bay.

Mtwara Port was constructed in the 1950s and has a 385 m continuous quay. The present port area is approximately 70 ha. An area of 2,650 ha has been acquired by TPA for port and waterfront development. An overview of the Mtwara Port area is shown in Figure 3.3(the pink area is the envisaged expansion area).



Source: Port Master Plan

Figure 3.3: Location Map of Mtwara Port

Access to Mtwara Port is by a natural one-way entrance channel, well marked by buoys and leading lines. A shoal in the outer approach area is marked by a single buoy. The channel has depths of more than 20 m with widths of 250–270 m.

Tidal variation at Mtwara is about 4 m. Longitudinal currents are noticeable in the channel during ebb and flood tide, but do not interfere much with navigation. There are no cross currents. Waves are moderate.

Pilotage is compulsory to enter Mtwara Port and pilots board about two knots north of the Shangani shoal. Vessels enter the access channel following the 154° leading line, then switch to a 189° line. After buoy 1 a sharp curve must be made before the natural basin. Four buoys mark the channel and shallows in the entrance.

At present, nighttime navigation is not possible because the buoys and leading lines do not have lights. There are some plans to upgrade the navigational system to allow night-time navigation by adding pairs of solar-powered lighted buoys to mark the channel and to reinstall lights in the leading lines.

The maximum vessel length allowed to enter the port is normally 175 m due to a limited width of the access channel. Larger vessels of up to 200 m can enter under good weather conditions, and have to wait for the high tide. To increase the maximum allowable vessel size the entrance channel must be widened accordingly.

Mtwara Port is regarded as an important gateway to the Mtwara Development Corridor (MtDC). The MtDC initiative was conceived in 1992 by the Southern African Development Community (SADC). Its aim is to reduce poverty by stimulating broad-based economic growth through the beneficiation¹⁶ of raw materials that will expand industrial production and boost exports.¹⁷

(2) Port Infrastructure

The existing quay structure is a 385 m long concrete gravity block wall on rubble. Depth at the quay is -9.8 m (CD). At present, construction work to expand the yard is under way.

The stacking yard has an area of 30,000 m². White and black oil products are imported using a manifold on the eastern side of the berth. There are four warehouses, with areas of 1,390 m², 3,120 m² (2x), and 9,290 m², respectively.

Mtwara Port has one 1,000 hp tugboat. The port has a plan to procure two additional tugboats with 4,600 hp each.

Photographs of Mtwara Port are presented below.



Photo 3.12:
383 m Long Straight Berth



Photo 3.13:
Ship's Gear Used for Handling



Photo 3.14:
**A Concessionaire of Oil and Gas
Exploration Uses Part of the Berth**



Photo 3.15:
**Future Container Yard
under Construction**

¹⁶ Beneficiation refers to a variety of processes whereby extracted ore from mining is separated into mineral and gangue, the former suitable for further processing or direct use.

¹⁷ In April 2013, TPA called for an EOI for "Construction of Four (4) additional berths" and "Development of Portside (Free Zone)" on BOT contract basis. According to "Project Information" prepared by TPA, these projects are initiated by the development of the offshore gas field.

(3) Cargo Handling System

There are two particularly noteworthy characteristics of Mtwara Port. One is that the main exports are cashew nuts, a seasonal cargo, from September to March, and another it is leasing outport facilities including the berth to a gas and oil boring company with considerable potential. Characteristics of cargo handling at Mtwara Port include the following:

- Containers are handled by ship's gear since there is no shore crane on the quay. Containers are transferred from shipside to/from the container yard on trailers and are lifted by a mobile crane at both ends.
- Construction materials and break-bulk cargo such as cement in bags are unloaded by ship's gear and carried by forklift into the shed or to the apron beside the shed.
- The main export, cashew nuts, is seasonal, with cargo handling therefore limited from September to March. During the season, empty containers are imported and placed in the container yard for the stuffing of cashew nuts into a bag. After customs procedures for exporting are completed, the containers are stored in the yard for loading onto the containership for export to Asia and other destinations.
- Container handling efficiency is 80–100 containers per gang per shift for empty containers and 40–45 for full containers due to use of a wire sling for full containers instead of a spreader for empty containers.
- Liquid cargo imports such as oil are conveyed to the adjacent oil tank through a connection pipe located at eastern end of the quay.

(4) Cargo Traffic

Cargo traffic statistics for Mtwara Port for 2000–2010 are presented in Table 3.14.

Table 3.14: Cargo Handled at Mtwara Port

Unit: tonnes

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Imports											
Containerised Cargo	6,651	12,591	10,519	5,821	9,340	9,771	9,266	6,642	7,249	11,334	14,522
Conventional Cargo	49,050	37,339	48,030	53,391	44,186	33,915	45,178	33,931	39,940	41,716	50,208
Liquid Bulk Cargo	23,138	21,388	20,185	10,745	12,235	11,604	8,154	5,600	6,513	0	8,020
Sub Total	78,839	71,318	78,734	69,957	65,761	55,290	62,598	46,173	53,702	53,050	72,750
Exports											
Containerised Cargo	43,217	79,713	86,647	24,649	67,780	35,086	55,090	14,758	1,292	64,019	119,567
Conventional Cargo	51,298	30,803	14,080	46,728	21,362	19,821	37,236	28,798	57,945	36,166	42,261
Liquid Bulk Cargo	-	-	0	0	0	0	0	0	0	0	0
Sub Total	94,515	110,516	100,727	71,377	89,142	54,907	92,326	43,556	59,237	100,185	161,828
Grand Total	173,354	181,834	179,461	141,334	154,903	110,197	154,924	89,729	112,939	153,235	234,578
Container Traffic TEU's	5,242	10,077	9,693	3,703	7,615	6,900	7,140	4,835	6,445	6,782	10,648
Total Vessel Calls	216	195	209	153	168	160	138	97	54	63	113

Source: Tanzania Ports Authority

There has been a significant decrease in liquid bulk imports since 2000 as gas has replaced oil as the main fuel for power generation. Break-bulk imports are mainly cement, while exports are mainly unprocessed cashew nuts. This traffic is extremely seasonal with most exports occurring between October and February.

About half of the traffic has traditionally been coastal, using mixed passenger/freight ferries from Dar es Salaam and Zanzibar. These have provided an important link to the outside world during the rainy season, when the road to Mtwara becomes impassable.

Cashew nuts exports through Mtwara decreased in 2008 and 2009 as a result of the increased proportion processed in Tanzania, and the diversion of exports to Europe, the United States, and South Africa to Dar es Salaam, where they can be shipped via scheduled container services. The drop in containerised exports through Mtwara was particularly pronounced in 2007, after paving of the road.

Since 2004 around 60% of cashew nut exports through Mtwara have been containerised. The tonnage of containerised exports exceeds that of containerised imports by a large margin, but inward and outward movements of full containers are surprisingly well balanced, in part because of the difference in stowage factors.

3.1.7 Other Coastal Ports

Other coastal ports such (Pangani, Kikindoni, Kilwa, Lindi, and Mikindani) are shown in Figure 3.4. All of the small coastal ports serve a local hinterland in terms of cargo flows and to a lesser extent tourism.¹⁸



Figure 3.4: Location of Small Coastal Ports

3.1.8 Ports in Neighbouring Countries

(1) Mombasa Port

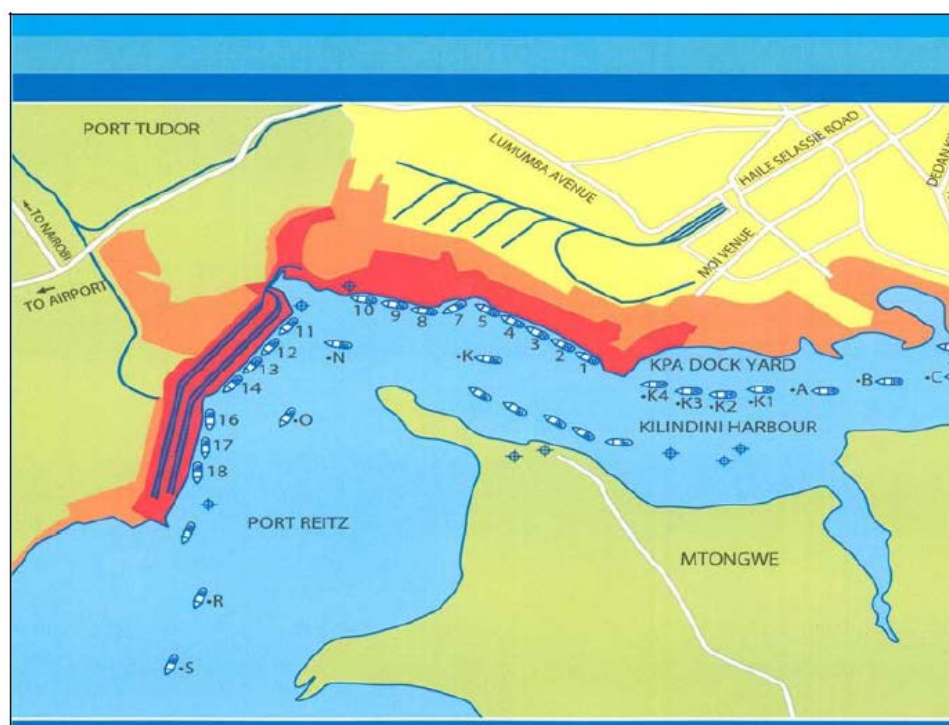
General

Mombasa Port is one of the largest ports along the East African coast. It is strategically located to serve the rich commercial, agricultural, and industrial hinterland of Kenya and the landlocked countries of Uganda, Rwanda, Burundi, the DRC, and Southern Sudan.

¹⁸ In April 2013, TPA called for an EOI for “Development of Rushungi Port,” “Development of Lindi Port” and Development of Kilwa Port” on BOT contract basis.

Mombasa Port is managed and operated by the Kenya Ports Authority (KPA) under supervision of the Kenya Ministry of Transport. KPA's mission is to promote national and international development through the provision of efficient and cost-effective port services.

There are a total of 18 berths at Mombasa Port as shown in Figure 3.5, and the berths are numbered starting with No. 1 and No. 2 in the middle of the navigation channel. The cruise ship wharf (Berth 1), an automobile berth, bulk cargo berths, general cargo berths, a container terminal, and an oil jetty (Kipevu Oil Terminal) are located in the southern part of the channel.



Source: Kenya Ports Authority

Figure 3.5: Mombasa Port

A 5 km portion of the northern channel of the existing 10 km navigation channel is relatively linear along the mooring facilities of Berths 1-18 from the south. The remaining 5 km portion of the southern channel has two bending places of about 70 degrees where careful ship manoeuvring is required. Since the tidal current is relatively fast in the channel, tugboat assistance is required.

The construction of a new container terminal (three berths) in Phase 1 with a capacity of 1.2 million TEUs per annum has been funded by concessionary ("soft") loans from the Japan International Cooperation Agency (JICA). The detailed designs were completed in June 2010 and the construction work commenced in November 2011.

A Dutch dredging firm was appointed in October 2010 to carry out the first stage of the dredging work. Dredging of the channel to the new container terminal to a depth of -15.0 m (CD) is still underway making partial use of the dredged material for land reclamation.

Port Infrastructure

Mombasa Port is a deep-water port with a total of 18 berths, three of which are dedicated berths at the Mombasa Container Terminal (MCT); these are Berths 16-18 (10-11.5 m depth) with

four STS gantry cranes. These berths complement the MCT, which originally was developed to handle 250,000 TEUs per annum, but has become saturated. In fact, a total of 695,600 TEUs were handled at Mombasa Port in 2010. The existing berths are constructed along the meandering shoreline of the water area with an incomplete segment (about 200 m in length) of the quay-wall between the Westside quays (berths No. 16–18) and the eastside quays (Berths 11–14). Berths 11–14 are also used for container handling by ship's gear, together with general cargo handling. In addition, there are two oil jetties with depths of –10 to –13 m. Illustrative photographs follow.



Photo 3.16:
Container Terminal



Photo 3.17:
Oil Jetties

Most berths were planned to accommodate 5,000 DWT class general cargo vessels, and constructed before the 1970s when containerised transport was introduced; most other wharves and piers were designed with –8 m or –10 m depth. Currently two thirds of the 18 berths serve as general cargo wharves. Transit sheds of cargo of about 80 m long stand in a row behind the 15 m wide apron. Some of the sheds are not fully utilized, demonstrating that non-containerised general cargo is decreasing. Expedite containerisation is becoming increasingly urgent at Mombasa Port.

Only berths No. 16 to No. 18 were constructed in 1985 and are relatively new dedicated container berths used as the only container terminal, equipped with STS gantry cranes. In the container yard, a transfer crane system is used. Illustrative photographs are presented below.



Photo 3.18:
Ship-to-Shore Gantry Crane (4 Nos.)



Photo 3.19:
Transfer Crane System Applied

Most of the facilities at Mombasa Port were designed with a concrete deck-on-pile structure. Revetments were constructed with stone or brick masonry. The base foundation is relatively good with sand and soft rock.

Although the total area is about 15 ha, the terminal is very narrow with only 150 m in terminal depth, and the container stacking yard has only 7.5 ha of effective area apart from roads, buildings, and the wharf apron.

The container terminal is directly connected to the rail network. The Northern Corridor connects Mombasa Port to its hinterland. The rail infrastructure of this corridor has metre-gauge, single-line railway tracks. Since 2006 the Rift Valley Railways Consortium of South Africa has operated the line under a concession agreement. The corridor is comprised of four main railway sections:

1. Mombasa–Nairobi–Tororo (1,076 km) with a branch line from Nakuru to Kisumu (217 km);
2. The Main Line in Uganda from Malaba to Kampala (251 km);
3. Kampala–Kasese Line (333 km); and
4. The Northern Loop Line in Uganda from Tororo to Pakwach (502 km)

Photographs of the railway inside Mombasa Port are presented below.



Photo 3.20: Railway inside Mombasa Port

Vessel Traffic

The regional and major shipping line services calling at Mombasa Port can be separated into two main groups: (i) those connecting Mombasa to Asia and the Middle East and (ii) a number of regional intra-African feeder connections, as well as some multi-purpose and Ro-Ro services linking Kenya to Europe and the Mediterranean.

The most important trade route links Mombasa to container hubs in the Middle East. Some of these services include calls in the Indian Subcontinent. MSC, Maersk, Delmas, CMA CGM, Safmarine, United Africa Feeder Lines (UAFL), Gold Star Line (GSL), and H&H Lines are deploying vessels along this trade route.

The services connecting Kenya to Asia either involve a call in the Indian Ocean or on the Indian Subcontinent. Shipping lines that offer this service pattern include Mitsui O.S.K. Lines, Pacific International Lines (PIL), and Delmas. MSC, Maritime Carrier Shipping (MACS), and Zim Integrated Shipping Services offer intra-African feeder connections among others.

Cargo Traffic

In terms of throughput, Mombasa Port is about 1.7 times larger than Dar es Salaam Port. Mombasa Port has a well-sheltered natural harbour with a throughput of 18.8 million tonnes in 2010, 86% of which was import cargo. Containerised cargo constitutes 36% of the total cargo handled at Mombasa. About 30% of the import volumes are transit volumes to landlocked countries and 16% are exports. In recent years (2006–2010) the share of transit cargo at Mombasa has increased from 20% to about 27%.

On average, container volumes increased by 10% annually between 2006 and 2010. Container throughput for imports is almost the same as that for exports although empty containers are dominant for export. Transshipment volume has declined since 2008.

Table 3.15: Container Traffic at Mombasa Port (2006–2010)

						(Unit: TEU)
	Status	2006	2007	2008	2009	2010
	Full	217,869	277,792	292,308	301,460	338,842
	Empty	11,596	4,244	5,080	6,387	6,472
Imports		229,465	282,036	297,388	307,847	345,314
	Full	86,317	101,314	102,914	95,842	110,314
	Empty	132,237	165,546	180,976	205,611	225,380
Exports		218,554	266,860	283,890	301,453	335,694
	Full	21,825	30,478	30,262	7,407	11,072
	Empty	9,511	5,993	4,193	2,109	3,520
Transshipment		31,336	36,471	34,455	9,516	14,592
	Full	326,011	409,584	425,181	404,709	460,288
	Empty	153,344	175,783	190,249	214,107	235,372
Total		479,355	585,367	615,430	618,816	695,660

Source: Kenya Ports Authority

The most important transit country for Mombasa Port is Uganda, which accounts for 79% of the transit volumes handled, followed by the DRC (8%), Rwanda (5%), Sudan (4%), and Tanzania (3%) according to KPA's records for 2010 as shown in Table 3.16.

Table 3.16: Transit Cargo Data (2006–2010)

		2006	2007	2008	2009	2010
		(Unit: DWT)				
Uganda	Imports	2,572,335	3,099,854	3,374,169	3,686,862	3,942,242
	Exports	249,796	298,721	327,086	293,532	290,492
	Total	2,822,131	3,398,575	3,701,255	3,980,394	4,232,734
Tanzania	Imports	245,975	226,661	236,166	231,188	168,489
	Exports	24,169	22,318	14,639	21,689	10,796
	Total	270,144	248,979	250,805	252,877	179,285
Burundi	Imports	66,182	49,798	55,488	19,093	5,785
	Exports	1,277	2,409	1,267	1,022	1,204
	Total	67,459	52,207	56,755	20,115	6,989
Rwanda	Imports	225,412	262,502	276,617	236,087	275,559
	Exports	27,701	24,153	16,884	14,472	12,564
	Total	253,113	286,655	293,501	250,559	288,123
Sudan	Imports	130,022	144,781	220,105	155,691	190,468
	Exports	7,822	700	3,176	11,662	32,999
	Total	137,844	145,481	223,281	167,353	223,467
D.R. Congo	Imports	202,832	225,014	264,248	263,110	401,703
	Exports	23,634	32,096	40,153	25,586	28,714
	Total	226,466	257,110	304,401	288,696	430,417
Somalia	Imports	29,960	32,862	43,157	16,446	5,219
	Exports	0	0	19	342	0
	Total	29,960	32,862	43,176	16,788	5,219
Others	Imports	482	480	605	3,970	14,811
	Exports	232	753	499	29	708
	Total	714	1,233	1,104	3,999	15,519
Total	Imports	3,473,200	4,041,952	4,470,555	4,612,447	5,004,276
	Exports	334,631	381,150	403,723	368,334	377,477
	Total	3,807,831	4,423,102	4,874,278	4,980,781	5,381,753

Source: Kenya Ports Authority

Table 3.17 and Table 3.18 present commodities imported/exported at Mombasa Port, respectively. The main commodities imported categorised as general cargo were iron and steel while dry bulk cargo included wheat, clinker, fertilizer, and coal. Liquid cargo accounted for about 38% of the total import cargo.

Table 3.17: Import Cargo by Commodity (2006–2010)

Commodities	Unit: ('000' DWT)				
	2006	2007	2008	2009	2010
Iron & Steel	593	621	595	780	826
Rice	311	328	275	387	285
Sugar	289	372	320	281	279
Chemicals & Insecticides	267	299	237	218	244
Plastic	266	308	313	402	454
M/Vehicles & Insecticides	202	287	334	296	283
Paper & Paper Products	209	244	208	296	336
Cereal Flour	101	149	143	177	153
Fertilizer	160	103	71	71	59
Clothing	105	115	105	35	105
Ceramic	90	162	143	145	251
Edible Vegetables	70	88	42	45	22
Vehicle Tyres & Spares	37	48	48	30	39
Tallow & Oil in Cases & Drums	35	29	27	33	17
Malt	26	26	30	33	22
Maize in Bags	25	9	15	42	18
Wheat in Bags	13	-	1	6	6
Agric. & Other Machinery	2	3	4	18	4
Other Cereals in Bags	-	-	6	4	5
Others	1,561	1,883	2,508	2,873	3,105
Total General Cargo	4,362	5,074	5,425	6,172	6,513
Wheat in Bulk	948	858	737	1,074	1,287
Clinker	520	1,080	1,013	1,135	1,428
Fertilizer in Bulk	337	280	236	388	366
Coal	167	176	174	162	236
Other Cereals in Bulk	204	135	257	103	30
Maize in Bulk	83	-	171	1,561	196
Others	85	193	304	218	284
Total Dry Bulk	2,344	2,722	2,892	4,641	3,827
P.O.L.	4,734	4,798	4,889	5,671	5,553
Other Liquid Bulk	669	676	552	760	833
Total Liquid Bulk	5,403	5,474	5,441	6,431	6,386
Grand Total	12,109	13,270	13,758	17,244	16,726

Source: Kenya Ports Authority

The major commodities exported were tea, soda ash, and coffee. The volume of dry bulk cargo has been stagnant in recent years. In general, cargo export volumes have been inactive.

Table 3.18: Export Cargo by Commodity (2006–2010)

Commodities	(Unit: '000' DWT)				
	2006	2007	2008	2009	2010
Tea	402	464	421	371	468
Soda Ash	200	309	549	121	391
Coffee	195	235	272	234	199
Maize	17	35	18	17	26
Fish & Crustacean	42	38	28	21	22
Tabacco & Cigarettes	43	42	34	33	38
Beans, Peas, Pulses	12	33	15	17	36
Iron & Steel	42	32	24	15	15
Cloths	22	24	23	18	18
Oil Seeds	27	22	32	59	20
Cotton	22	19	7	14	6
Hides & Skins	32	18	20	18	29
Sesal	22	14	5	5	-
Cement in Bags	-	5	2	5	-
Cashew Nuts	6	4	8	4	2
Rice	6	4	2	2	2
Tinned Fruits, Vegetables & Juice	18	-	58	43	83
Others	261	278	426	446	422
Total General Cargo	1,369	1,576	1,944	1,443	1,777
Soda Ash in Bulk	112	77	74	56	-
Cement in Bulk	113	54	10	-	-
Flourspar	87	71	101	6	31
Other Dry Bulk	2	3	15	-	39
Total Dry Bulk	314	205	200	62	70
Bulk Oils	64	85	122	99	44
Bunkers	68	82	68	68	51
Total Liquid Bulk	132	167	190	167	95
Grand Total	1,815	1,948	2,334	1,672	1,942

Source: Kenya Ports Authority

Operational Problems and Expansion Plans

The existing container terminal is almost saturated and the berth occupancy rate is approaching 90%, resulting in long waiting times for container vessels. At the same time, container volumes are increasing and as an intermediate solution Berths 11–14 are being used for container handling as well as for handling general cargo.

Containerised traffic at Mombasa Port was 696,000 TEU in 2010 and is expected to reach 1.0 million TEUs in 2014 assuming an annual growth rate of 10%. KPA's plans to accommodate the expected growth at Mombasa Port include:

- Equipment modernisation;
- 24/7 port operations;
- Introduction of a computerised port management system;
- Dredging of the channel to 15.5 m depth; and
- Capacity expansion.

For capacity expansion, conversion of Berths 11–14 with a total yard area of 120,000 m² to a modern container terminal is expected to increase total capacity to about 1.2 million TEUs and reduce dwell times. Also, construction of a second container terminal in the western part (three berths, water depth of 15.5 m, new access road) with JICA financial assistance will increase container handling capacity.

(2) Nacala Port

General

Nacala Port served as the main port for Malawi, handling about 95% of its trade before civil war broke out in the mid-1970s. It was also an important outlet for Zambian trade in the early 1970s when fighting in Angola and the declaration of independence in Zimbabwe cut it off from its more southerly supply routes.

To promote economic development in northern Mozambique and increase transit trade, the Governments of Mozambique, Malawi, and Zambia have set up the Nacala Development Corridor Group. This in turn has formed a public private partnership, the Companhia de Desenvolvimento do Norte (CDN), with a private consortium called the Sociedade de Desenvolvimento do Corredor de Nacala (SDCN), which has leased Nacala Port and the rail system in the northern province of Nampula for 20 years.

Port Infrastructure

Nacala Port is situated in the northern part of Mozambique about 900 km south of Dar es Salaam, and has a natural deep water harbour at the southern end of the Baía de Bengo. It has two container berths (372 m) with a water depth of 12–14 m but no specialised container handling equipment (e.g., STS gantry cranes). Also, the port has four general cargo berths, one of which can be used for liquid bulk cargo. The maximum storage capacity of the terminal is about 6,700 TEUs, including 24 connection points for reefer containers. Photographs of Nacala Port follow.



Photo 3.21:
Container Handling by Ship's Gear



Photo 3.22:
Rail Mounted Gantry Crane

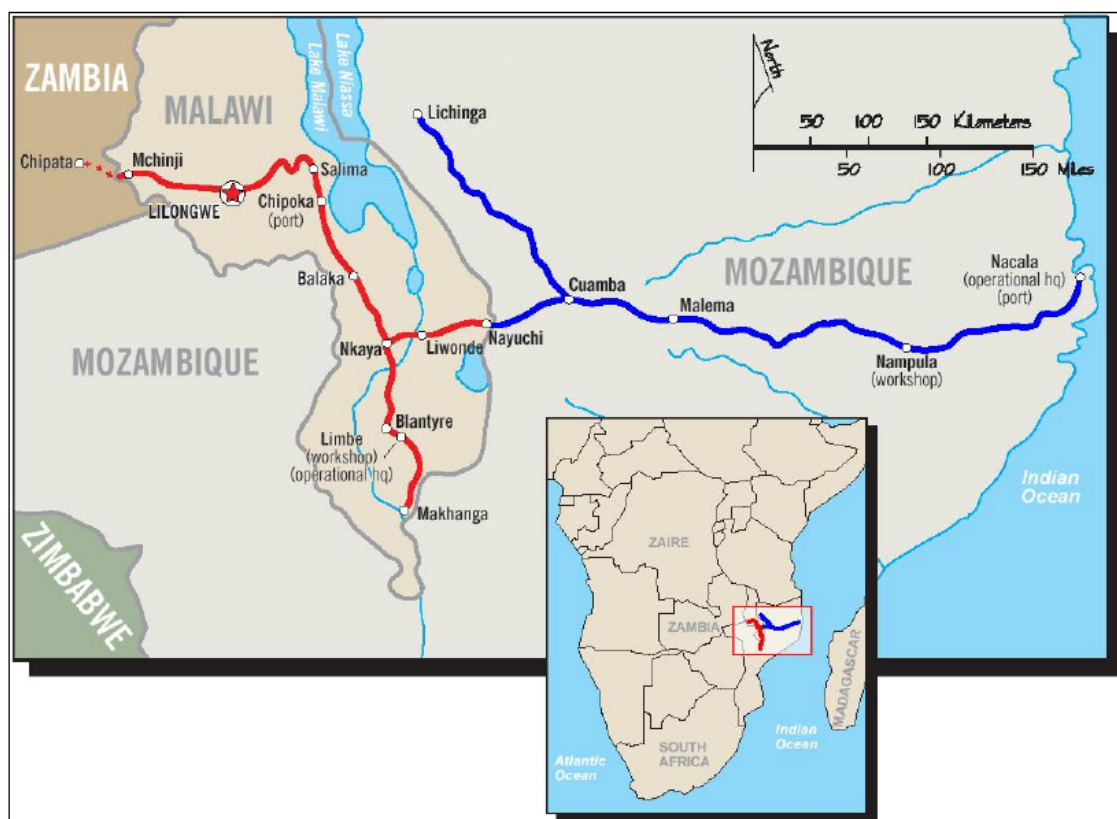


Photo 3.23:
General Cargo Berths



Photo 3.24:
Container Yard

Nacala Port is the starting point of the Nacala Corridor, which links the rail systems of Mozambique to Central and Southern Malawi (1,014 km to Lilongwe) and Eastern Zambia as illustrated in Figure 3.6.



Source: Feasibility Study of the Proposed Port at Mbegani–Bagamoyo

Figure 3.6: Nacala Development Corridor

The hinterland of Nacala Port consists mainly of northern Mozambique and the central and southern parts of Malawi, which are well connected by railway. The private consortium Corredor de Desenvolvimento do Norte (CDN) operates and manages both Nacala Port and the railway system in the northern province of Nampula. There is only very limited transit to Eastern Zambia and Southern Tanzania.

The travel time for a train between Nacala and Malawi is 12 hours. The Malawi railway system consists of 797 km of main line track. It extends from Mchinji in the northwest to the southern border of the country.

Vessel Traffic

As presented in Table 3.19, a total of 274 ships called at Nacala Port in 2010 according to CDN, including 249 ships for import/export cargo. The number of ships calling at Nacala Port gradually increased from 2006 to 2010, except for 2008 and 2009. The number of container ships substantially increased after 2006, at an annual average growth rate of 14% between 2006 and 2010. The total number of container ships in 2010 (145) accounted for 53% of total vessel traffic. The number of tankers also increased significantly over the period with a mean annual growth rate of 18%.

Table 3.19: Number of Ship Calls at Nacala Port

						Unit: ships
	Year	2006	2007	2008	2009	2010
No. of Ships		230	242	236	236	274
1.DOMESTIC		52	55	51	25	25
1.1 General Cargo Ships		1	0	0	0	1
1.2 Container Ships		28	30	30	2	0
1.3 Others		0	0	0	0	0
1.4 Tanker		23	25	21	23	24
2. OVERSEAS		178	187	185	211	249
2.1 General Cargo Ships		42	57	28	37	24
2.2 Dry Bulk		10	8	24	9	15
2.3 Others		9	6	0	8	8
2.4 Fishery		5	2	4	3	5
2.5 Container Ships		85	84	98	109	145
2.6 Tanker		27	30	31	45	52

Source: Corredor de Desenvolvimento do Norte

Cargo Traffic

As shown in Table 3.20, a total of 1,155,418 tonnes were handled at Nacala in 2010, which represents an increase of about 10% compared to 2009. Containerised cargo accounted for 66% or 765,582 tonnes.

Table 3.20: Cargo Handled at Nacala Port

						Unit: tonnes
	2006	2007	2008	2009	2010	
CARGO	809,432	951,594	875,935	1,049,980	1,155,418	
1.Domestic	57,989	54,082	39,249	27,327	29,981	
1.1 Loading	18,588	18,480	9,114	8,331	7,319	
1.2 Landing	39,401	35,602	30,135	18,996	22,662	
2. International	728,875	856,638	801,529	981,768	1,025,673	
2.1 Mozambique	618,064	642,409	574,421	720,882	804,956	
2.1.1 Export	202,413	218,202	217,720	234,036	332,743	
2.1.2 Import	415,651	424,207	356,701	486,846	472,212	
2.2 Transit	110,811	214,229	227,108	260,887	220,718	
2.2.1 Export	36,243	67,448	75,583	65,496	48,079	
2.2.2 Import	74,568	146,781	151,525	195,390	172,639	
3. Transshipment	22,568	40,874	35,157	40,885	99,764	

Source: Corredor de Desenvolvimento do Norte

As shown in Table 3.21, container handling volume increased to over 70,000 TEUs in 2010, a 34% increase compared to the volume of 53,215 TEUs in 2009.

Table 3.21: Containerised Cargo Handled at Nacala Port

	2006	2007	2008	2009	2010
Mozambique Export	10,831	13,411	18,758	17,455	26,485
Mozambique Import	12,048	18,104	18,138	21,205	25,748
Transit Export	1,836	3,647	3,246	3,381	2,515
Transit Import	2,073	2,396	2,962	2,791	2,373
Domestic	5,344	4,793	3,787	4,356	5,877
Transshipment	996	2,336	2,791	4,027	8,114
Total	33,128	44,687	49,682	53,215	71,112

Unit: TEUs

Source: Corredor de Desenvolvimento do Norte

Other projects in the Nacala Corridor that could boost future port throughput include the Mulange bauxite mine, the Tundulu phosphates development, the Angoche mineral sands, the Manhamba coal mines, and development of the Chikwawa coal reserves.

Since May 2010 Nacala has been connected to southern Tanzania by the Unity Bridge across the Ruvuma River, allowing it to compete for Tanzanian traffic for the first time. However, the road distance from Nacala to the Tanzanian border is about 700 km and most sections of the road are still unpaved.

(3) Beira Port

Beira Port, about 870 km southwest of Nacala, has 11 quays, which are located 17 km from the mouth of the Pungue Estuary and stretch over a length of 1,994 m, including a container terminal (645 m) equipped with two STS gantry cranes, but excluding Berth 1, which is reserved as a fishing harbour. The terminal design capacity is 100,000 TEUs per year. The design depth alongside the quays is about 12 m, but the depth alongside these quays varies from 8 m to 12 m. A major problem of Beira Port is its entrance channel, which has suffered from siltation. Consequently, continuous maintenance dredging of the channel is required. Photographs of cargo handling equipment at Beira Port follow.



Photo 3.25:
Quayside Gantry Crane



Photo 3.26:
Reachstacker System Applied

The dry cargo facilities are operated by a joint venture between Cornelder Holding (67%) based in Rotterdam and the Mozambique Ports & Railways Company (CFM) (33%).

Dry cargo throughput is about 1.5–2.0 million tonnes per annum including about 55,000 TEUs of containers. Half of the containers are transit traffic, with imports and exports evenly balanced. Exports from Mozambique are mainly agricultural products (tobacco, timber, prawns, cotton,

and sugar), whereas exports from Zimbabwe, the most important of the landlocked countries in terms of transit traffic, are mainly granite and other minerals. Zimbabwean traffic has increased rapidly over the last few years, resulting in significant levels of congestion in 2010.

Container storage and stacking facilities at Beira Port include a 20 ha container yard, which can accommodate 3,117 TEUs, including 144 electrical reefer points. There is one bonded transit warehouse of 8,400 m² for stuffing and stripping of containers and a 3,650 m² covered storage area.

Construction of new bulk terminals for coal (Vale/Riversdale), fertilizer (Yara), minerals, and sugar is underway. However, because of draft limitations in the access channel, coal handling will require offshore transshipment from smaller bulk carriers.

The Machipanda rail link connects Beira to Zimbabwe, from where there is a link into the Zambian rail network. The Sena rail link connects Beira to northwestern Mozambique (Tete) and Malawi. However, road haulage is the dominant mode of freight transport to/from Malawi. The shortest road link from Beira to Malawi is via Gondola–Bandula–Mwanza (Malawi); the road is paved and follows broadly the same route as the rail link. Photographs of transport along these rail links follow.



Photo 3.27:
Container Transport by Railway



Photo 3.28:
Coal Transport by Railway

3.2 Lake Ports and Lake Transport

3.2.1 General

Tanzania has three lakes on its borders with the neighbouring countries: (i) Lake Victoria with Kenya and Uganda; (ii) Lake Tanganyika with Burundi, the DRC, and Zambia; and (iii) Lake Nyasa with Malawi and Mozambique. Lake Victoria and Lake Tanganyika have played an important role in the trading system of the landlocked countries bordering on the lakes.

Marine transport on Lake Victoria has been important for the trade of Uganda, which benefits from having a secure option to the Indian Ocean through Tanzania. With a rail linkspan¹⁹ to TRL, Mwanza Port has been providing a railway connection between Uganda and Tanzania via Motor Vessel (MV) Umoja, a railway wagon ferry operated by Marine Services Co., Ltd. (MSCL) to Port Bell Port. Table 3.22 shows international traffic at Mwanza Port (2000–2010) (import and export cargo of Uganda and Kenya).

¹⁹ A linkspan is a type of drawbridge used mainly in the operation of moving vehicles on and off RoRo vessels or ferries.

Table 3.22: International Traffic at Mwanza Port (2000–2010)

Unit: tonnes

INTERNATIONAL TRAFFIC		2000	2001	2002	2003	2004	2005	2006/07	2007/08	2008/09	2009/10
UGANDA	Imports	181,869	201,400	176,832	194,214	243,640	279,820	47,931	43,566	28,345	13,403
	Exports	36,394	52,500	75,733	43,251	65,862	68,928	69,385	68,493	44,862	22,067
	SUB TOTAL	218,263	253,900	252,565	237,465	309,502	348,748	117,316	112,059	73,207	35,470
KENYA	Imports	20,033	24,812	18,218	26,569	28,415	26,073	28,806	14,720	18,240	16,300
	Exports	975	1,036	186	90	0	6	541	1,242	928	1,218
	SUB TOTAL	21,008	25,848	18,404	26,659	28,415	26,079	29,347	15,962	19,168	17,518
Uganda & Kenya	Imports	201,902	226,212	195,050	220,783	272,055	305,893	76,737	58,286	46,585	29,703
	Exports	37,369	53,536	75,919	43,341	65,862	68,934	69,926	69,735	45,790	23,285
	TOTAL	239,271	279,748	270,969	264,124	337,917	374,827	146,663	128,021	92,375	52,988

Similarly for Burundi and the DRC, marine transport on Lake Tanganyika has served as an important transport route for their trade. A large volume of cargo to/from the TRL railway used to be loaded and unloaded at Kigoma Port. The cargo was transported by ship from/to lake ports. However, in parallel with the decline in railway transport, the volume of cargo handled at both Mwanza and Kigoma Ports has been declining. Table 3.23 presents data on international traffic at Kigoma Port (2004–2010) (import and export cargo of Burundi and the DRC).

Table 3.23: International Traffic at Kigoma Port (2004–2010)

Unit: tonnes

INTERNATIONAL TRAFFIC		2004	2005	2006/7	2007/8	2008/9	2009/10
DRC	Import	69,529	86,259	52,861	51,388	67,575	30,073
	Export	11,107	10,610	11,117	4,176	10,441	14,904
	Sub total	80,636	96,869	63,978	55,564	78,016	44,977
BURUNDI	Import	17,382	21,564	20,751	14,868	32,272	13,745
	Export	2,221	2,652	0	0	0	504
	Sub total	19,603	24,216	20,751	14,868	32,272	14,249
DRC & Burundi	Import	86,911	107,823	73,612	66,256	99,847	43,818
	Export	13,328	13,262	11,117	4,176	10,441	15,408
	Sub total	100,239	121,085	84,729	70,432	110,288	59,226

Source: Tanzania Ports Authority

In 2010, Mwanza Port handled minimal cargo of Uganda and Kigoma Port had no cargo of Burundi and only a small volume of DRC cargo. The revitalization of TRL railway transport is vital if Mwanza and Kigoma Ports are to capture the freight traffic of Uganda, Burundi and DRC.

Marine transport on Lake Nyasa mainly hauls consumables for persons living on the lake's eastern shore within Tanzanian territory, as surface access is difficult because of the steep escarpment of the Livingstone Mountains.

Regarding domestic lake marine transport in Tanzania, MSCL monopolizes services on Lake Tanganyika and Lake Nyasa. This is due to the relatively small demand for cargo and passenger transport along these lakes, which prevents the private sector from competing with MSCL. In 2011, three ships rendered services on Lake Tanganyika: MV Liemba, MV Mwongozo, and Motor Tanker (MT) Sangara. MV Mwongozo, a cargo-passenger ship capable of carrying 80 tonnes of cargos and 500 passengers, ceased operating because of a breakdown in 2009. The vessel is currently under repair at the slipway at Kigoma Port. As MT Sangara is an oil tanker, only MV Liemba, a cargo-passenger ship capable of carrying 200 tonnes of cargo and 600 passengers, built in 1913, is currently operated, serving as a lifeline for persons living on the eastern shore of the lake. On Lake Nyasa, two cargo-passenger ships have been operated in 2011, MV Songea and MV Iringa. They operate between Mbamba Bay Port in Tanzania and Nkhata Bay Port in Malawi, serving small-scale trade. MV Songea is capable of carrying 40

tonnes of cargo and 212 passengers, but due to hull leakage its operation was stopped in 2011; after repair at a floating dock at Monkey Bay in Malawi, it will be operated again in 2012. Currently, only a small cargo-passenger boat (MV Iringa) capable of carrying 5 tonnes of cargo and 139 passengers is operated on the lake.

Unlike Lake Tanganyika and Lake Nyasa, the private sector is active on Lake Victoria competing with MSCL to transport cargo and passengers. This is due to the relatively large traffic demand on Lake Victoria; there is no escarpment along the lakeshore but rather relatively flat land that can sustain agriculture and relatively high population densities. Traffic demand has been increasing in parallel with the economic growth in the areas near the lake. As almost all the ships owned by MSCL are outdated cargo-passenger vessels, MSCL has been losing market share to the private sector, which is deploying RoRo ships that allow for speedy cargo loading/unloading. TPA needs to rehabilitate its berthing facilities as lake marine transport is increasingly operated with RoRo ships. A policy decision is required for MSCL to compete with the private sector in RoRo services or concentrate on long-haul services such as between Mwanza and Bukoba, Kemondo Bay on the western shore of the lake, and Port Bell in Uganda. In the latter two cases, the rehabilitation of the TRL will support MSCL's operation, and in the former case, MSCL's outdated cargo-passenger ships will have to be replaced with RoRo ships.

TPA has started "Community Service Project" in 2011 to upgrade several ports on Lake Tanganyika and Lake Nyasa. They are Kagunga, Kibirizi, Lagosa, Kalya, Karema and Kipili on Lake Tanganyika and Kiwira on Lake Nyasa. TPA intends to construct same types of facilities for each port consisting of the following:

- Jetty of a 19.2 m length, 10 m width and 5 m depth
- Flat cargo shed of 20 m and 10 m floor area with 3 office rooms
- Approach road, fence, toilet, generator house, gate house, gate, water tower

The budget of "Community Service Project" for each port is 1.2 billion TZS.

The progress of the construction works for the project is as follows:

- Kagunga: To start in February 2012
- Lagosa: To complete in February 2012
- Kalya: To complete in February 2012
- Karema: To complete in December 2012
- Kibirizi: To complete in December 2012
- Kiwira: Not yet programmed

Table 3.24 summarises the present situation of the lake ports in the territory of Tanzania.

Table 3.24: Summary of Lake Ports of Tanzania

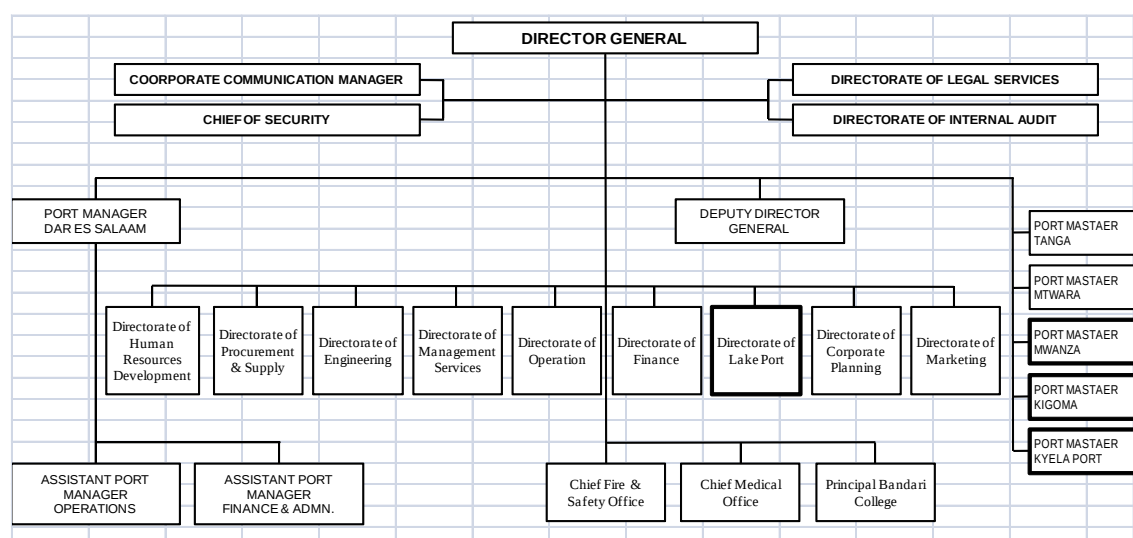
Lake	Category	Port	Remarks
Victoria	Major Ports (7 in total)	Mwanza North	Paved road, MSCL serviced
		Mwanza South	Paved road, rail & a link span, MSCL serviced
		Bukoba	Paved road, MSCL serviced
		Kemondo Bay	Paved road, rail & a link span, MSCL serviced
		Musoma	Paved road, rail & a link span, MSCL serviced
		Nansio (Ukewere)	Paved road/ferry& boat, MSCL serviced
		Mwaloni (Mwanza)	Paved road/ferry& boat, operated by municipality
	Cluster ports (51 in total)		
		Chato	Paved road/ferry& boat
		Busisi	Ditto
		Kamanga	Ditto
		Bukondo	Ditto
		Nkome	Ditto
		Nyakaliro	Ditto
		Nyamanzugo	Ditto
		Kisorya	Ditto
		Others	Road & boat (42 in total)
Tanganyika	Major ports	Kigoma	Rail & unpaved road, MSCL serviced
		Kasanga	Unpaved road, MSCL serviced
	Cluster ports (19 in total)	Kibirizi	Proposed jetty to be built by TPA, Oil terminal, Dhow port
		Ujiji	Unpaved road
		Mtanga	No road, MSCL serviced
		Mwamgongo	Ditto
		Kagunga	Ditto
		Karema	Unpaved road, MSCL serviced
		Sigunga	Ditto
		Kabwe	Ditto
		Kirando	Ditto
		Kipili	Ditto
		Ohthers	No road, MSCL serviced
Nyasa	Major ports	Kiwira/Itungi	To Itungi: paved road To Kiwira: 6.5 km unpaved road
		Mbamba Bay	Road currently rehabilitated
	Cluster ports (11 in total)	Matema	Unpaved road, MSCL serviced
		Manda	Ditto
		Others	No road due to sharp escarpment

3.2.2 Management and Operation of Lake Ports

Lake transport depends on a limited fleet of vessels from different countries. Marine Service Company Limited (MSCL), a government-owned enterprise, monopolizes domestic marine transport services on Lake Tanganyika and Lake Nyasa. However, the private sector is competing actively to transport cargo and passengers on Lake Victoria on which traffic demand has increased. MSCL is exempt from paying port dues under the Ports Act of 2004. TPA collects embarkation fees from passengers and wharfage charges.

As noted in the previous subsection, TPA needs to rehabilitate the berthing facilities at lake ports since lake marine transport is increasingly operated by RoRo ships. A policy decision is required for MSCL to compete with the private sector in RoRo services or concentrate on long-haul services. MSCL's outdated cargo-passenger ships must be replaced with RoRo ships as the vessels currently being operated are outdated, which restricts operational flexibility.

TPA has a Directorate of Lake Ports and lake port offices at Mwanza, Kigoma, and Kyela its current organization, as highlighted in the Figure 3.7.



Source: Tanzania Ports Authority

Figure 3.7: Organization of the Tanzania Ports Authority

3.2.3 Ports on Lake Victoria

(1) Mwanza Port

Mwanza is the second largest city in Tanzania and is located on the southern shore of Lake Victoria. The port consists of a South Port and a North Port. In addition to international cargo, Mwanza Port handles local cargo, the statistics of which are shown in Table 3.25. Since 2006/2007 the port has been handling more than 250,000 tonnes per year of local cargo and the volumes have been gradually increasing.

Table 3.25: Local Cargo Handled at Mwanza Port

Unit: tonnes

	2000	2001	2002	2003	2004	2005	2006/07	2007/08	2008/09	2009/10
Outward	27,679	24,584	28,614	28,201	46,918	48,767	108,143	122,268	143,069	164,246
Inward	31,635	28,414	31,600	31,000	51,899	52,425	150,710	143,543	136,992	129,060
Local Cargo Total	59,314	52,998	60,214	59,201	98,817	101,192	258,853	265,811	280,061	293,306

Source: Tanzania Ports Authority

North Port

The North Port is utilized mainly for passengers, vehicles, and local cargo. Passenger-cargo ships load international cargo at the South Port, and then call at the North Port for passengers. Until 2100 ships are permitted to enter the port here, after which they are compelled to anchor in the outer harbour.

South Port

The South Port handles the transport of railway wagons to/from Uganda and Kenya, and Bukoba, Tanzania, and international cargo. Ships can enter the port until 1800. Two units of floating docks, a general cargo wharf, a liquid cargo wharf, and a rail linkspan for the wagon ferry are linked from the north to the south. The passenger-cargo RoRo ship MV Serengeti, several other ships, and a tugboat are moored south of the dock.

The general cargo wharf is 255 m long and composed in two stages. A railed jib crane is settled on waterside, which is 40 cm lower than landside. The crane collapsed and is not workable at present. A manifold for oil products is adjacent to this crane at the northern side of the railway link span.

Two 1,600 m² warehouses are situated along the quay line although there has been no cargo since the suspension of TRL's service. MV Umoja, a wagon ferry owned by MSCL, is moored on the rail linkspan, and rails have been laid to the port rail yard, but there has been no operation and there is only a grass field now.²⁰ The Mwanza railway line connecting with Tabora comes here, but has not been operated in recent years.

MSCL has nine types of ships here, but most including the oil tanker MT Nyangumi and a tugboat are not operating. The largest wagon ferry, MV Umoja, can load 1,200 tonnes of cargo on a maximum of 19 wagons (38 TEUs). It has an additional cargo hold under the car deck with two small hatches on the car deck between the rails, but it is impossible to load or discharge cargo without manual handling.

The South Port has a powerful truck crane, but it is rusted and has been left for scrap in the corner of the port. Since there is no container handling equipment available here now, cargo is handled manually. Stevedores carry 80 kg of gunny bags of cottonseed cakes on their shoulders from a barge to vans. TPA may continue this handling system in the future since there is a surplus of labourers in this area. The photograph below shows manual unloading of cargo at Mwanza South Port.



Photo 3.29: Manual Unloading at Mwanza South Port

Since abandoned rail sidelines (spurs) are located on the other side of the warehouses from the quay line, it is apparent that a system for smooth and rapid cargo flow was in place many years ago.

Port Perspectives

In conclusion, Mwanza South Port is inactive without railway service. Export and import cargo from/to Rwanda and Uganda seems to have shifted to another route through Kenya via railway and/or truck. After TRL service was substantially reduced, the cargo throughput at Mwanza South Port substantially declined. However, inward/outward cargo volume to/from the two

²⁰ In October 2011, MV Umoja made a round trip to Port Bell Port in Uganda transporting rail wagons after a long suspension.

landlocked countries is not decreasing. Road and rail transport along Lake Victoria is more economical than carriage by lake ship and then relaying the cargo to TRL. A large number of passengers and vehicles utilize RoRo ferries at ports on Lake Victoria. Most are operated by the private sector and are based in the North Port.

After TRL suspended its operations, Mwanza has served as a regional port for local area residents and production activities, and handles daily consumption goods such as cottonseed, fish, and coffee. In the prior time of full operation, TRL freight rates between Mwanza and Dar es Salaam were USD 60–70 per tonne for Ugandan cargo, which was about three times higher than for Kampala/Mombasa (USD 20–30). Truck transport rates were more than twice as high for the same route, and additional lake transport freight charges were applicable because of the double handling for the lake/rail route.²¹

(2) Bukoba Port

Bukoba, the capital of Kagera Region, is situated on the western shore of Lake Victoria. The port serves as the gateway to the region and is the second largest port on Lake Victoria after Mwanza. Bukoba Port is located south of the city. It is served by a regular connection on MV Victoria, MSCL's largest cargo-passenger ship capable of carrying 200 tonnes of cargo and 1,200 passengers, via Kemono Bay to Mwanza, on Mondays, Wednesdays, and Fridays. The city is also served by ground transport to Kampala every day. Because of the well-developed road network on the western shore of Lake Victoria, bus transport operated by the private sector is competitive between Bukoba and Mwanza.

Table 3.26 presents the cargo handling performance of Bukoba Port in 2007/2008 and 2008/2009. The port handled about 80,000 tonnes per year, with the ratio of outbound to inbound cargo 52:48 in 2007/2008 and 58:42 in 2008/2009. The main cargo items included foodstuffs (e.g., beer, wheat flour) and cement.

²¹ In April 2013, TPA called for an EOI for "Modernization of Mwanza South Port" on EPC contract basis. According to TPA's project information, the contractor will be free to design and optimize the port facilities.

Table 3.26: Cargo at Bukoba Port

Unit: tonnes		
LOCAL	2007/08	2008/09
DWT TONS		
Outward	42,204	45,824
Inward	38,824	33,100
Bulk Oil	0	0
TOTAL DWT TONS	81,028	78,924
COMMODITY		
Sugar	8,020	9,040
Bulk Oil	592	0
Edible Oil	6,272	5,928
Cement	13,520	8,400
Wheat flour	14,282	12,860
Rice	5,526	5,480
Coffee	0	3,600
Beer	18,464	17,828
Soft drinks	9,516	9,860
Tobacco	0	0
Others	4,836	5,028
TOTAL	81,028	78,024

Source: Tanzania Ports Authority

As shown in Table 3.27, the volume of freight carried by MSCL ships through Bukoba Port decreased from 2006 to 2009. However, the volume rebounded in 2010 by about 50% from the previous year. This increase reflected economic growth in the region, with inbound cargo consisting of general goods and vehicles from Mwanza Port rapidly rebounding. However, the volume of coffee transported by ship has been decreasing, due to the development of the road network and the poor performance of TRL between Mwanza and Tabora.

Table 3.27: Freight Carried by MSCL through Bukoba Pier

Unit: tonnes					
Freight	2006	2007	2008	2009	2010
Beans	2,671	2,200	2,050	1,950	1,760
General Goods	3,222	2,700	2,380	2,100	3,120
Empty Bottles	3,672	2,033	1,100	800	600
Vehicles	2,574	2,534	2,200	1,900	4,900
Coffee	104	153	170	80	54
TOTAL	12,243	9,620	7,900	6,830	10,380

Source: Marine Services Company Limited

As shown in Table 3.28, the number of passengers carried by MSCL ships through Bukoba Port peaked in 2007 at 95,000 and has been decreasing gradually since then, to 75,531 in 2010. This decrease was due to the development of bus transport between Mwanza and Bukoba.

Table 3.28: Number of Passengers Handled by MSCL at Bukoba Port

PORT	2006	2007	2008	2009	2010
Bukoba	79,738	95,000	92,000	80,014	75,351

Source: Marine Services Company Limited

Bukoba Port has three berths built in 1945 that are still in use. The main one is Berth No. 1, where the MV Victoria is accommodated. Berths No. 2 and No. 3, in a U-shaped basin, serve smaller ships. The port has three cargo sheds and one passenger shed. The photograph below shows the MV Victoria unloading cargo at Berth No. 1.



Photo 3.30: MV Victoria Unloading Cargo at Bukoba Port

(3) Kemondo Bay Port

Kemondo Bay is situated on the western shore of Lake Victoria about 20 km south of Bukoba City. Kemondo Bay Port has a rail linkspan that is used to transport railway wagons loaded with coffee beans produced in its hilly hinterland. However, the coffee beans are currently stuffed in containers and transported by truck to Dar es Salaam Port or transported as break-bulk cargo by the MV Victoria to Mwanza, and then to Dar es Salaam by truck. Rail is not used due to the poor performance of TRL.

If the TRL railway were rehabilitated, Kemondo Bay Port could be developed as an international transport link between Lake Victoria and Uganda, since it is located close to the paved road (National Road B8) that extends to southern Uganda.

As shown in Table 3.29, major cargo items handled at Kemondo Bay Port include cement and foodstuffs. Compared to 2007/2008, the loading of coffee beans increased substantially in 2008/2009, when it became the major cargo handled at the port.

Table 3.29: Cargo at Kemondo Bay Port

	Unit: tonnes	
LOCAL	2007/08	2008/09
DWT TONS		
Outward	6,038	13,061
Inward	7,434	2,920
Bulk Oil	-	-
TOTAL DWT TONS	13,472	15,981
COMMODITY		
Sugar	1,340	812
Bulk Oil	-	-
Edible Oil	870	644
Cement	4,188	1,897
Wheat flour	1,960	760
Rice	1,724	960
Coffee	160	9,240
Beer	-	-
Soft drinks	1,006	892
Tobacco	-	-
Others	2,224	776
TOTAL	13,472	15,981

A photograph of Kemondo Bay Port is presented below.



Photo 3.31: Kemondo Bay Port

(4) Nansio Port

Nansio Port is situated on the southern shore of Ukerewe Island of Lake Victoria, about 50 km north of Mwanza. Nansio Port is served by an MSCL cargo-passenger ship and RoRo ships operated by the private sector. According to TPA statistics, the port handled about 12,000 to 14,000 tonnes of cargo annually in 2007/2008 and 2008/2009 (see Table 3.30). The major commodity transported to the port was beer followed by other foodstuffs.

Table 3.30: Cargo Handled at Nansio Port

Unit: tonnes		
LOCAL	2007/08	2008/09
DWT TONS		
Outward	5,618	9,656
Inward	8,112	2,420
Bulk Oil	0	0
TOTAL DWT TONS	13,730	12,076
COMMODITY		
Sugar	865	680
Bulk Oil	0	0
Edible Oil	808	1,028
Cement	1,280	756
Wheat flour	1,240	940
Rice	950	640
Coffee	0	0
Beer	6,857	5,960
Soft drinks	940	1,280
Tobacco	0	0
Others	790	792
TOTAL	13,730	12,076

Source: Tanzania Ports Authority

The port is served by MV Clarias, a cargo-passenger ship capable of carrying 10 tonnes of cargos and 293 passengers, operated by MSCL and several RoRo ships operated by the private sector. Since the pier operated by TPA cannot accommodate RoRo ships, private operators have built their own jetties where their RoRo ships are berthed. Since RoRo vessels are more efficient than conventional cargo-passenger ships at the distance between Mwanza and Nansio, the private sector is successfully competing with MSCL on this route. Table 3.31 shows the number of passengers handled by MSCL at Nansio Port from 2006 to 2010.

Table 3.31: Number of Passengers Handled by MSCL at Nansio Port

PORT	2006	2007	2008	2009	2010
Nansio	99,452	95,760	90,000	112,055	18,176

Source: Marine Services Company Limited

As the jetty operated by TPA cannot accommodate RoRo ships but only conventional cargo-passenger ships, and since MV Clarias is under repair, all passengers and cargo are transported by RoRo ships to the privately operated jetties, which seem to have been temporarily constructed and have no paved access to the island road network. TPA should build a jetty to accommodate RoRo ships to improve safety. The photographs below show: (i) the jetties of both TPA and the private sector and (ii) a RoRo ship at the jetty operated by the private sector.



Photo 3.32: TPA Jetty and Private Jetty at Nansio



Photo 3.33: Private Jetty and RoRo Ship at Nansio

(5) Other Ports on Lake Victoria

There are 7 major ports and 51 cluster ports on Lake Victoria within Tanzanian territory. In addition to five ports previously described (Mwanza North, Mwanza South, Bukoba, Kemondo Bay, and Nansio), there are other two major ports, Musoma Port and Port Mwaloni, each of which is described below.

Musoma Port

Musoma, the capital of Mara Region, is situated on the eastern edge of Lake Victoria not far from the Kenyan border. The port handled relatively large cargo volumes before the road from Mwanza was completed. After completion of the road, almost all cargo handled by Musoma shifted to road transport and MSCL stopped serving the port. The port is currently handling liquid bulk and cotton seed, which are more efficiently transported by ship than truck. The port does not have an important role in the nationwide transport network. Table 3.32 shows cargo handled at Musoma Port in 2007/2008 and 2008/2009.

Table 3.32: Cargo at Musoma Port

Unit: tonnes		
LOCAL	2007/08	2008/09
DWT TONS		
Outward	4,472	6,824
Inward	4,396	0
Bulk Oil	13,440	12,016
TOTAL DWT TONS	22,308	18,840
COMMODITY		
Sugar	0	0
Bulk Oil	13,440	12,016
Edible Oil	36	0
Cement	0	0
Wheat flour	0	0
Rice	0	0
Coffee	0	0
Beer	4,360	0
Soft drinks	0	0
Tobacco	0	0
Cotton seed cake	4,472	6,824
TOTAL	22,308	18,840

Source: Tanzania Ports Authority

Musoma Port is situated on the Tanga Corridor, which according to Transport Sector Investment Programme (TSIP) I is to serve the Lake Victoria regions as well as Uganda, Burundi, and Rwanda using Tanga Port. In order to operationalize this corridor, two large-scale projects have to be implemented: (i) Mwambani Port at Tanga and (ii) the Tanga–Arusha–Musoma Railway. To this end, the Governments of Tanzania and Uganda agreed on joint bilateral cooperation to undertake the construction of a railway line between Tanga (Mwambani) and Kampala via Arusha and Musoma. However, at this stage the limited availability of funds to finance studies to assess the socio-economic and environmental viability of these projects is a constraint on project implementation.

Port Mwaloni

Port Mwaloni is situated on the shore about 2 km north of Mwanza North Port adjacent to the municipal market. The port is managed and operated by the Mwanza municipal government. The port provides services for relatively small ships plying between Mwanza and small islands or villages that are not served by larger ships. Almost all of the ships served here are not properly registered. The photograph below shows Port Mwaloni.



Photo 3.34: Port Mwaloni, Mwanza

Cluster Ports

On Lake Victoria, there are 51 cluster ports served by the private sector but not by MSCL. These ports do not play an important role in the nationwide transport network although they do provide vital service for the communities on the lakeshore.

(6) Ports in Other Countries

Port Bell in Uganda

Port Bell is a small industrial centre about 11 km by road southeast of the central business district of Kampala, Uganda. Port Bell has a rail link branched from the Kampala-Jinja main line and a rail/road ferry wharf used for international traffic across Lake Victoria to/from Tanzania and Kenya. The port is located at the end of a narrow inlet of Lake Victoria.

The Corridor Diagnostic Study of the Northern and Central Corridors of East Africa, Action Plan, Volume 2: Technical Papers, F. Lake Transport, reported the following:

- Port Bell is comprised of one finger pier, 100 m long and 45–50 m wide, fitted with a standard rail link for the wagon ferry service. The depth alongside the pier is 8 m at the wagon carrier link. One of the deepest ports on the lake, it is owned and operated by the Rift Valley Railways (RVR).
- The port was designed to handle wagon ferries and the interlink system is still in good condition. The yard will hold 130 rail wagons, which is equivalent to 260 TEUs.
- The port received calls from the Tanzanian wagon ferry 4–6 times per month until TRL had to stop service to repair a washout. The operation handled 19 wagons, both covered and container on flat car per trip. These wagons were stripped at the RVR ICD 9 km from the port.
- When it was operated by the Uganda Railways Corporation, the port handled 360,000–400,000 tonnes annually.
- It is currently handling an average of 60,000 tonnes annually. Ginger accounts for 45% of this total, with remaining items including wheat, cottonseed, cooking oil, rice, and break-bulk consumer goods.
- Two wagon ferries are in bad condition and consequently out of service. The Government of Uganda is considering letting a contract to rehabilitate these wagon ferries.
- The port's main problem is a lack of operating space. A shallow overgrown marsh area adjacent to the rail yard could be reclaimed to create a yard area of about 1 ha. Such reclamation would allow for the construction of a 100 m marginal wharf, which would substantially improve operations.
- Most cargo is handled manually except for heavier general cargo.

There have been reports that the Government of Uganda will buy a new train ferry, recondition the ships and return them to service, or improve the port facilities for private operators to operate railway ferries. It has also been reported that a private company will bring a fleet of fast ferries to connect the ports on Lake Victoria. Although to date none of these proposals have materialized, they seem worthy measures to establish efficient transport networks between and among countries of the East African Community (EAC) and to thereby promote long-term regional development.

Kisumu Port in Kenya

Kisumu is a port city in western Kenya and is the third largest city in the country. Thriving with rich sugar and rice irrigation industries, Kisumu has become one of the fastest growing cities in Kenya. Kisumu's contribution to the Kenyan economy is large owing to its natural resources and role as an important business centre in East Africa.

The port was developed in 1901 as the main inland terminal of the Uganda Railway. After a period of stagnation in the 1980s and 1990s, the port has been serving increasing traffic, particularly oil exports. A transformation of international business and trade, as well as the shipments of goods destined for Uganda, Tanzania, Burundi, Rwanda, and the DRC, has stimulated the growth of the port.

The Corridor Diagnostic Study of the Northern and Central Corridors of East Africa, Action Plan, Volume 2: Technical Papers, F. Lake Transport, reported the following:

- The port is owned and operated by the Kenya Rail Road (KRR). It functions strictly as a landlord and maintains the facilities. It also leases out storage space in a transit shed.
- The jetty is 900 m long of which about 500 m is operable.
- The port includes a docking facility for the operable wagon ferry Uhuru (a sister ship of MV Umoja of MSCL of Tanzania).
- There are two tracks entering the port rail yard but they have not been used for a long time except for local petroleum movements.
- The port does not have any cargo handling equipment. All operations are carried out with day labourers hired directly by the vessel owner.
- The most valuable asset of the port is the small shipbuilding and repair yard adjacent to the rail yard. It has been leased to a private operator for the repair of small lake vessels. It includes a working dry dock of 100 m × 30 m with a working draft of 6 m. The facility includes two slipways, one of which is unusable. The other is gradually being renovated by KRR for future use. It can accommodate vessels of up to 800 tonnes.

According to the report, cargo throughput in a recent year (unspecified) is limited strictly to local lake trade, as follows:

- 28,000 tonnes of exports, of which 21,000 tonnes were petroleum products to Mwanza, Tanzania, and 7,000 tonnes were break-bulk cargo including sweets, soap, salt, cooking oil, and stationary and general merchandise; and
- 8,000 tonnes of imports consisting mainly of cottonseed cake from Tanzania used for animal feed.

Kisumu no longer handles containers. The Corridor Diagnostic Study concluded that even if the Government of Uganda renovates its two wagon ferries and all four are operable, there still would be little economic incentive for RVR to reactivate the service through Kisumu due to the high cost of operating the ferries. Potentially the most economically justifiable routes for the wagon ferry service would be Mwanza to both Kisumu and Port Bell since Reli Assets Holding Company (RAHCO) and RVR are not currently interconnected.

(7) Lakeborne Transport

In view of traffic demand on Lake Victoria, shipping companies could productively provide passenger and vehicle services on the lake. While there is a good road network around Lake

Victoria, ferries are indispensable for local residents. The mode is relatively efficient for long trips beyond the lake; road transport is indirect due to creeks or rivers and night bus travel is uncomfortable for passengers.

In serving passengers, it is important for shipping companies to adhere to their timetables. When passenger-cargo ships operate, only relatively small volumes of cargo should be carried and loading/unloading should be completed before the scheduled departure time to minimize delays for passengers. In any case, there is generally less demand for cargo traffic on Lake Victoria compared to other international lakes (although for Rwanda and Uganda, Tanzania provides an alternative route to the sea). Accordingly, it is preferable that cargo space be small in passenger ships.

Wagon ferries have been deployed on Lake Victoria for their quick turn-around at the start, because of the short time for pushing/pulling wagons by locomotive on/off a wagon ferry. However, a RoRo ferry system seems better here because long-distance trucks take the ferry over the lake to/from countries beyond and around Lake Victoria. The drivers can rest aboard the ship.

Loading railway wagons on ferries is not a viable option because of: (i) the limited availability of usable wagons, (ii) the difficulties associated with the interoperability of wagons between countries, (iii) the heavy weight of wagons (20 tonnes, about one third of gross weight), and (iv) the associated requirement of maintaining the rail linkspan and shunting yard locomotives.

The existing wagon ferry can be used as a RoRo ferry to carry trucks, cars, containers on chassis, and containers handled by a forklift with a spreader on the railway wagon deck during the remaining service life. In the future, new RoRo ferries can be productively deployed to serve lake traffic. The ferries should have a ramp in the bow or stern, with 7 m high space for cargo, so that two tiers of containers or containers on chassis can be loaded. Fast operations may be expected because all vehicles are self-propelled. Other palletized general cargo can be carried and stored on their cargo decks by forklift. The rail linkspan may be used for this wagon ferry during its service period.

It will be necessary to improve or rebuild the wharf edge if the new type of RoRo ferries are put into service. The railway shunting yard can be used as a car parking yard for ferries. New jib cranes should be installed on the wharf to handle unpacked general cargo.

(8) Cargo Handling

There are five main ports on Lake Victoria in Tanzania: Mwanza South Port, Mwanza North Port, Bukoba Port, Nansio Port, and Musoma Port. Cargo handling at each of these five ports is described below.

Mwanza South Port

There are two shore cranes on the quay (with a capacity of 5 tonnes each) at Mwanza South Port, but they are out of service because of the difficulty of procuring spare parts as they were installed in 1920. Cargo is loaded/unloaded on/off a vessel at the quay by ship's gear. If a ship has no gear for the loading/unloading operation, the cargo is handled manually. Also, cargo is manually carried on/off trucks on the quay. When cargo was handled by railway wagon ferries (e.g., MV Umoja, MV Uhuru), it reportedly took about 2–3 hours to shunt 19 wagons (2004).²² There is no handling equipment for containers in the port. Operations at this port are undertaken by MSCL.

²² Tanzania Ports Master Plan, Final Report, 2009.

Mwanza North Port

Mwanza North Port is mainly used as a hub port for cargo-passenger ships for passengers and domestic cargo. Cargo is loaded/unloaded on/off the ship at the quay by ship's gear. Cargo is manually carried on/off trucks on the quay. The trucks are kept alongside the ship when cargo is loaded/unloaded on/off a vessel. Operations at Mwanza North Port are also undertaken by MSCL.

The private sector has built jetties at Mwanza North Port for their RoRo ships. Most cargo is transported by truck, but some break-bulk cargo is loaded onto RoRo ships on pallets using a forklift.

Bukoba Port

There is no handling equipment (e.g., shore cranes) at Bukoba Port. Cargo is loaded/unloaded on/off the ship at the quay by ship's gear. If a ship has no gear for the loading/unloading operation, the cargo is handled manually. Trucks are kept alongside the ship when cargo is loaded/unloaded on/off a vessel. Also, cargo is manually carried on/off trucks on the quay. Operations at this port are also undertaken by MSCL.

Nansio Port

There is no cargo handling equipment at the TPA pier at Nansio Port. Cargo is loaded/unloaded on/off the ship (MV Clarias) at the quay by ship's gear. Also, cargo is manually carried on/off trucks on the quay.

The private sector has built jetties at Nansio Port for their RoRo ships. Most cargo is transported by truck, but some break-bulk cargo is loaded onto RoRo ships on pallets using a forklift.

Musoma Port

There is no handling equipment on the quay at Musoma Port. Cargo is loaded/unloaded on/off the ship at the quay by ship's gear. If a ship has no gear for the loading/unloading operation, the cargo is handled manually. Cargo is manually carried on/off trucks on the quay.

(9) Ships and Shipbuilding

Ships

Tanzania is a member of International Maritime Organization (IMO) and all international regulations for ships are applied.

Domestic regulations require that all vessels have annual inspections including an underwater survey by the government, which issues seaworthiness certificates. There is no classification society²³ establishing and maintaining standards for vessels engaged in lakeborne transport.

Table 3.33 lists the nine Tanzanian-flag-registered ships for Lake Victoria owned and operated by MSCL (The Marine Services Company limited) with its headquarters at Mwanza.

²³ A classification society is a non-governmental organization that establishes and maintains technical standards for the construction and operation of ships (and offshore structures).

Table 3.33: MSCL's Lake Victoria Fleet

Name	Ship kind	Built	Load (m)	B (m)	Draft (m)	Pax	Cargo(t)	Gross Ton	Engine(ps)	Speed(kt)
MV Victoria	Pass/Cargo	1980	76.6	12.5	3.96	1200	200	1599	2x1100	14
MV Serengeti	Pass/Cargo	1988	55.6	11.7	2.76	593	350	912	2x510	9.8
MV Butiama	Pass/Cargo	1980	29.8	7.0	1.8	200	100	300	1x80	12.5
MV Clarias	Pass/Cargo	1961	30.0	7.9	3.0	293	10	180	2x275	10.5
MV Umoja	Cargo	1964	91.7	16.5	3.96		1200	1599	2x1405	11.5
MV Maindi	Cargo	1938	34.2	7.2	1.0		120	100	1x200	8.0
MV Wimbi	Cargo	1928	34.2	7.2	1.0		120	100	1x200	8.0
MT Nyangumi	Tanker	1958	55.0	9.0	3.5		350	300	1x460	9.0
MV Ukerwe	Tug	1983	28.5	7.4	2.3		720	125	1x1125	7.0

Source: Marine Services Company Limited

MV Serengeti was built on the No. 1 floating dock in Mwanza, but other MSCL vessels were built in a Kenyan shipyard. The crew of ships are all Tanzanian nationals. A selection of photographs of the ships follows.



Photo 3.35:
MT Nyangumi



Photo 3.36:
MV Serengeti (Built in 1988)



Photo 3.37:
MV Wimbi (Built in 1928)

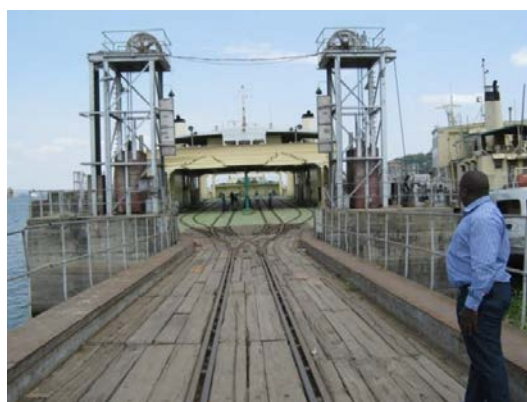


Photo 3.38:
Wagon Ferry MV Umoja

In addition to the nine MSCL vessels, there are more than 20 ships operated by private companies, including the ships listed in Table 3.34.

Table 3.34: Private Sector Fleet on Lake Victoria

NAME OF VESSEL	KIND OF VESSEL	OWNER	ENGINE TYPE
M.V Orion I		Kamanga Ferry	DAF 350.x 350
M.V TAFIRI I	Lake research boat	TAFIRI (Tanzania)	DAF HP 220 x 1
M.V Explorer	Lake research boat	TAFIRI (Tanzania)	DAF HP 220 x 1
M.V Luxury		Hoseah Mashimba	DEWOO HP 180 x 2
M.V Matara		Mkombozi Fishing and Marine Transport Co.	DAF HP 250 x 2
M.V Munanka		Mkombozi Fishing and Marine Transport Co.	450 X 2
M.V Malkia		Major Songoro; Former owner Joseph Mush	CATERPILLAR HP 250 X 1
M.V Juliana		Mrs. Kasandiko	DAF HP 200 x 250
F.B Mugendi		Mkombozi Fishing and Marine Transport Co.	SCANIA
M.V Samar II (Ex-M.V Vero)		Salum Ally; former owner Joseph Mush	ISUZU 350 x 2
M.V Samar I		Salum Ally	HP 350 x 2
M.V Nyehunge		Said Mohamed and Brothers	DEWOO HP 360 x 2
M.V Nyigu		Major Songoro	HP 98 x 1
R.V Uvumbuzi	Lake research boat	Lake Victoria Fisheries Organization - Uganda	CAT HP 276 x 2
R.V Hammerkop	Lake research boat	Lake Victoria Fisheries Organization – Uganda.	CAT HP 276 x 2

A photograph of one private sector vessel and the RoRo jetty at Mwanza North Port follow.



Photo 3.39:
M.V Orion I



Photo 3.40:
RoRo Jetty at Mwanza North Port

Domestic regulations require that all ships undergo annual inspections including an underwater survey, on which basis a seaworthiness certificate is issued.

Repair/Shipbuilding Facilities

TPA Mwanza has two floating docks moored on the north side of the cargo quay in Mwanza South Port. Table 3.35 lists the dimensions of the docks. Photographs of the floating docks follow.

Table 3.35: Dimensions of Floating Docks in Mwanza

	No.1 Dock	No.2 Dock (new)
Length (m)	60	110
Breadth (m)	14	19
Lifting Capacity (tons)	860	2,100
Built		1989



**Photo 3.41:
No.1 Floating Dock (Old)**



**Photo 3.42:
No.2 Floating Dock (New)**

3.2.4 Lake Tanganyika

(1) Kigoma Port

Kigoma is the largest Tanzanian port on Lake Tanganyika. It has a TRL railway terminal hub connecting with Dar es Salaam, the gateway port on the Indian Ocean. TRL serves as the transport artery for the three countries on the lake: Burundi, Zambia, and the DRC. Kigoma has the potential of functioning as a reliable terminal on the Central Corridor for these countries, although the condition of the railway is critical. The capacity of TRL between Kigoma and Dar es Salaam is low at present. Only one freight train with 20 wagons and two passenger trains run per week, and they take almost three days to arrive at the destination. This service has deteriorated to such an extent because of a need for new locomotives, wagons, and coaches, and a requirement for track maintenance (which has not been undertaken for several years).

Table 3.36 presents data on local cargo handled at Kigoma Port in recent years. Total local cargo decreased from a peak of 10,676 tonnes in 2006/7 to 6,568 tonnes in 2009/10.

Table 3.36: Local Cargo at Kigoma Port

Unit: tonnes

	2004	2005	2006/7	2007/8	2008/9	2009/10
Inward	5,789	6,385	6,536	6,366	4,613	5,461
Outward	1,769	1,897	4,140	2,233	1,849	1,107
Local Cargo Total	7,558	8,282	10,676	8,599	6,462	6,568

The general cargo wharf at Kigoma Port is 301 m long, and the depth along the quayside is 2.85 m due to siltation (it was originally 6 m). As shown in the photograph below, part of the seaside of the wharf is 85 cm lower than the landside. The landside was filled with soil to avoid being covered by lake water at times of high water level.

Two portal cranes with a capacity of 5 tonnes each are on the lower side and handle break-bulk cargo between ships/railway wagons and ships/trucks put on the higher stage of the wharf. The forklift cannot be moved down to the lower stage.

A warehouse and a 10,000 m² general cargo yard are at the higher side of the quay, where trucks and containers on the wagons are kept, and the portal cranes carry break-bulk cargo.



**Photo 3.43: General Cargo Wharf at Kigoma
(the Seaside is 85 cm Lower than the Landside)**

The container wharf is 96 m long with a 3,745 m² yard at the end of the general cargo berth. There is a rail-mounted gantry crane of 35 tonnes with a cantilever for container handling, but it has not been in workable condition for several years due to a shortage of parts and a lack of maintenance. Since it has been used for only 20 years, rehabilitation to restore its full functionality may be possible.²⁴ At present, it is impossible to load/discharge containers at Kigoma because no handling equipment is available.

Passenger ships go alongside the 100 m long finger-type pier. A small passenger terminal with an immigration office inside is located close to the pier. Similar to the case of the general cargo wharf, the water depth by the pier is shallow due to siltation. Cargo-passenger ships are therefore moored away from the pier with a “dead ship” placed between the ship and the pier. Embarking and disembarking passengers must walk on a catwalk across to a barge.

²⁴ In August 2013, TPA called for the tender for “Rehabilitation of Rail Mounted Gantry Crane for Kigoma Port.” TPA is planning to rehabilitate the cargo terminal of the port.

Cargo-passenger ships then proceed to the general cargo wharf for the unloading/loading of cargo. A photograph of the passenger jetty and MV Liemba is presented below.



**Photo 3.44: MV Liemba on Passenger Jetty
with a Boat in the Centre**

MV Liemba is a large passenger-cargo ferry that departs for Mpulungu, Zambia, on Wednesdays twice a month and calls at Tanzanian ports toward the south to load dried fish and a small quantity of agricultural produce (Kasanga is the port of call). The vessel discharges dried fish and agricultural produce at Mpulungu and returns to Kigoma the following Sunday according to the general schedule. One round trip takes 4–5 days; the vessel is chartered out during the idle time. Another ship, MV Mwongozo, was moored for two years, due to a stability problem, and is now on the slipway at Kigoma for repair.

An oil jetty with several oil stowage tanks is 1 km from the centre of the port. A 400-tonne oil tanker, MT Sangara, owned by MSCL carries refined oil of GBP Tanzania Ltd to Uvira, DRC, for a lump sum freight charge of USD 8,500. The oil is carried and poured into the tanks by tank wagons and tank containers on the railway wagons from Dar es Salaam, after which the oil is transferred to the tanker at this jetty. MSCL has offered the same freight rate from Kigoma to Bujumbura as from Kigoma to Uvira, but a contract has not been concluded.

The quantity of export/import cargo at Kigoma has decreased significantly since 2006. Zambia, the DRC, and Burundi cargo has moved away from Kigoma Port as TRL's carrying capacity has decreased.

Kigoma is in a key location in Central Africa that was once was relatively prosperous with good railway service, but which is now in decline. Kigoma Port cannot survive without a reliable railway connection.

Kigoma Port is expected to be a key node for central/southern DRC and northern Zambia along a valuable corridor to Dar es Salaam and onward to the Indian Ocean. The route across Lake Tanganyika is shorter for these two countries than going around the lake.

To attract DRC cargo to this corridor toward Dar es Salaam, improved railway operation and a reconsideration of freight rates are essential. Otherwise, the DRC may choose to use a route toward the Atlantic Ocean, featuring a gateway port in Angola.

The beach called “Kibirizi” located to the north of the oil jetty at Kigoma is used by local wooden boats (Dhows) that are propelled with outboard engines. At the beach, there is small scale of the trade with DRC, Zambia and Burundi. Cargo mainly going to DRC with smaller amounts for Mpulungu and Bujumbura are loaded to the wooden boats. They are transporting mainly salt, general cargo and rice as outbound cargo and a small amount of Burundian coffee as inbound cargo. Many of the loaded cargo are locally repurchased goods imported from overseas. There are about 80 cargo boats per month handled at Kibirizi. TPA has an immigration office to facilitate the trade.²⁵

(2) Kasanga Port

Kasanga Port is on the southern tip of Lake Tanganyika and is connected by a gravel road to Sumbawanga, where the unpaved road connects the Tanzania–Zambia (TANZAM) Highway and the TAZARA border station at Tunduma. Upgrading of the 223 km road from Tunduma to Sumbawanga, the capital of the Rukwa Region, is underway with financing from the Millennium Challenge Corporation of the United States. The road is to be paved in a few years although the work seems behind schedule (completion was scheduled for January 2013). Upgrading of the 112 km road from Sumbawanga to Kasanga Port is also underway, with financing by the Government of Tanzania and completion also scheduled in January 2013. Once these road projects are completed, Kasanga Port will be connected with Dar es Salaam Port by a paved trunk road. Transit cargo to/from DRC is likely then to pass through Kasanga Port since this road provides about a 1,000 km shortcut between the western shore of Lake Tanganyika of the DRC and Dar es Salaam.

The TPA Master Plan (2009) proposed a railway link with TAZARA at Tunduma to Kigoma with a junction leading to Kasanga Port. If implemented, this railway link will provide intermodal services to the DRC ports of Kalemie, Moba, and Muliro as well as to Bujumbura Port in the north. Another proposal is for a link connecting the TRL endpoint at Mpanda to a cluster port at Karema on Lake Tanganyika, to facilitate intermodal linkages with the DRC. The upgrading of the road between Tunduma and Kasanga Port will substantially decrease the significance of the rail extension from TAZARA to the port.

There is no import cargo at Kasanga Port as shown in Table 3.37, which shows the export (and import) cargo from 2004 to 2009/2010. The export cargo mainly consists of cement, maize, and maize flour. Cement is produced at the cement factory in Mbeya.

Table 3.37: Export and Import Cargo at Kasanga Port

	2004	2005	2006/7	2007/8	2008/9	2009/10
Import	0	0	0	0	0	0
Export	11,450	14,541	10,671	12,647	12,541	10,826
TOTAL	11,450	14,541	10,671	12,647	12,541	10,826

Source: Tanzania Ports Authority

Kasanga Port has one berth of 20 m length supported with concrete pedestals on the tip of an unpaved rectangular reclamation about 30 m long. Since it is located on a small hilly peninsula, the water is deep and the hinterland is high. Therefore, siltation is not a problem and expansion of the quay wall will not be costly. However, considerable cut and fill works may be necessary to create a wide flat cargo/container stacking area adjacent to the port. Anticipating completion of the road upgrading project, TPA has formulated a development plan to construct a container stacking yard on the hill behind the warehouses.

²⁵ Excerpt from “LAKE TANGANYIKA PORTS DEVELOPEMENT PROGRAM”, October 2011, at Page 22.

Currently, MV Liemba provides a scheduled service to the port. However, the service has been reduced to twice a month from the previous weekly service, before MV. Mwongozo (2006) was grounded for safety and technical reasons by Sumatra. Further, the poor railway services has tremendously affected the volume of traffic movement at the major Kigoma Terminal, which similarly has influence on passenger transiting through Port Kigoma, subsequent Cluster Ports to/or from Kasanga Port.

Likewise, Cement produced in Mbeya and maize or maize flour are also exported to Burundi through the Kasanga Port. Import/inbound cargo is not unloaded at Kasanga Port since the population of Rukwa Region is not large and the general consumer merchandise imported to this region is transported by road through Tunduma.

A photograph of Kasanga Port is presented below.



Photo 3.45: Kasanga Port



Photo 3.46: MV Liemba Moored at Kasanga Port

(3) Other Cluster Ports

There are 19 cluster ports on the shore of Lake Tanganyika within the territory of Tanzania. Among them, 7 ports are connected to the hinterland with unpaved roads. The villages where the remaining cluster ports are situated have access from the lake only. None of the cluster ports have port facilities to accommodate a ship. Therefore, MV Liemba, a cargo-passenger ship built in 1913 and currently operated by MSCL, needs a lighter to load and unload cargo and a small boat for passengers to embark and disembark the ship. To facilitate lake transport for local

residents and improve their standard of living, it is necessary to introduce RoRo ships as well as construct simple jetties to accommodate them.

(4) Ports in Other Countries

Bujumbura Port

There are three wharves in the Port of Bujumbura: a general cargo wharf, a container wharf, and an oil wharf.

The general cargo wharf is 400 m long with four units of rail-mounted jib cranes with capacities of five tonnes each. These are standard port cranes of 7.5 m/25 ft rail span and appear to be well maintained.

The main cargo items handled at Bujumbura Port are cement in ply bags, coffee beans in gunny bags, and steel bars in bundles for construction. Cranes lift this bagged cargo that stevedores put on skids in the ship's holds, and carry them onto the wharf with a sling. Forklifts take them into the warehouse for storage. This handling method is the most advanced among the lake ports in the region at present. However, dense cement dust rises from broken bags due to rough handling by workers.

There are four warehouses of about 2,000 m² each along the quay line, with each warehouse accommodating classified lot cargo; sugar in No. 2, coffee beans in No. 4, and other general cargo in No. 1 and 3. The immigration office, which processes passengers on international long-distance buses in and out of Burundi, is in a part of the No. 2 warehouse.

There is triangle-shaped paved backyard behind the No. 1 and 2 warehouses, which is now used as parking space for external trucks. Three old and small warehouses are in the corner. This will provide good space for cargo handling when a new layout is prepared.

There is no containerised cargo in Bujumbura because of the poor container handling equipment, but there is a 50-tonne crane at the wharf on the opposite side wharf. All cargo in containers is packed/unpacked on the apron and loaded/discharged onto/from ships as break-bulk cargo. Cargo is transported to and from points outside of Bujumbura all the way through to the destination by truck.

A 50-tonne revolving crane is fixed on the 100 m container wharf opposite of the general cargo wharf, where the containers are handled. However, this crane was not originally designed for container handling but rather for lifting boats from the sea for repair. It has been used for more than 50 years and therefore operates at a slow speed. It can handle only 2–3 containers per hour. Much time is used for hook lifting sling wire on the container corner fittings since the spreader cannot be attached, and to stop spinning and swinging wire ropes on containers during handling.

The ship should be rope-shifted to keep the indicated loading/discharging position for the ship on the wharf. After the container crane in Kigoma broke down, no container has arrived at Bujumbura.

Ship owners in Bujumbura have two container loadable ships with container fittings welded on board. One is the full container ship Teza owned by Batralac, which can load 40 TEUs (26 TEUs in the hold and 14 TEUs on deck), while the other is the convertible ship Ruremesha owned by Arnolac, which can load 14 units of 20 FT on deck only. Neither has loaded containers over the last several years. A photograph of container fittings on the hatch cover of M/S Teza is presented below.



Photo 3.47: Container Fittings on the Hatch Cover of M/S Teza

The 150 m petroleum wharf is adjacent to the container wharf with several oil tanks nearby. Arnolac has two tank barges, MT Cohohe of 336 DWT and MT Rweru of 115 DWT, but they have not been used to carry oil to this wharf in recent years. Tank trucks directly transport refined oil from Dar es Salaam to the storage tanks here. Special haulage may be contracted for oil carriage along this route.

Kalemie Port in the DRC

Kalemie is a town on the northwestern shore of Lake Tanganyika in Katanga Province, DRC. Kalemie Port was constructed by Belgium from 1930 to 1931. The port is owned and operated by Société Nationale des Chemins de Fer du Congo (SNCC), which is the former Société Nationale des Chemins de Fer Zaïrois (SNCZ). SNCC is a state-owned enterprise that is also operating the national railway of the DRC except for the Matadi - Kinshasa line.

The wharf has a total length of 380 m with a width of 10-15 m. It has two different elevations; the lower part is the quayside where rail-mounted wharf cranes are placed and the higher part is the apron. There is no space on the apron for trucks or other vehicles to reach the wharf cranes for loading/offloading cargo, which makes rail wagons the only accessible means of transport for entering the port. Otherwise, cargo is handled manually. The navigational channel is not clearly located. The seabed depth along the berth line is about 3 m.

The port infrastructure and facilities have deteriorated significantly. There are four rail-mounted wharf cranes each with a 5-tonne lifting capacity and one derrick crane with a 50-tonne lifting capacity; these cranes were manufactured in the 1950s. Two wharf cranes are no longer operational and cannot be repaired. There is also one old rail wagon crane with a 5-tonne lifting capacity.

The main cargo items handled at the port are coal and general cargo. Gantry cranes are equipped with a clamshell bucket for coal exports. General cargo is offloaded manually from the ships and loaded onto the trucks for transport to Lubumbashi. Usually passengers are transported together with this cargo. Vessels of private companies also carry cargo. The cargo throughput of SNCC at the port has been increasing in recent years as shown in Table 3.38.

Table 3.38: Cargo Throughput of SNCC at Kalemie Port

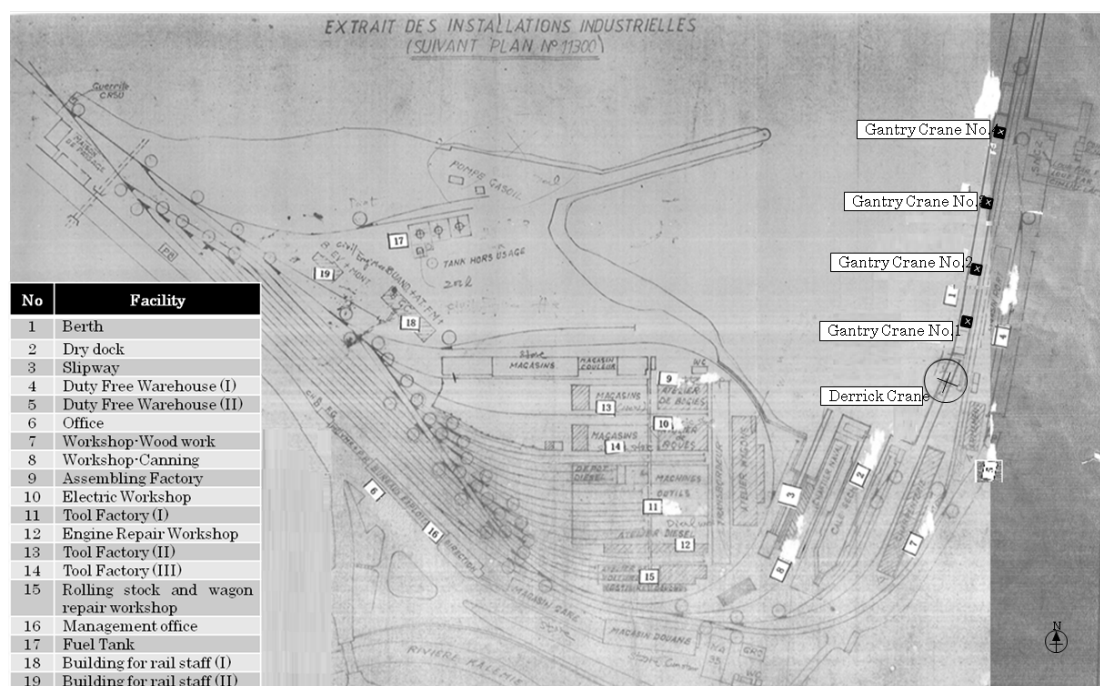
	Type of cargo	Year Unit	2006	2007	2008	2009	2010	2011
Export	Coal	ton	14,487	16,479	17,484	14,389	32,114	18,541
Import	General cargo	ton	791	8,904	9,461	11,724	15,281	36,202
	Total	ton	15,278	25,383	26,945	26,113	47,395	54,743

Note: The figures for 2011 are the total volume from 1 January to 7 September.

Source: Prepared by the JICA Study Team based on the data obtained from Société Nationale des Chemins de Fer du Congo

Road and railway conditions in the DRC around Lake Tanganyika are very poor. The distance between Lubumbashi and Kalemie is about 1,120 km. However, it takes more than three weeks by rail to transport cargo over this distance. The road from Uvira to Kalemie and from Lubumbashi to Kalemie is very bad; it becomes inaccessible during the rainy season. There is no plan for rehabilitation or development of the port.

The layout plan (Figure 3.8) and photographs of Kalemie Port are shown below.



Source: JICA Study Team

Figure 3.8: Layout Plan of Kalemie Port



Photo 3.48:
Dual Elevation Wharf (Kalemie)



Photo 3.49:
Damaged Concrete Deck and Piles (Kalemie)

Mpulungu Port in Zambia

Mpulungu Port is Zambia's only port. Mpulungu town is situated at the southern tip of Lake Tanganyika, between mountains, along the shore. The port is the gateway to the neighbouring countries on Lake Tanganyika. Zambia is currently exporting sugar, cement, reinforcing bars (rebars), and other cargo through this port to Burundi, Rwanda, and the DRC. With the completion of the construction boom associated with South Africa's hosting of the World Cup in 2010, construction has started booming in Burundi, and the export of construction materials including cement and rebars, from Zambia to Burundi, has sharply increased. Table 3.39 shows the cargo volumes at Bujumbura Port from Mpulungu Port over the past 10 years. Cement, construction materials, and sugar exported to Bujumbura through Mpulungu Port peaked in 2010.

Cement exports are transported from the cement factory at Lusaka to Mpulungu Port by road, a distance of about 1,180 km. Sugar exports are also transported by road from Mazanbuka, west of Lusaka. Imported cargo includes food products such as dried fish. If the transport route to South Africa is improved, coffee beans may be transported from Burundi through this port.

Table 3.39: Cargo Volumes at Bujumbura Port from Mpulungu Port

Unit: tonnes

Items	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Consumables	12	36	41				36	668		
Drinks			5							
Bitumen		250								
Slate	230						957	61		
Cement	14,493	35,862	46,631	28,946	46,142	42,079	12,035	7,039	31,043	92,091
Engine oil			300	1,047			150	83		
Lubricants	21	7								
Construction materials	469	502	309	568	118	58	322	601		1,834
Malt	250	497		116		180	820	55		
Paper	90	213	169	113	35	111	36			
Chemical products	396	559	241	10	223	150	28	212	23	
Salt				1,557			1,322			
Sugar	11,754	10,299	14,004	9,861	12,579	14,087	10,938	9,660	14,031	15,777
Forage crops		4								
Vehicles	2	22	16	40	93	514	131	90	71	81
Cotton										
Others	301	251	197	151	301	282	351	335	237	357
Total	28,017	48,500	61,914	42,409	59,491	57,461	27,126	18,805	45,405	110,140

Note: Yellow cells show the peak over the last 10 years.

Source: Société Concessionnaire de l'Exploitation du Port de Bujumbura (EPB)

MV Liemba, a cargo-passenger ship operated by MSCL, used to provide weekly services but currently its services are provided twice a month (fortnightly) due a decrease in cargo demand. The ship brings traders from Bujumbura in Burundi and Kigoma in Tanzania to sell their merchandise in Zambia. On its outward journey, it takes goods from Zambia to markets farther north.

The port has a 20 m long berth and three warehouses. Cement and sugar to export are stored in the warehouses and transported by four flat bed chassis to the berth, where a crawler crane is located to load them onto the ship. The cargo handling operation is carried out by a semi-governmental entity, Agro-Fuel Investments Ltd.

Photographs of Mpulungu Port and MV Liemba moored at the port follow.



Photo 3.50: Mpulungu Port



Photo 3.51: MV Liemba Moored at Mpulungu Port

The African Development Bank (AfDB) is assisting the Government of Zambia in rehabilitating Mpulungu Port to provide a gateway for Zambia's exports and imports to the Great Lakes Region. Also, AfDB is proposing a railway from Mpulungu to Nseluka on the TAZARA line. A rail link between Mpika and Mchinji is also under consideration. If the link is built, the rail distance from Mpulungu to Nacala Port in Mozambique will be substantially shortened. With the completion of this railway link, the trade route between the east coast of Africa and the landlocked countries of Burundi, Rwanda, and the DRC (the western shore of Lake Tanganyika) may change, as may also the route to the eastern shore of the lake in Tanzanian territory.

The Southern Africa Transport Network: Comparative Transit Transport Cost Analysis in 2001, assisted by the United States Agency for International Development (USAID), assessed development of the Mpulungu Corridor combining road, railway, and lake transport. The two routes assessed were:

Lusaka–Kigali (via Mpulungu)

Lusaka–Mpulungu (Zambia):	1,041 km (road)
Mpulungu–Bujumbura (Lake Tanganyika):	650 km (water)
Bujumbura–Kayanza (Burundi):	119 km (road)
Kayanza–Kigali (Rwanda):	230 km (road)
Total:	2,040 km

Lilongwe–Bujumbura (via Mpulungu)

Lilongwe–Karonga–Chitipa (Malawi):	693 km (road)
Chipita–Mpulungu (Zambia):	328 km (road)
Mpulungu–Bujumbura (Lake Tanganyika):	650 km (water)
Total:	1,671 km

(5) Lake Transport

For lake traffic, it is recommended to adopt a barge transport system for short courses of less than about 10 hours. Barge networks along arterial rivers in Europe (e.g., the Rhine, the Danube) are well developed. A typical fleet may include 32 TEU and 108 TEU double connection (48 TEU and 60 TEU barges connected) vessels. The following 32 TEU type of motor barge may be suitable for this improvement project:

32 TEU 2-person crew and fitted anti-heeling system:

Length overall (LOA) 67 m, beam 7 m, draft 2.75 m

800 tonnes

Speed of 24–30 kph in calm water

32 TEUs loadable in 2 rows × 8 bays × 2 tiers

Since this motor barge is shallow in draft and easy for container operation with a reach stacker/jib crane, it is good for general cargo transport in still lake water. Even if barges without engines are used, a towing or pushing system may be adopted for this lake traffic, which would still be better than the existing situation. These barges may carry cargo for 10 hours between Kigoma and Bujumbura, a distance 160 km. In the barge shuttle operation system, a tugboat can tow another barge when one barge stays on the wharf for cargo operation. Thus, 2–3 tugboats can take care of several barges.

Such a barge transport system can be used for general cargo. It is especially useful in shallow ports and ports with heavy siltation. There are two kinds of navigation routes on Lake Tanganyika (which is of a long, narrow shape), the long course of Bujumbura/Kigoma/Mupulungu and the short courses of Kigoma/Bujumbura and Kigoma/Kalemie/Uvira. Barge transport is especially economical along the route across the lake.

The advantages of barge transport include the following:

- The shape and the size of a barge may be designed to meet requirements and need not be regulated.
- The number of crew members onboard is smaller and their qualifications are lower than for ships.
- A tugboat can tow/push two or more barges.
- Barges can easily enter shallow berths. They may access sandy beaches.

The disadvantages of barge transport are as follows:

- Their speed is slow, about 7–8 knots at a maximum.
- It is difficult for barges to swing right/left when towed.
- No handling equipment can be equipped on a barge.
- The air draft of barges is small. Barges are easily pushed by swells.

(6) Cargo Handling

There are two main ports on Lake Tanganyika in Tanzania, Kigoma and Kasanga. Cargo handling in each is discussed below.

Kigoma Port

Kigoma Port has three shore cranes at quay to handle break-bulk cargo. However, these cranes date back to 1960 and one is currently out of order. Their lifting capacities have decreased from 5 tonnes to 3 tonnes. Cargo is handled between the ship and the quay by shore crane and manually carried on/off trucks and wagons. Cargo is moved between the quay and the warehouse with forklifts.

Kigoma Port has a gantry crane for use with containers up to 35 tonnes. It can cover the yard for rail wagons and ships alongside the quay. However, the gantry crane is currently out of order and the required spare parts have not been procured. Since there is no other handling equipment for containers, containerised cargo is devanned and transferred onto trucks.

Other than shore cranes and gantry cranes, the equipment for container handling includes the following:

- 4 forklifts (3-tonne capacity × 3, and 5-tonne capacity × 1);
- 10 trailers (40 foot trailer × 6 and 20 foot trailer × 4); and
- 2 terminal tractors.

Cargo handling is carried out by a private company but not by TPA.

Liquid products are transferred by tank truck or tank container to store in the tank in Kibirizi located 1.5 km north of Kigoma Port. They are transported to the DRC by MT Sangara owned by MSCL.

Kasanga Port

The quay of Kasanga Port is about 20 m long and provides working space for one gang. There are two warehouses at the backyard of the quay, one for “clean” cargo such as maize, maize flour, and rice, and the other for “dirty” cargo such as cement. Cargo handling is operated by a private company (Agro-Track Investments Ltd). During the loading operation, the cargo is taken from the warehouse, transferred to the quay by truck, and temporarily stacked on the quay before loading. The cargo is loaded by the ship’s gear or manually to the ship’s hold with a shoot. TPA owns a forklift and the trucks are owned by the private company. Since the quay is short, a cargo ship of the size of MV Teza has to be shifted during cargo loading.

(7) Ships and Shipbuilding

Ships

Table 3.40 lists ships owned by TPA and operated and managed by MSCL’s Kigoma branch. Shipbuilding usually is done on the beach and the newly built MV Malagarasi, which has been just registered under Tanzanian flag, is moored at the wharf. Photographs of two of the vessels follow the table, along with some note on MV Liemba.

Table 3.40: MSCL Fleet on Lake Tanganyika

Name	Ship kind	Built	Load (m)	B (m)	Draft (m)	Pax	Cargo(t)	Gross Ton	Engine(ps)	Speed (kt)
MV Liemba	Pass/Cargo	1913	71.4	9.9	3.0	600	200	755	2x1100	11.0
MV Mwongozo	Pass/Cargo	1982	59.5	9.6	2.5	800	80	800	1x1125	11.5
MT Sangara	Tanker	1981	38.8	5.8	2.0		410	200	2x190	8.0
MV Malagarasi	Cargo	2011								

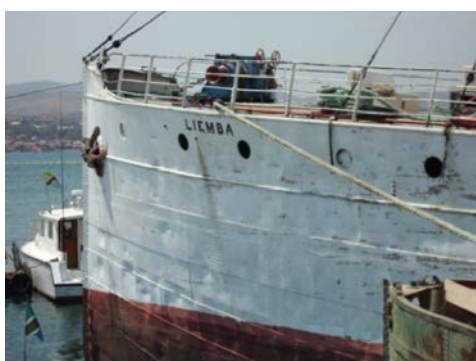


Photo 3.52:
MV Liemba (Built in 1913)



Photo 3.53:
MV Mwongozo (Built in 1982)

According to the Technical Status of MV Liemba issued by MSCL in 2010, it is the oldest merchant vessel in the world, built in 1913 at a German shipyard, and transferred to Lake Tanganyika, before being divided into several blocks and reassembled on a slipway in Kigoma in 1915. Steel plates in the outside shell were constructed by rivet, and are all in good condition without corrosion because the vessel has been used in fresh water. However, the machines, equipment, and other fittings inside the vessel have been replaced or renewed many times. The main engines were replaced in 1977 and 1993, from the original steam engines to diesel engines at present. Other auxiliary machines in the engine room and deck machinery (e.g., winch, steering gear, electrical equipment) is generally in good condition, but accommodation including passenger rooms needs repair and renewal. It was recently reported that the ship will be renovated from a cargo-passenger ship to a passenger ship. Illustrative photographs follow.



Photo 3.54:
MT Sangara (Built 1981)



Photo 3.55:
MV Malagarasi (New Building)

Repair/Shipbuilding Facilities

TPA's Kigoma office constructed a transversely launching type of slipway in 1912 for ship repair. It is able to accommodate ships of a maximum length of 70 m. The slipway is fitted with 11 horizontal cradles and an electro-hydraulic winch. Horizontal cradles were installed after 1925. For small vessels, the main shaft can be divided into two shafts in the centre position, removing the claw clutch. Vessels from other countries can also use the slipway, but Tanzanian vessels have priority when the slipway is busy. Illustrative photographs follow.



Photo 3.56:
11 Horizontal Cradles



Photo 3.57:
MV Mwongozo on the Slipway



Photo 3.58:
Electro-hydraulic Winch



Photo 3.59:
Claw Clutch



Photo 3.60: Lathe

The workshop for engines, auxiliaries, equipment, and fittings repair is located near the slipway; lathes and other machine tools are installed in the workshop.

3.2.5 Ports on Lake Nyasa

(1) Itungi Port and Kiwira Port

Itungi Port is located in the extreme north of the Lake Nyasa (also known as Lake Malawi). The port was once used as passenger terminal with a floating pontoon by the side, but now ships are not able to enter the estuary to Itungi because of sand banks created by southerly winds. The Kiwira river stream pushed this sand to the lake. The sand drifted along the shore to the north with the littoral drift generated by the southerly waves and reached the estuary where the pontoon is moored, and decreased river water volumes have caused significant siltation at the mouth of the estuary leading to Itungi Port.

Passengers go onboard ships at a new floating pontoon in Kiwira, 6 km from Itungi. There is a small passenger waiting area in Kiwira. The road to Kiwira is rough and is inundated in the wet season from February to April. During floods, Itungi Port is used to transport passengers to and from the ship with a small boat.

In Itungi, pontoons are pushed onto land in the dry/low water season. There is a big maintenance shop and steel slipway owned by MSCL to lift ships up for repair, but these have long been unused.

MSCL has two passenger-cargo ships: MV Songea and MV Iringa. MV Songea can accommodate 212 passengers and 40 tonnes of cargo, but has been moored at Kiwira for more than one year due to cracking on the bottom. MSCL has no docking plan for MV Songea until July 2012 because of full booking of the floating dock at Monkey Bay in Malawi. MV Iringa is smaller than MV Songea; it can accommodate 139 passengers and 5 tonnes of cargo. MV Iringa provides a daily means of transport for local residents. A photograph of MC Songea follows.



Photo 3.61: MV Songea Moored on the Beach

Other cargo to Kiwira includes Mchuchuma coal for a cement factory brought on a square lighter towed from Amella Bay several times a year.

(2) Mbamba Bay Port

Mbamba Bay Port is one of the two ports with port facilities on Lake Nyasa within Tanzanian territory. The other is Kiwira Port at Keyla. Mbamba Bay Port is the homeport of MV Songea

and MV Iringa, which make their last call within the territory of Tanzania when they travel the southwards from Itungi/Kiwira Port. From available photographic information, it appears that the port has one T-type pier with a wooden platform on the piles.

(3) Other Cluster Ports

There are 11 cluster ports between Itungi/Kiwira Port and Mbamba Bay Port along the eastern shore of Lake Tanganyika within Tanzanian territory. As the escarpment steeply falls into the lake, there is virtually no access from the landside to the villages situated on the shore. The services by MV Songea and MV Iringa provide an indispensable lifeline for the villagers. However, none of these cluster ports have port facilities such as piers. All passengers have to go on board and get off the ship using a small boat. Cargo has to be loaded from and unloaded to a small lighter by use of ship's gear. In addition, the services of these ships are halted by occasional breakdowns or strong southerly trade winds blowing from the south to the north along the longitudinal direction of Lake Nyasa. The villagers are likely to use a small boat for their travel. This is dangerous and is one reason why passenger volumes on MSCL ships have been decreasing. Therefore, it is necessary to introduce RoRo ships of appropriate dimensions so that cargo can be transported quickly and travel on the lake can be made safer.

(4) Ports in Other Countries

Nkhata Bay Port in Malawi

Nkhata Bay Port in Malawi is on the shore of Lake Nyasa across from its counterpart port at Mbamba Bay in Tanzania. Nkhata Bay Port is one of the main ports on the lake. From the Google Earth image, it was determined that the port has one floating pier connected to the land with a trestle and there are two warehouses.

Currently, MV Songea or MV Iringa of MSCL of Tanzania calls at the port as a returning point on their service route. A small scale of trade between Tanzania and Malawi is being carried out with MSCL's ships and motorized dhows; for example, when excess sugar is produced in Malawi, it is exported to Tanzania. Reportedly, the Government of Malawi has a plan to introduce ferry service between Nkhata Bay and Mbamba Bay. The port is called on by the MV Ilala steamship travelling up Lake Malawi from Monkey Bay in southern Malawi, to Chilumba in the north, via Likoma Island and Chizumulu.

Monkey Bay Port in Malawi

Monkey Bay Port is one of the main ports on Lake Nyasa situated on the shore at almost the southern end of the lake. Although it is more than 500 km from Itungi/Kiwira Port in Tanzania and it is a small port, Monkey Bay Port is indispensable for lake transport within Tanzanian territory because it is the only port on Lake Nyasa that has ship repair facilities. MV Songea, the larger of the two cargo-passenger ships that MSCL operates on Lake Nyasa, has been waiting for the availability of the floating dock moored at Monkey Bay Port for repair of its hull. On Google Earth, a floating dock with dimensions of about 50 m by 20 m is visible.

Two passenger ferries make weekly sailings along Lake Malawi between Monkey Bay and Chilumba. One is the MV Ilala, a 350-passenger steamship that has served the route since 1951. The road connection to Monkey Bay has been developed with assistance of the European Union. A total of 420 km of road were rehabilitated/maintained during 2002–2007, including: Mangochi–Monkey Bay (€8 million) and Masasa–Golomoti–Monkey Bay (€17 million). There is the Marine Training College at Monkey Bay, the training facilities of which have been provided by projects funded by JICA and the Icelandic International Development Agency (ICEIDA).

(5) Lake Transport

The frequency of passenger ship service should be increased on Lake Nyasa to better serve local residents, especially considering that lake passenger ships are their only means of transport. There is no suitable road along the lake because of consecutive steep cliffs rising directly from the lake. Motor vehicles must make a long behind the mountains. Therefore, ship traffic is essential for daily life. The passenger ships are fully occupied every voyage. The intervals between passenger services have lengthened since MV Songea was damaged. There is demand for a larger passenger ship to maintain regular service even in times of strong winds and swells.

The cost of the dredging to remove the sandbar will be a burden in case the existing Itungi Port is utilized. Accordingly, the passenger terminal should be moved to Kiwira. A new port road should be constructed at Kiwira so that buses may come to the pier even during floods. The cement manufacturer could join this new road construction venture.

Cargo demand is low at present as stated above. This small cargo volume can be loaded manually on board passenger ships for the foreseeable future.

(6) Cargo Handling

Itungi is the only main port on Lake Nyasa. Because the sandbank has made the port entrance shallow and narrow for navigation, a new landing site has been located at Kiwira 5 km from Itungi.

At Kiwira, there is a steel pontoon on the sandy shore on which the ships are berthing. Cargo handling between the ship and the pontoon is by ship's gear in the case of MV Songea, while cargo is transferred manually between the pontoon and the sandy shore. Cargo handling between MV Iringa and the quay is done manually, as the ship has no gear. Bulk cargo such as coal, which is used for the cement factory at Mbeya, is unloaded by temporarily building a rubble mound jetty and steel slab on the shore.

(7) Ships and Shipbuilding

Ships

Table 3.41 lists ships owned and operated by MSCL at the Itungi branch.

Table 3.41: MSCL Fleet on Lake Nyasa

Name	Ship kind	Built	Load (m)	B (m)	Draft (m)	Pax	Cargo(t)	Gross Ton	Engine(ps)	Speed(kt)
MV Songea	Pass/Cargo	1974	31.5	5.9	1.9	213	50	199	2x226	8.0
MV Iringa	Pass/Cargo	1974	31.5	5.8	1.9	125	5	199	2x226	8.0

Repair/Shipbuilding Facility

There used to be a slipway with dimensions of 50 m × 10 m with 50-tonne winch capacity in Itungi Port, but it can no longer be used. A photograph presenting a trace of the slipway is presented below.



Photo 3.62: Trace of Slipway

MSCL has a workshop in Itungi Port for minor ship repair. However, if the ship hull has to be repaired in dry conditions, the floating dock in Monkey Bay in Malawi is the only facility that can be used for this purpose. All vessels go there when periodical surveys, inspections, and repairs are necessary. The floating dock can be used for shipbuilding.

