Technical Report:

Logistics Review of the Beira and Nacala Corridors

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LIST OF ACRONYMS

AfDB	African Development Bank
AICD	Africa Infrastructure Country Diagnostic
ANE	Container Freight Station
B/L	Bill of Lading
C&F	Clearing and Forwarding
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CdM	Cornelder de Mozambique, Lda
CDN	Corridor de Developmento do Norte
CFM	Portoes e Caminhos de Ferro de Mozambique
CFS	Administracao Nacional de Estradas
CIF	Cost Insurance and Freight
COMESA	Common Market for East and Southern Africa
COO	Certificate of Origin
CPMZ	Companhia e Pipeline Mocabique-Zimbabwe
CRS	Constant Returns to Scale
DCT	Durban Container Terminal
DEA	Data Envelopment Analysis
DFID	Department for International Development
DMU	Decision Making Unit
EDI	Electronic Data Interchange
ETA	Estimated Time of Arrival
FCL	Full Container Load
FEU	Forty-foot Equivalent Unit
FOB	Free on Board
GDP	Gross Domestic Product
GOM	Inland Container Depot
GP	General Purpose
ICD	Government of Mozambique
ICT	Information and Communication Technology
ISPC	International Ship and Port Facility Security Code

JICA	Japan International Cooperation Agency
KM	Kilometer
KPA	Kenya Port Authority
KPI	Key Performance Indicators
LFC	Less Than Full Container
M	Meters
MCNET	Mozambique Community Network
MT	Metric Tons
MTC	Ministry of transport and Communications
NA	Not Available
NCL	NCL and AFRICA, Import and Export Lda
PMAESA	Port Management Association for East and Southern Africa
POL	Petroleum, Oil and Lubricants
PPP	Public-Private Partnership
RTG	Rubber Tire Gantry crane
SADC	Southern African Development Community
SATH	Sothern Africa Trade Hub
SCDN	Sociedade de Desenvolvimento do Norte
SEWS	Single Electronic Window System
SSG	Ship to Shore Gantry Crane
TEU	Twenty-Foot Equivalent Unit
THC	Terminal Handling Charges
TIMS	Transit Information Management System
TN	Terminais do Norte
TOS	Terminal Operating System
TPA	Tanzania Port Authority
UNCTAD	United Nations Conference on Trade and Development
US$	US Dollar
USAID	United State Agency for International Development

Introduction

The United States Agency for International Development (USAID) through this study, undertook a logistic review of Beira and Nacala corridors to establish what improvements in efficiency and reduction of costs at the ports could entail for the agriculture/agribusiness sectors of Mozambique and neighboring countries in the region. The review was undertaken jointly by the USAID programs, namely, AgriFUTURO Program and the Southern Africa Trade Hub (SATH).

The assessment unpacked the causes of the poor performance of the Nacala and Beira ports and corridors they serve, with the view of sharing some of the best practices of ports and corridors in the region in order to reduce the delays at these ports. Reduction in port dwell time through legal and regulatory reforms, as was done in Durban, could reduce the cost of doing business through these two transport corridors.

Purpose and Objectives of the Assessment

The main objective of the assessment was to determine:

- The current ports capacity and efficiency (cargo throughput and traffic, ships traffic, number and size of gantries, container movements, relevant bulk handling equipment, storage, frequency of sailings etc.);
- The port dwell time and the legal and regulatory changes necessary to reduce the dwell time if any;
- The goods clearance procedures and documentation for exports and imports of all relevant agencies in the ports and assess whether they promote or hinder port efficiency;
- Other causes for substantial delays in clearing cargo at the ports as compared to other ports in the region, specifically Durban, and recommend actions to address this;
- Establish the modal split by road and railway of goods entering and exiting the port, including the port's capacity and efficiency in clearing inland cargo for export and import; and
- Time and cost chain analyses to determine where the major time and costs in movements occur.

Key Findings

The study observed the region served by Beira and Nacala corridors is endowed with high potential for production and consumption, and is experiencing rapid economic growth. However, this growth is faster than the expansion of capacities and developments of roads, rail, ports and pipeline infrastructures and systems that serve the movement of goods. For instance, the expansion of coal mines at Moatze in Tete Mozambique alone is projected to reach annual production of 20 million tons, and to be handled through Beira and Nacala railway systems and

ports by 2015. Urgent attention is therefore required for upgrade and improvement on inefficient areas. The following are the key areas of findings and recommendations:

Ports

- Beira and Nacala offer significant geographical and overall land transport costs advantages over the competing regional ports from the common hinterlands.

- However, Beira and Nacala Ports do not offer favorable productivity and efficiency advantages compared to other ports in Eastern and Southern Africa. When benchmarked against several standard Key Performance Indicators (KPIs) affecting port operations, including delivery, storage, transfer; and loading and discharging cargo, as was done in this assessment, both ports exhibit remarkable inefficiencies and low productivity.
- Another revealing finding is that neither Beira nor Nacala Ports use a common set of KPIs. This is in part due to difference in contractual concession arrangements. Whereas Beira Port Container and General Cargo Terminals are under management contract from CFM, to Cornelder de Moçambique, The Port of Nacala has been concessioned to Corredor de Desenvolvimento do Norte by the Mozambican Ministry of Transports and Communications.
- CFM functions both as the regulator and an equity owner in ports and railways concessions. This is an issue the proposed regulator will undoubtedly have to address once the regulatory structure has been fully established.
- Dwell times for both ports are exceedingly high, with annual average for 2011 of 18.25 days for Beira Port and 26 days for Nacala Port. This is at a time when the dwell time at Durban Container Terminal is under four days and well below the international benchmark of less than seven days. In addition to port terminals concessionaires shortfalls, other important contributing factors to high dwell times in Beira and Nacala include a significant number of empty boxes kept inside the port by several shipping lines, as well as use of marine terminals for confiscated containers by customs authorities.
- The average truck cycle time for Beira and Nacala Ports in 2011 were respectively 4.1 and in excess of six hours. The international standard, which all ports try to achieve, is under one hour. By comparison, the benchmark results for Durban Pier 1 and the Port of Elizabeth indicate performance for average truck cycle times of 15 and 18 minutes, respectively.
- There is shortage of adequate equipment, especially reach stackers, terminal tractors and trailers to perform routine port handling operations, which lowers the port's productivity and efficiency. The situation is worse at Nacala Port where the equipment availability is less than 35 percent.
- Both Beria and Nacala Ports are experiencing significant capacity problems at their container terminals. In 2011, Beira Port was at 91.4 percent of its

container terminal capacity of 175,000 Twenty-Foot Equivalent Units (TEUs). By 2015, the projected traffic demand for container traffic at Beira Port is expected to reach 280,000 TEUs. To rebalance its terminal capacity utilization rate to below 80 percent and meet the projected traffic demand, Beira Port plans to expand its container terminal capacity to 400,000 TEUs by 2015. This is year over year average of 75,000 TEUs by per year. The result of the expanding container terminal to 400,000 to 450,000 TEUs yields a capacity utilization rate of between 62 to 70 percent. Nacala Port has also exceeded its container terminal capacity of 75,000 TEUs. In 2011, Nacala Port handled 89,719 TEUs, which is almost 20 percent above its terminal capacity. By the following year, the Nacala Port exceeded its terminal utilization rate by 21 percent above the benchmark terminal utilization rate of 80 percent.

- A review of the legal and regulatory structure found no evidence that the Mozambican laws or maritime regulations adversely impact on container or vessel dwell times.
- Currents efforts underway at the Port of Beira to develop the port's infrastructure involve expanding the container terminal and building a new coal terminal, fertilizer terminal, quay extension by 540 m as well as a dedicated dry bulk terminal (excluding coal). For Nacala, new developments include expansion of the container terminal, adding a dedicated mooring facility for oil tankers, as well as construction of a coal terminal on the other side of the bay at Nacala-a-Velha.

Customs

- Mozambique is implementing a Single Window Electronic System (SEWS), which will cut the lead time for customs clearance considerably. Implementation has been done with port community users at Maputo, Beira, and Nacala.
- Full pre-clearance of goods has not been authorized in Mozambique. The law provides issue of "contramarca", which is the sequential entry number of means of transport at a given customs border in Mozambique. Every vessel calling at Mozambican ports is assigned the respective order number at entry point while proceeding to berth, without which customs clearance cannot be accomplished. It is worth noting that the customs clearance time at Beira and Nacala ports has not been a major problem as the process even before SEWS took 1-2 days. The process with full implementation of SEWS is estimated to take less than half a day. This is by far better compared to 3-4 days of customs clearing in East African ports.
- Mozambique is yet to implement some critical instruments on regional facilitation of trade and transport, which includes Regional Transit Bond Guarantee and establishment of customs to business forum.
- Scanning charges are made on full load consignment and not on the actual cargo scanned. This bears significant logistic cost increase to shippers with

big consignments, and pushes the prices of commodities high as they seek to recover additional costs from final buyers of their products.

- Inefficient communication channels between customs authorities and shippers at both Ports of Beira and Nacala. There is no forum to discuss relevant customs matters such as new procedures and systems prior to implementation, to gather ground inputs and ensure ownership of the new processes from shippers and their agents.

Roads

- Both Beira and Nacala corridors have sections of roads which are in poor conditions. The sections fall on main arterially roads and are Beira-Inchope (135km), Mocuba-Milange (192km), and Nampula-Cuamba-Mandimba-Lichinga (748km). The sections impacts heavily on vehicle operation costs and transit time.
- Vehicle overloading is a major concern on the corridors. It is estimated that about 25-35% of trucks in both corridors are overloaded. Truck operators overload to increase their productivity and offer lower prices to customers. This in the long run is not safe and drives up maintenance costs.

Railways

- The railway systems are yet to exploit the economies of scale in bulk haulage and long distances due to their poor performance. Factors contributing to poor performance include lack of maintenance which leads to deterioration of the line and increase in turnaround time of the rolling stock, and shortage of both wagons and locomotives.
- The tariffs on the railway lines are said to be high and contributing to diversion of cargo from railways to the roads, especially on Beira railway system.
- There are no KPIs established on railway operations.

Shipping Developments

- Both Beira and Nacala are repositioning themselves as regional ports and are receiving direct calls that connect to East Africa and East Asia. For Beira port, this has largely been enabled by dredging of the channel which was completed in July 2011.
- There are a multiple of shipping lines local charges, which have very high cost margins. This increases costs of goods, especially for exports that have to compete in the international markets.

Transit Time Analyses

- Transit times in the corridors are observed to be very high with ports accounting for the largest share with cargo inventoried in storage areas. High port dwell time is a major source of inefficiency where on average cargo takes 17 to 20 days for delivery on transit destinations.

- Driving times are also high due to poor condition roads at Beira-Inchope and Mocuba-Milange road sections. The transport operators due to poor road condition have abandoned the route Nampula-Cuamba-Mandimba, which is a shorter route to Malawi due to its poor condition.
- The border crossings have long clearing times of an average one day for all borders observed. This is considered to be very high noting that all logistic formalities have been cleared with the uplift of cargo at the ports.

Cost Chain Analyses

Road haulage costs:

- Poor condition of road contributes significantly to high costs of transportation. Generally, road haulage on both corridors is very expensive with a cost of US$5.96 per TEU-km on Beira-Machipanda, US$4.11 per TEU-km on Beira-Harare; US$4.03 per TEU-km on Nacala-Milange-Blantyre; and US$3.47 per TEU-km Nacala-Milange-Lilongwe.
- Comparatively, road haulage costs are higher on Nacala corridor than Beira corridor due to long sections of poor road on the Nacala corridor.

Border costs:

- Border costs are high caused by multiple and cumulative costs which includes road toll fees, insurance, carbon tax, vehicle permit and port health permit. The costs though by countries which are members of Southern African Development Community (SADC) are not harmonized. Border costs are high compared to other corridors served by Mombasa, Dar es Salaam and Maputo Ports.

Railway haulage costs:

- The rail systems have lower costs of transportation compared to road transport. However, due to its underperformance, Beira railways system does not enjoy the economies of scale as it only handles 3% of transit traffic and 10% of the national traffic handled at Beira.

Special Export Terminal

- Customs has issued a service order requiring operations related to exports through Nacala Port to be carried out at a special export terminal for customs control. The terminal that is located 9km from the port is owned and operated by NCL and AFRICA, Import and Export Lda (NCL), a private operator.
- One of the major concerns is that the export terminal could result in higher tariffs to exporters. Analyses undertaken already indicates that the NCL handling charges are US$87 and US$156 higher than Nacala Port's handling charges for 20' foot and 40' foot containers, respectively. This is 44% more expensive in handling charges at NCL in both categories of containers.
- There are additional logistic movements and handling costs which have also resulted from the requirement to clear export cargo through the terminal.

Key Recommendations

Ports

- USAID undertake Ports Efficiency Improvement Program (PEIP) on ports area that entails:
  - (a) Support for establishment of a Port User Group as a forum for users of Beira and Nacala Ports to inform operational and policy decisions by the Government of Mozambique and the concessionaries;
  - (b) Support to establish standards, collection, use and publication of standardized productivity and efficiency indicators for all Mozambican ports, including those operating under concession agreements;
  - (c) Support including technical assistance and training for the creation of a PPP subscription-based advanced container information management and tracking system for port users of the Nacala and Beira Corridors; and
  - (d) Support and establish initiatives to reduce dwell time through shippers' behavioral changes on ports as storage areas, free periods allowed, ports tariffs, and ports operational efficiency.
- Recommend that Corridor de Developmento do Norte (CDN) undertake urgent steps to acquire additional port handling equipment to improve its operational efficiency and productive capacity.
- CFM create two gates for port entry and exit to alleviate traffic jam and hence congestion, inside the ports.

Customs

- USAID undertake PEIP on customs area that entails:
  - a) Support review of regulation to allow for cargo pre-clearance by repealing requirement to provide a sequential entry number of vessel (contramarca) for import cargo;
  - b) Support to establish customs forum that brings together all stakeholders involved in undertaking customs formalities. Such should be established as a permanent committee that meets regularly to discuss issues involving customs facilitation; and
  - c) Support to prepare a Standard Operating Procedures Manual for all customs clearance regimes that should be produced, updated as required and made available to all customs officers, transit agents and brokers at the clearing points.
- Recommend Mozambique Revenue Authority (MRA) to review, provide and make available regulation for random scanning of goods (instead of full shipments).
- Recommend MRA to eliminate scanning charges of goods, which are considered as operation costs of customs. This will have substantial effect on reducing the handling costs of goods.

- Recommend MRA to eliminate SEWS charges, which are considered as customs operation costs. The effect will be to reduce handling costs of goods.
- Recommend MRA to establish and publicize a toll free line for reporting incorrect practices.

Roads

- Government of Mozambique through Japan International Cooperation Agency (JICA) is undertaking both the preparation of the Nacala Corridor Economic Development Strategies, and upgrade of the Master Plan for the expansion of the Nacala port. A finalization of these studies will provide with some of the future strategies and actions required to address the capacity upgrade and operational efficiency of the Nacala corridor. A similar undertaking by Government of Mozambique that addresses the entire corridor approach is required for Beira corridor.
- Urgent need by Container Freight Station (ANE) and Government of Mozambique to rehabilitate identified road links to reduce their impact on transport costs and time. ANE may consider tendering for concessions as quick approach to funding and maintenance.
- ANE undertake a pragmatic approach and provide adequate weighbridges for overload control. The management of the weighbridges can also be concessioned for operational efficiency.
- The Government and ANE undertake to have corridor links considered in the SADC and development partners' regional programs and receiving funding for their development.

Railways

- CFM undertakes to improve the management and operation of the Beira railway system by buying more wagons, locomotives and upgrading of rail tracks. CFM can consider a strategic partner for investment and management.
- Upgrading of Nacala railway system by investing on wagons, rolling stock and rail tracks.
- CFM and railway operators establish KPIs on railway operations.

Shipping

- USAID undertake PEIP on shipping area that entails:

  a) Support to establish the corridor shipping councils that will comprise all stakeholders, including ports and shipping lines that will consider optimal solutions for various costs and operation efficiency. The councils will look at many other matters geared to increase trade and make the corridors competitive; and

  b) Support to establish a market oriented regulatory authority that will guide on optimal charges.

- Beira and Nacala ports undertake to collect the stevedoring charges. This will have immediate effect of reducing any cost mark-up and lowering the terminal handling charges.

Border Post

Border posts measures by Government include:

- USAID undertake PEIP on border post area that entails:
  a) Support to establish one-border posts on Beira and Nacala corridors to reduce clearing time by minimizing duplication of processes; and
  b) Support an assessment of border posts operation efficiency.
- Government of Mozambique to work with corridor countries and implement the SADC trade and transport facilitation instruments on documentation and processing for cargo, vehicles and persons crossing the borders.
- Government of Mozambique to invest on information facilities at the borders.

Special Export Terminal

- Recommend that Mozambique Customs authorities provide export terminal market access and open registration for other market participants and eliminate NCL's monopoly position. This will create competition that will ensure optimal service level and competitive prices.
- USAID working with the Mozambique Customs support establish KPIs and relevant statistical requirements with NCL to measure the operation efficiency of the NCL export terminal and other terminal that may be created.

Structure of the Report

Presented below is the organization and contents of this Assessment Report. The report contains the following six Chapters:

- Chapter 1 below is the introduction and background to this study. This section also describes the objectives of the study and outlines the methodological approach, which includes data collection, data analysis, and the expected output from the assessment. The Chapter also present the macro-economic framework of the region and describes the transport infrastructures and supply characteristics.
- Chapter 2 assesses the productivity and efficiency of Beira and Nacala ports and undertakes a three dimensions process analysis on gate, terminal and quay.
- Chapter 3 assesses the service level that customs clearance provides, and examines customs procedures and documentation, legislation and regulation requirements impact on time and costs, and regional compliance.
- Chapter 4 presents critical path review of Beira and Nacala corridor performance. The Chapter examines the logistic performance of the corridors measured on time, costs and reliability. The Chapter also presents and

examines logistic costs of requirement for a centralized location of customs clearance for exports at the NCL, which is a special export terminal at Nacala.

- Chapter 5 finally presents a number of summaries of key findings on areas assessed that include ports, customs, road, railway and shipping, and key recommendations for improvement.

1.0 LOGISTICS REVIEW OF THE BEIRA AND NACALA CORRIDORS

1.1 Introduction

1.1.1 Background

The findings of various studies and assessments undertaken in the region reveal that over 65% of the time goods take to go through SADC transport corridors is spent at the ports, indicating the need to improve ports efficiency and reduce delays in order to reduce transport costs and transit times through corridors served by these ports. However, some ports have been doing better, thanks to the strategic heavy investment. Durban for instance takes an average of four days to clear, albeit at a higher cost while Beira and Nacala Ports stand out as being slow to clear and expensive.

The United States Agency for International Development (USAID) through this study undertook a logistic review of Beira and Nacala corridors to establish what improvements in efficiency and reduction of costs at the ports could imply for the agriculture/agribusiness sectors of Mozambique and neighboring countries in the region. The review was undertaken jointly by the USAID programs, namely, AgriFUTURO Program and the Southern Africa Trade Hub (SATH).

The assessment unpacked the causes of the poor performance of the Nacala and Beira ports and corridors they serve, with the view of sharing some of the best practices of ports and corridors in the region in order to reduce the delays at these ports. Reduction in port dwell time through legal and regulatory reforms as was done in Durban could reduce the cost of doing business through these two transport corridors.

AgriFUTURO

The purpose of USAID's AgriFUTURO Program is to increase Mozambique's private-sector competitiveness by strengthening targeted, agricultural value chains. The Project in its four major components focuses on value chain development as a means of creating incentives to:

- Improve the Enabling Environment for Agribusinesses;
- Expand and Strengthen Agribusiness Development Services;
- Build Linkages to Financing Services for Agribusiness Development; and,
- Increase and Strengthen Public-Private Partnerships.

USAID's AgriFUTURO Program leverage innovations and improvements in specific value chains to improve the competitiveness of Mozambican agribusiness in general and, specifically, to bring about change in the overall business environment.

Southern Africa Trade Hub (SATH)

The overall goal of the SATH is to increase international competitiveness, intra-regional trade, and food security in the SADC region. SATH will deliver

targeted technical assistance to governments, the private sector, and civil society organizations in support of advancing regional integration and increasing the trade capacity of selected value chains within Southern Africa. The project addresses regional issues that include:

- Strengthening the technical and management capacities of the SADC Secretariat and other regional bodies that promote trade and address food security;
- The provision of technical assistance aimed at reducing trade costs through harmonizing policy, enhancing regulatory efficiency, and improving delivery in both the public and private service sectors (e.g., energy, finance, investment, Information and Communication Technology (ICT));
- Continuing to support trade corridors to expand trade opportunities; and
- Development of regional information sharing and monitoring networks for market information and the sharing of 'best practices' which is an effective incentive for encouraging regulatory and policy reform.

The Statement of Work for the assessment is given in Annex 2.

Purpose and Objectives of the Assessment

The main objectives of the assessment is to: a) review previous studies conducted pertaining to Beira and Nacala corridors; b) assess the efficiency with which cargo is moved in and out through the Beira and Nacala ports; c) conduct a detailed assessment of the critical path for exports and imports through the Beira and Nacala corridors, and determine where major costs in movements occur; and d) identify interventions necessary to improve the efficiency of Beira and Nacala Ports and the corridors.

The Assessment Team undertook to determine:

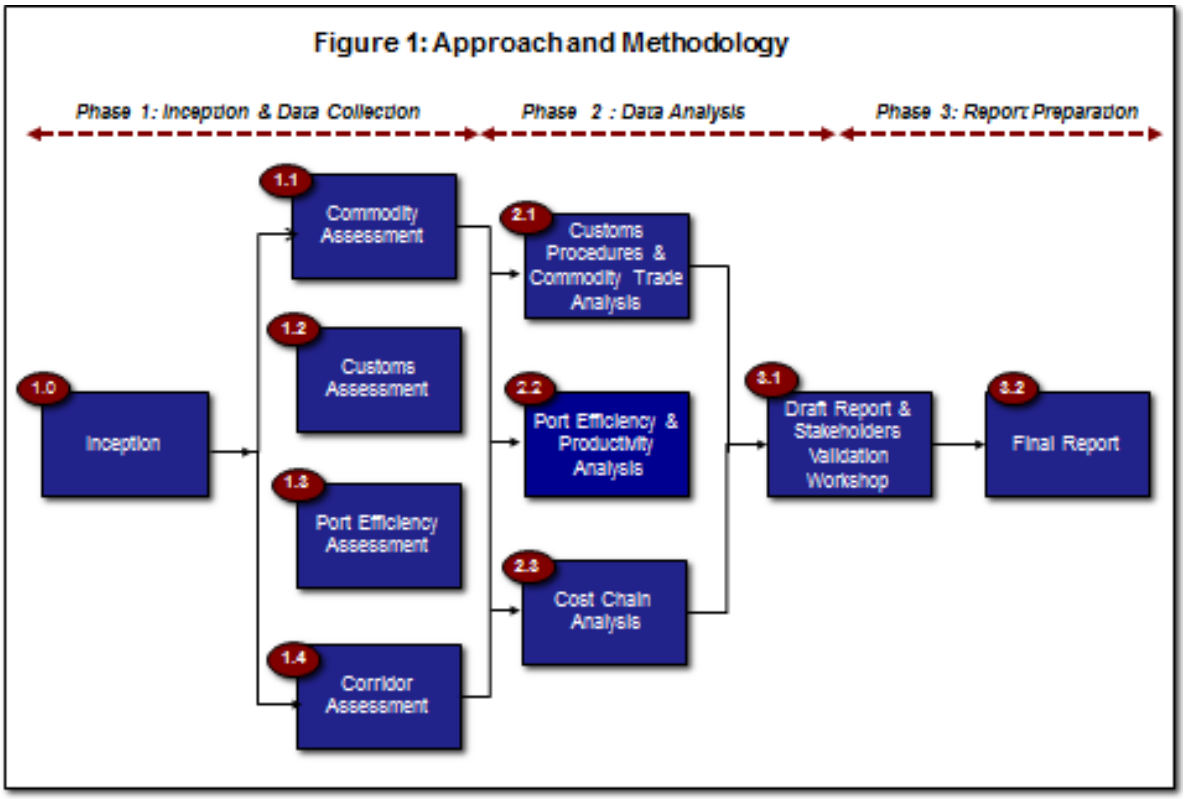
- The current ports capacity and efficiency (cargo throughput and traffic, ships traffic, number and size of gantries, container movements, relevant bulk handling equipment, storage, frequency of sailings etc.);
- The port dwell time and the legal and regulatory changes necessary to reduce the dwell time if any;
- The goods clearance procedures and documentation for exports and imports of all relevant agencies in the ports and assess whether they promote or hinder port efficiency;
- Other causes for substantial delays in clearing cargo at the ports as compared to other ports in the region, specifically Durban, and recommend actions to address this;
- Establish the modal split by road and railway of goods entering and exiting the port, including the port's capacity and efficiency in clearing inland cargo for export and import; and
- Time and cost chain analyses to determine where the major time and costs in movements occur.

Methodology and Approach

The approach and methodology give the manner in which the team planned to achieve the outcomes described above. A diagrammatical overview of the methodological flow and execution of the assessment is indicated below.

The approach and methodology was organized in three phases, namely:

- Data collection;
- Data analyses; and
- Report preparation.



Data Collection

The data collection methodology entailed:

a) A desk study review of what exists already in current/previous studies, and obtaining additional data from sources and contacts; and

b) Field visits for observations and direct interviews with stakeholders and operators. Interviews were conducted targeting diverse groups representing specific sectors, individual companies and agencies, which included:

- Shippers — traders, manufacturers, and retailers;
- Transport service providers—ports, shipping lines, inland container depots, truckers, railways and pipeline operators;

- Freight forwarders — freight forwarders, clearing agents, insurance companies;
- Government ministries and agencies—transport ministries, customs agencies, regulatory entities and regional government entities; and
- Regional and multi-national organizations and agencies – SADC, Common Market for East and Southern Africa (COMESA), Port Management Association for East and Southern Africa (PMAESA), World Bank, African Development Bank (AfDB) etc.

Data collection involved visits to Beira, Nacala, Nampula and Maputo with more than 50 interviews from March 26 - May 20, 2012 being done.

Data analyses

The analytical framework focused on variables to measure the operational efficiency of the corridors. The corridors were considered as comprising the nodal points, links and enabling environment. Nodes represented the ports and borders. Information on nodes covers their physical characteristics and operations. For example, information on the port covers the channel, the berth, the yard, customs clearance, and the gate. The links are routes segments with unique characteristics and includes the roads, railway and pipeline. Information on links includes modal-oriented information that defines performance (e.g., capacity, price, and travel time). In the enabling environment, the study considered how the corridors are organized, governed, administered and operated. This entailed the team study on the sector policy and strategic objectives, legal and regulatory framework of Mozambique and SADC that govern the region approach.

Report Preparation

The final report is the final deliverable that was preceded by the corridors stakeholders' validation workshops, organized at Beira and Nampula. Key outputs of the assessment are listed below:

- Inception report;
- Draft final report;
- Two validation workshops, organized at Beira and Nampula, bringing together stakeholders' to review and consider the draft final report; and
- Final report, which incorporates comments and updated information from the stakeholders.

Key Study challenges

The study team made a lot of success in gathering information from the field and data received and making analyses for report writing. However, the following are challenges encountered:

Roads and Road Transport

- Limitation of field visits to Beira and Nacala taking away the opportunity to observe the corridor operation activities on routes, border points, and production and market centers. Consequently, the study could not undertake full cost analyses for markets and transport costs for exports that are charged from their point origin from Malawi, Zambia, and Zimbabwe.
- Lack of verification of information gather on borders post and condition of roads.
- No route observation on operational activities, which include weighbridges and road blocks and other route activities.
- Lack of information on traffic counts for both Beira and Nacala corridors. The information was critical for analyses on traffic volumes and market demand and supply.

Ports and Shipping

- Limited information on Key Performance Indicators (KPIs) for both ports by operators/concessionaires and CFM, which includes performance measurements and targets.
- Lack of marine service information especially at Beira.
- Lack of information on Nacala Port Master Plan.
- Lack of legal framework governing concessions.

Railways

- Limited information on KPIs for both ports by operators/concessionaires and CFM, which includes performance measurements and targets.
- Lack legal and operating framework governing concessions.

Other major challenge encountered frequently is slow response on information requested.

Travels were curtailed by late mobilization of resource persons on commodity and customs, and unavailability of data collectors. However, initial scope had scheduled corridor trip visits.

Despite the challenges encountered the assessment received excellent cooperation from all stakeholders, including officials of Government of Mozambique, customs, CFM, ports and railway concessionaires, shipping agents, shipping lines, transporters, customs brokers, clearing and forwarding agents, exporters, importers and other actors and agents met in the field visits.

1.2 Macroeconomic Performance

The Beira and Nacala corridors are strategically located to serve the economies of Mozambique, Malawi, Zambia, Zimbabwe, DR Congo and Botswana. The southeastern part of Tanzania can also be served through Nacala Port. The operational efficiencies of these corridors have links to the economic growth and production of these countries, which have the following socio-economic characteristics given in Table 1. Figure 2 below shows a map of the regions served by Beira and Nacala corridors.

Table 1: Socio-economic Indicators in Easter Corridors Countries

Country	Mozambique	Malawi	Zambia	Zimbabwe	DRC	Tanzania
Area (km²)	799,000	118,484	752,612	390,580	2,345,409	947,300
Population (2012 Projected)	24 million	14.9 million	12.9 million	12.6 million	65.9 million	22.9 million
Economic Growth (%) (2010)	6.8	3.8	5.9	8.2	0.66	4.0
GDP Per Capita US$ (2010)	457	339	1255	593	199.5	551
Major Exports	Sugar, cashew nut, maize, cotton, tobacco, timber, fish, coal, aluminum, natural gas, sesame, soya beans, granite	Tobacco, tea, sugar, cotton, coffee, peanuts, sesame, nuts	Copper, cobalt, cotton, sugar, tobacco timber, Ferro-chrome	Tobacco, tea, granite, nickel, timber, steel, Ferro-chrome, iron ore, cotton, coffee, graphite, copper, cobalt, maize, wheat	Copper, sugar, coffee, zinc, diamond, cobalt	Fertilizer, wheat, sugar, coffee iron, , sorghum
Trade: Export (2010)	2.59 billion US$	964 million	7.2 billion	2.3 billion	10.9 billion	5.6 billion
Trade Imports (2010):	4.59 billion US$	1.6 billion	4.7 billion	3.6 billion	7.8 billion	7.1 billion

Source: Institute Nacional De Estatistica (Mozambique), CIA Fact book and World Bank's World Development Indicators

Figure 2: Eastern Corridors

1.3 The Corridors Transportation System

Table 2: Beira and Nacala corridor transportation systems

Corridor	Port	Road	Railway	Pipeline
Beira Corridor	Berth number: 12 berths	Account 95% freight traffic	Account 3% of freight traffic	Account 2% of freight traffic
	Berths length: 1914m	Beira port link to Mozambique, Zimbabwe, Malawi, Zambia, Botswana, and DR Congo	Network link to Zimbabwe	Oil pipeline link to Zimbabwe (Feruka)
	Draught: 9-12 m			
Nacala Corridor	Berth number: 6 berths Berths length: (982m)	10% traffic by road Road freights to/from Malawi, Zambia, and DR Congo	Account 90% of freight traffic Nacala port network link Mozambique, Malawi, Zambia	(3.5km from port to tankers outside – Petromoc)
	Draught 7-10 & 14m			

Source: Cornelder, CDN, CFM, Companhia e Pipeline Mocabique-Zimbabwe (CPMZ)

The Beira and Nacala corridors comprise network of transportation systems, which plays a key role in development of the economies served. The corridors comprise the ports, roads, railways and pipeline transportation networks, which have the following basic features given in Table 2.

1.4 SADC Corridors Cluster Concept

In order to carry out joint planning, implementation, coordination, monitoring and reporting of regional trade, SADC has configured corridors into “clusters”, by grouping countries served by a set of corridors which share ports and or other transport and logistics infrastructure.

The Corridor Cluster is used as an organizational vehicle for consultations and convening technical and ministerial meetings that address the common issues across a set of corridors shared by countries. This approach has been motivated by the absence of formal and functional joint corridor management committees in the majority of corridors and the need to rationalize corridor institutions and meetings. The cluster approach allows countries and stakeholders sharing the corridors to meet at corridor level and discuss on issues to improve the efficiency of corridor performance. Four Corridor Clusters have been established by SADC, namely:

- Western Corridors Cluster;
- Eastern Corridors Cluster;
- Southern Corridors Cluster; and
- North South Corridor.

The Beira and Nacala corridors which are also shown in Figure 2 above are clustered in the Eastern Corridor Cluster together with some other corridors as shown in the Table 3 below.

Table 3: SADC Eastern Corridor Cluster

Corridor	Port	Country
Dar es Salaam Corridor	Dar es Salaam	DR Congo, Malawi, Tanzania, Zambia
Mtwara Development Corridor	Mtwara	Malawi, Mozambique, Tanzania, Zambia
Nacala Development Corridor	Nacala	Malawi, Mozambique, Zambia
Beira Development Corridor	Beira	Malawi, Mozambique, Zambia, Zimbabwe
Limpopo Development Corridor	Maputo	Mozambique, Zimbabwe

Source: SADC Secretariat

1.5 Ports

The ports play a key role as gateway for exports and imports, and in overall have been handling an increasing traffic. Their strategic importance is also manifested by their trade orientations. The two ports have different

orientations as Beira port handles more transit traffic than the national cargo. In 2010, Beira port handled 4,011,800 tons, of which transit traffic accounted 67% of the port traffic as shown in the Table 4 below.

Table 4: Beira Port Traffic in Metric Tons

	2007	2008	2009	2010
Mozambique	1,095,800	1,142,000	1,118,300	1,343,900
Exports	241,500	289,200	241,600	562,400
Imports	854,300	852,800	876,700	781,500
Transits	1,865,300	1,895,000	1,910,500	2,667,900
Exports	492,400	371,100	452,700	607,200
Imports	1,372,900	1,523,900	1,457,800	2,060,700
Total	2,961,100	3,037,000	3,028,800	4,011,800
Transit %	63%	62%	63%	67%
Exports %	25%	22%	23%	29%
Imports %	75%	78%	77%	71%

Source: CFM, Annual Statistical Information (Informacao Estatistica), 2007-2011

Traffic at Nacala port is dominated by Mozambique cargo, and transits accounted 25% of total port traffic in 2010. Though in overall the traffic increased from 287,900 tons in 2008 to 346,700 in 2010, the share of transit traffic through port has been declining from 28% recorded in 2008. The decline was registered in transit exports that declined from 72,900 tons in 2008 to 52,800 tons in 2010 as shown in the Table 5 below.

Table 5: Nacala Port Traffic in Metric Tons

	2007	2008	2009	2010
Mozambique	**859,100**	**758,000**	**921,800**	**1,060,300**
Exports	275,100	251,200	257,500	376,400
Imports	584,000	506,800	664,300	683,900
Transits	**241,000**	**287,900**	**348,400**	**346,700**
Exports	67,400	72,900	65,500	52,800
Imports	173,600	215,000	282,900	293,900
Total	**1,100,100**	**1,045,900**	**1,270,200**	**1,407,000**
Transit %	22%	28%	27%	25%
Exports %	31%	31%	25%	31%
Imports %	69%	69%	75%	69%

Source: CFM, Annual Statistical Information (Informacao Estatistica), 2007-2011

However, traffic through the two ports is likely to change dramatically as the Mozambique prepares to export large amount of coal from Moatze mines and other minerals. The coal mines are strategically located to use the two ports. This together with anticipated rapid growth of Mozambique economy will lead

to a higher amount and share of national traffic handled through the ports. The ports also expects to handle increased traffic from expanded growth in DR Congo as the economy expands, and improved economies from Malawi, Zambia and Zimbabwe.

1.6 Road Transportation and Infrastructure

Beira Corridor

Beira corridor has a number of alternative routes that branch from the main route from Beira, which are shown in Table 6 below. The main arterially from Beira route handles about 3,000 vehicles per day, of which 80% are trucks. The road section between Beira-Inchope in Mozambique is in poor condition, and requires rehabilitation. The road section, which is only 135km, takes 3-4 hours for heavy vehicle trucks. The condition impacts heavily on vehicle maintenance and transit time. Though the road is in dare need of rehabilitation, only funds for the routine maintenance are currently available. However, there is long term plan to rehabilitate the entire road section between Beira and Machipanda (285km).

Rehabilitation of Vanduzi-Chagara road section, which is a part of the corridor, was completed in 2010. The Administracao Nacional de Estradas (ANE), which is the road agency, has already issued a concession to construct and manage the following road sections, which have civil works ongoing:

- Changa-Cuchama (50km, leading to Zimbabwe border);
- Changa-Zóbue/Mwanza (210km leading to Malawi border); and
- Tete-Cassacatiza (240km leading to Zambia border).

There are five weighbridges installed on Beira corridor at Dondo, Inchope and Nova Vanduzi, Tete and Mussacuma. The weighbridge at Dondo is said not to be operational, but soon will be repaired. A weighbridge is proposed to be installed at Machipanda.

The roads comprising the Beira corridor accounts for 95% of freight traffic despite the need for improvement. The share is likely to remain because of poor performance of railways.

Table 6: Road routes Beira corridor

Route	Distance (km)	Border	Condition
Beira- Machipanda/Forbes-Harare	559	Machipanda/ Forbes	Poor condition on Beira-Inchope (135km). Weighbridges at Dondo, Inchope and Nova Vanduzi, Tete
Beira- Machipanda/Forbes-Mutare-Bulawayo	726	Machipanda/ Forbes	
Beira- Machipanda/Forbes-Harare-Chirundu-Lusaka	965	Machipanda/ Forbes; Chirundu	
Beira-Tete-Cassacatiza/Chanida-Lusaka	1480	Cassacatiza/ Chanida	

Beira-Tete-Zóbue/Mwanza-Blantyre	812	Zóbue/Mwanza	and Mussacuma.
Beira-Tete- Dedza/Calomue-Lilongwe	950	Dedza/Calomue	Proposed weighbridge at Machipanda.
Beira- Machipanda/Forbes-Harare-Chirundu-Ndola	1372	Machipanda/ Forbes; Chirundu;	
Beira- Machipanda/Forbes-Harare-Chirundu-Kitwe	1372	Machipanda/ Forbes; Chirundu;	

Source: Administracao Nacional de Estradas (ANE, National Roads Administration)

Nacala Corridor

Nacala Corridor has two alternative routes that branch at Nampula, which is about 200km from Nacala. Alternative routes are shown in the Table 7 below. Due to the poor road condition, trucks mainly use the Nampula-Mocuba-Milange-Blantyre route. However, the road also has poor section from Mocuba to Milange border (192km). Civil works for rehabilitation with funding from the European Union have started and ongoing on Nampevo-Mocuba and Mocuba-Alto Benefica. Funds are yet to be identified for the road section Alto Benefica to Milange (border with Malawi).

Trucks are not using the alternative route Nampula-Cuamba-Mandimba, which is in very poor condition. The ANE however has civil works for rehabilitation started on Nampula-Cuamba (448km) with funding from Government, AfDB, Korean Export bank, and JICA. The designs for rehabilitation have also been completed for Cuamba-Mandimba (150km) and Mandimba-Lichinga (150km). The small road link of 3-4km from Midamba to Malawi border will also be rehabilitated. Funds to finance the planned civil works are yet to be identified.

Table 7: Road Routes Nacala Corridor

Route	Distance (km)	Border	Condition
Nacala-Nampula-Milange	789	Milange	Poor condition on Mocuba-Milange (192km) Weighbridges at Nacala and Nampula
Nacala-Nampula-Milange-Blantyre	1150	Milange	
Nacala-Nampula-Milange-Blantyre-Lilongwe	1600	Milange	
Nacala-Nampula-Cuamba-Mandimba-Lichinga	898	N/A	Poor condition on Nampula-Cuamba-Mandimba-Lichinga (748km) Weighbridges at Nacala and Nampula
Nacala-Nampula-Cuamba-Mandimba	748	Mandimba	
Nacala-Nampula-Cuamba-Mandimba-Liwonde-Blantyre		Mandimba	
Nacala-Nampula-Cuamba-Mandimba-Liwonde-Lilongwe		Mandimba	

Source: Administracao Nacional de Estradas (ANE, National Roads Administration)

The condition of road infrastructure on Nacala corridor has played a great role in determining the modal split of traffic either by road or railway. Currently, only 10% of transit traffic goes by road and 90% goes by rail due to poor condition of road sections linking to Malawi.

Nacala corridor has two weighbridges installed at Nacala and Nampula. Weighbridges have also been installed in other road networks in Mozambique. It is estimated that about 25-35% of trucks in both corridors are overloaded. A laxity on weight restrictions could allow truck owners to overload their equipment to increase their productivity and offer lower prices to customers. In the long run, regular overloading is unsafe and drives up maintenance costs.

1.7 Railway

The performances of the railway systems in Beira and Nacala corridors in Mozambique have different orientations and market shares. The Beira railway system comprise the Machipanda and Sena lines and only account for less than 10% of freight traffic moved along the Beira corridor. On the other hand, the Nacala railway system account for 90% of the total freight traffic through the Nacala port. The Table 8 below gives an overview of the Beira and Nacala corridor railway systems in Mozambique.

Table 8: Beira and Nacala Corridor Railway Systems in Mozambique

	Beira corridor		**Nacala Corridor**
Line	Machipanda line	Sena line	Nacala-Entre Lagos (Mozambique/Malawi border)
Distance (km)	317.7 km (Beira to Machipanda)	574km (Beira-Sena-Moatze)	610km Nacala-Entre Lagos
		82km branch: Inhamitanga- Marromeu	262km branch Cuamba-Lichinga
		44km branch: Dona Ana - Vila Nova da Fronteira (exists possible link to Malawi)	
Organization structure: partnership/ concession	Central Railway System CFM100% ownership Trains operated by CFM	Central Railway System CFM100% ownership Trains operated by CFM Vale and Rio Tinto also operate their own trains and pay to CFM track access fees	North Railway System CFM 49 % ownership and CDN 51% ownership Trains operated by CDN
Traffic (annual, 2011)	Total: 565,000 tons	Total: 472,000 tons	241,724 tons
	Descend: 408,500 tons	Descend: 421,100 tons	Descend: 95,925 tons
	Ascend: 156,400 tons	Ascend: 51,000 tons	Ascend: 145,802 tons
Main commodity in-bound	Wheat, sugar, molasses, tobacco, granite, copper,	Coal, sugar, molasses, timber and limestone	Cashew nut, timber, banana, sugar,

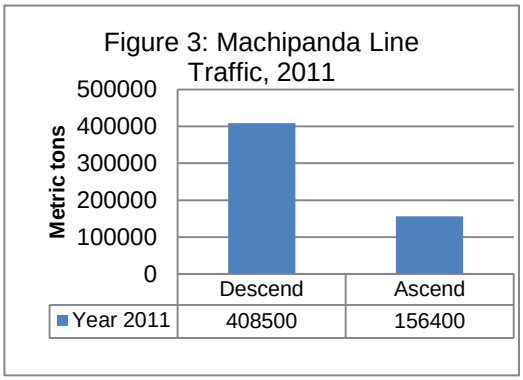
(descending)	coal and ferro-chrome		tobacco, pigeon peas
Main commodities out-bound (ascending)	Fertilizer, wheat, rice, soya beans, maize, cement, machinery and fuel	Fertilizer, wheat, rice, machinery, clinker and fuel	Clinker, fertilizer, wheat, rice, cement, machinery and fuel
Links and regions served	Mozambique and links to Zimbabwe, Zambia, Botswana and the Democratic Republic of Congo (DRC)	Mozambique (line to Moatze coal mines in Tete, and Marromeu sugar plantation and possible link to Malawi)	Mozambique and links to Malawi
Challenges/ constraints/ condition	Shortage of wagons and locomotives	Shortage of wagons and locomotives	Shortage of wagons and locomotives
	Deterioration of the lines due to lack of maintenance	Inadequate maintenance of tracks	Inadequate maintenance of tracks
	High turnaround	High turnaround	High turnaround
	High tariffs	High tariffs	High tariffs
Interventions (investment plans)	Investing in new rolling stock (wagons and locomotives)	CFM takeover of concession in December 2011 to improve performance	Investing in new rolling stock (wagons and locomotives)
		Upgrade of track and signaling to handle to 6 million tons in 2012; 10 million tons in 2013; and 18 million in 2016	
		Investing in new rolling stock (wagons and locomotives)	

Source: CFM and CDN

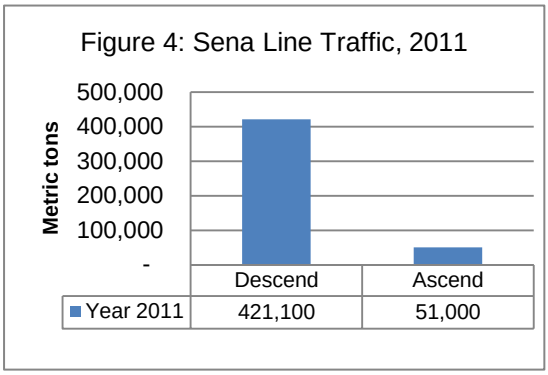
Beira Railway System

Beira corridor comprises the railway system that connects Mozambique with Zimbabwe and Zambia. The Beira railway system in Mozambique covers two very important lines in central region of Mozambique, namely Machipanda line with 317.7 km linking Beira Port to Machipanda and Mutare in Zimbabwe, Sena line with 574 km from Beira Port to the coal village of Moatize and other two branches from Inhamitanga to Marromeu with 82 km and from Dona Ana to Vila Nova da Fronteira with 44 km linking to Malawi.

Traffic analyses for Machipanda and Sena lines as shown in Figures 3 and 4 below indicate a strong dominance of downward traffic over the ascending traffic. With increasing expanding production of coal and other minerals and products in the region, the share of downward cargo is likely to even further.



Source: CFM



Source: CFM

The trends of traffic on the two lines are shown in the Table 9 below. The performance of transit traffic under Machipanda line has been declining from a high 464,000 tons in 2007 to 301,000 tons in 2011. The national traffic through Machipanda line however increases from 78,000 tons in 2007 to 264,000 tons in 2011. The increase in trend however does not reflect the rapid expansion of Beira port traffic, which increased by 32% from 3,028,800 tons in 2010 to 4,011,800 ton in 2010. This implies that the supply and delivery logistics of the Beira port are largely provided alternative modes by road and pipeline.

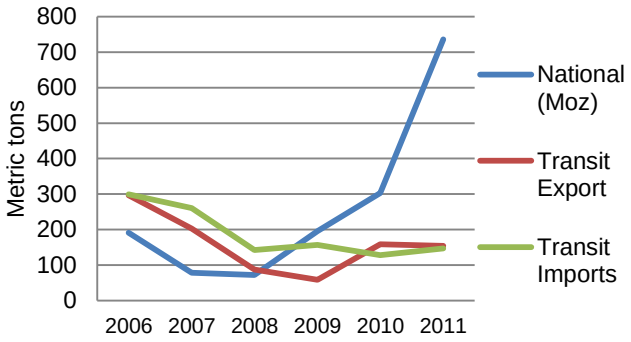
Table 9: Machipanda and Sena Railway Line Traffic in '000 Metric Tons

	2006	**2007**	**2008**	**2009**	**2010**	**2011**
GLOBAL	787	543	301	411	590	1,037
National	191	78	72	196	303	736
Transits	596	464	229	215	287	301
Transit (TEU)	3,445	3,841	2,995	2,684	3,688	2,268
L. Machipanda (Total)	**787**	**543**	**301**	**387**	**546**	**565**
National	191	78	72	172	259	264
Transit	596	464	229	215	287	301
Exports	297	203	87	58	159	154
Imports	299	261	142	157	128	147
Transit (TEU)	3,445	3,841	2,995	2,684	3,688	2,268
Exports	2,055	2,235	1,910	1,581	1,749	2,268
Imports	1,390	1,606	1,085	1,103	1,939	0
L. Sena (Total)				24	44	472
National				24	44	472
Transits				0	0	0

Source: CFM: Portos E Caminhos De Ferro De Mocabique (Ports and Railways)

The graphic view of traffic trend is shown in Figure 5 below. The graph shows a decline in transit traffic, which has much been affected by modal shift of traffic from rail to road. The decline is observed more in transit imports, where there was no cargo transported by rail in TEUs in 2011.

Figure 5: Beira Corridor International and National Traffic



Source: CFM

Factors contributed to the low performance of on Machipanda line, includes deterioration of the line due to lack of maintenance, especially during the seven years of the concession period from 2004 to 2011. This had effect of increasing the turnaround time of the rolling stock. Another factor leading to poor performance is the shortage for both wagons and locomotives. Due to unreliability, this had effect of cargo being diverted to the roads.

Factors for poor performance on Sena line include shortage of capacity on the line and lack of availability of wagons and locomotives, especially for national traffic and small coal producers. Vale and Rio Tinto, which are big coal producers at Moatze in Tete operate their own trains and have drivers and wagons. The tariffs on both lines are said to be high and therefore contributing to diversion of cargo from railways to the roads.

CFM intends to improve the efficiency of operation of the Sena line, which will include new investment by upgrading of the railway line to handle 6 million tons in 2012, and further upgrade to handle 10 million in 2013, and 18 million tons by 2016. Investments are also planned for both lines on railway wagons and locomotives. CFM projects the following traffic on Sena line that will be accommodated by new investment as shown in Table 10 below.

Table 10: Sena Line Traffic Projections

Commodity	From 2011 – 2015	Traffic (Tons)
Sugar	Marromeu – Beira	160,000
Molasses	Marromeu – Beira	40,000
Limestone	Muanza-Dondo	350,000
Gypsum	Beira – Dondo	10,000
Clinker	Beira – Dondo	60,000
Timber	Central Mozambique	20,000
Pol	Various	100,000
Others	Various	10,000
Malawi	Beira – Border	350,000

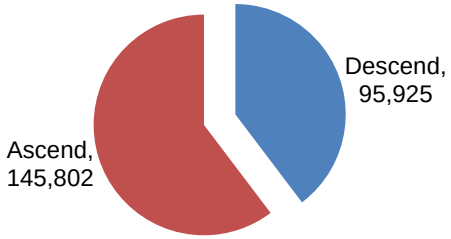
Sub-Total		1,100,000
Coal	Moatize – Beira (requires additional Investments)*	18,000,000
Other Coal	Moatize – Beira	1,000,000
Sub-Total		19,000,000
Grand Total		23,100,000

Source: CFM: Portos E Caminhos De Ferro De Mocabique (Ports and railways)

Nacala Railway System

Railway traffic on Nacala corridor has the upward traffic (ascending cargo) for international imports and internal traffic dominating cargo moved by rail. The railways also accounts for a dominant 90% of cargo deliveries and receipts for Nacala port transits. The graphical share of traffic for upward and downward traffic is shown in Figure 6.

Figure 6: Nacala Railway Line Traffic in Tons, 2011



Source: CFM

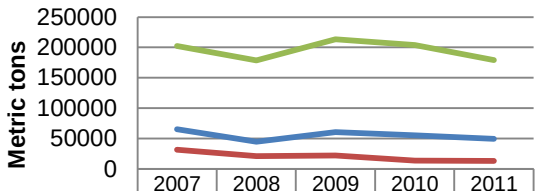
Although railways takes majority share of logistic supply and deliveries made from port, the overall amount of cargo moved along the corridor has been declining from a high 296,362 tons in 2009 to 241,727 tons in 2011. The decline is observed in all categories of trade, but with higher rate in transits. Reasons could be related to factors associated with general performance of the railways and performance of Malawi economy which generates most transits. The trend is shown in Figure 7.

1.8 Shipping Developments

Introduction

The dredging of the approach channel and improved productivity of Beira port has transformed the port from a feeder port that was served largely from Durban, to both direct and indirect point of call. A 12 month dredging program, which was completed in July 2011, opened the way for fully loaded ships of 60,000 tons to berth and sail from Beira port. Dredging re-established the port seaway to

Figure 7: Nacala Railway Line Traffic



	2007	2008	2009	2010	2011
Internal (National)	65179	44910	60831	55333	49467
Intra-regional (Mozambique & Malawi)	31449	21177	22051	13460	13160
International	202073	178847	213480	204149	179100

Source: CFM

its original depth of 8.5m below chart datum. There are gains from the dredging, with bulk carrier ships increasing from 44 ships arrival in 2010 to 79 ships in 2011. Though the number of ship traffic for container and general cargo vessels generally remained the same, the port received larger vessels with higher trade volumes.

Ships calling at Nacala have also been increasing in their number and frequency, especially for container vessels are now making direct calls. Vessels arriving for break-bulk have also increased. The ports are anticipated to attract more calls from the increasing production and economic growth in Mozambique and Malawi, and further from DR Congo and Zambia.

Ships Service Routes

Beira and Nacala ports falls within the main trading routes, which connects the ports with Asia, Indian Ocean Islands, East Africa, and Middle East and Far East. The ports, for instance are served by Maersk and CMA-CGM through their new MOZEX Service which offers direct service connecting Asia and Mozambique. Direct and weekly services are also offered by PIL to East Africa and East Asian markets. The MSC only offers feeder services from Durban. The following are service port rotations offered by major container shipping lines at Beira and Nacala ports as shown in Table 11 below.

Table 11: Ships Service Rotations for Beira and Nacala Ports

Shipping Line	Rotation	Call type & Frequency (average)	Vessels Size	Departure Port and Fixed Days	Transit Time to Beira/ Nacala
MAERSK and CMA CGM partnership	Tanjung Pelepas / Port Kelang / Tamatave / Maputo / Beira / Nacala / Port Louis	Direct call and weekly service. Four vessels monthly	Vessels size nominal ships 2,200 TEUs	Tanjung Pelepas, Port Kelang	20 days to Beira
Mediterranean Shipping Company (MSC)	Durban-Beira-Durban	Feeder service: transshipment at Durban. Weekly service 4-5 vessels monthly	600-800 TEUs feeder vessels	Durban	6-7 days to Beira
	Durban-Nacala-Durban		11,500-13,000 DWT		
PIL	Singapore-Reunion-Tamatave-Maputo-Beira-Singapore	3-4 vessels a month		Singapore	14-17 days to Beira
PIL	Singapore-Hong Kong-Singapore-Colombo- Port Louis-Nacala-Mombasa-Colombo-Singapore	3-4 vessels a month		Singapore	16 days to Nacala

Source: Shipping Lines Calling Beira and Nacala Ports

Empty Containers

Empty containers are owned by the container shipping lines. Despite the region being highly skewed on imports, there is adequate availability and distribution of empty containers. The shipping lines have been able to meet demand of containers for exports, and where necessary make requisitions of empties from Durban port or pre-plan and include delivery of empties in their rotations. Another strategy the shipping lines have been using is to retain empties in the region at their depots and ports, a factor that is manifested by high dwell times for empty containers. The shipping lines own directly the depots or have arrangements for drop offs and collection of empty containers at Beira and Nacala, as well as in Malawi, Zambia and Zimbabwe. Shipping lines charge for detention of containers that are not returned to container depots on time or delivered to the port on time for shipment by requesting a refundable deposit for release of containers. The deposit is to safeguard against any loss or damage to the container and refunded upon return of container. Various deposits amounts are given in Table 12 below by various shipping lines.

Table 12: Container Depots in US Dollars

Shipping Line	**Local**		**Transit**		**Specialized**	
	20'	**40'**	**20'**	**40'**	**20'**	**40'**
Maersk	500	1,000	500	1,000	1,000	1,000
MSC	741	1,667			2,778	5,556
CMA CGM	1,000	2,000	2,000	4,000	4,000	8,000
PIL	1,000	2,000	1,000	2,000	2,000	3,000

Source: Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala ports

Shipping lines allow different free periods for detention of the containers. Thereafter, they charge for detention on period above the free period offered. Shipping lines have different charges for demurrage on periods exceeding free periods, which are charged by type and size of container, and different for regime trade for local and transit as shown in the Table 13 below.

Table 13: Shipping Lines Demurrage and Detention Free Period in Days at Beira and Nacala Ports

Container type	Range	Average
Demurrage Free Period (General Purpose) (local)	5-7	6.5
Demurrage Free Period (Open Top/Flat Rack) (local)	5-7	6.5
Demurrage Free Period in Transit	21	21
Demurrage Free period, Reefer (local)	3-5	4.5
Demurrage Free Period, Reefer in Transit	10	8.5

Source: Maersk, CMA-CMG, MSC, PIL Shipping Lines Calling at Beira and Nacala Ports

Free period is the period shippers are allowed to hold the container without charging, and is counted from the date the vessel completes discharge. Local import reefer containers have on average three days free period to return empties to the port or designated depot. Other containers have on average seven days. Reefer containers for transits have on average 10 days free period, while other transit containers to Malawi, Zambia, Zimbabwe and DR Congo have on average 21 days as free period.

Local Charges

Shipping lines charge various local charges at ports of imports destinations and origins of exports. The charges are either related to cargo handling, documentation, equipment or security. Major local charges observed for shipping calling at Beira and Nacala ports include:

- **Terminal Handling Charges (THC):** These are origin and destination handling charges collected by shipping lines as costs for the loading and offloading containers. There are different charges for 20' 40, reefer, open-top, flat rack containers.
- **Origin and destination documentation fees**: they are charges covering the whole agency for export and import processes. On the export side, the origin documentation fees covers the processing of bookings, shipping instructions, invoicing and printing and release of the original transport documents. The destination documentation fees on the import side covers costs associated with creation and processing of destination documentations such as arrival notifications; standard invoices (not including detention and demurrage invoices) and the acceptance and handling of Release documents.
- **Export and import fees:** covers the handling of the equipment on behalf of the shipping line, and includes export fees, for release and loading of empty containers from the depot, and import fees, for turn-in and offloading of empty containers at the depot.
- **Carrier Security Charge**: This charge covers the cost of the standard ISPS code security measures that are put in place for all containers and vessels.
- **Container cleaning fee**: This is a fee towards the cost of cleaning all import containers that are turned-in e.g. containers imported with cement and have to be cleaned for loading with sugar.
- **Import detention (demurrage and detention fee):** the detention collection fee is a punitive charge aimed to ensure timely return and optimal turn-around of empty equipment, and recover some contribution towards the cost of idle time, in excess of the standard requirement.

The following are the average local charges from the main shipping lines calling at Beira and Nacala ports, provided in Table 14 below.

Table 14 Average Shipping Line Local Charges in US Dollars

Import		Beira				Nacala			
	Basis	**Dry**		**Reefer**		**Dry**		**Reefer**	
		20'	**40'**	**20'**	**40'**	**20'**	**40'**	**20'**	**40'**
THC (General Purpose-GP)	Per container	98	175			91	165		
THC Open Top/Flat Rack (OT/FR)	Per container	141	232			125	222		
THC Reefer	Per container			145	234			138	221
Demurrage GP	Daily rate	36	68			34	68		
Demurrage OT/FR	Daily rate	73	118			73	118		
Demurrage Reefer	Daily rate			85	125			85	125
Demurrage Free Period GP	Days	6.5	6.5			6.5	6.5		
Demurrage Free Period OT/FT	Days	6.5	6.5			6.5	6.5		
Demurrage Free Period in Transit	Days	21	21			21	21		
Demurrage Free period, Reefer (local)	Days			4.5	4.5			4.5	4.5
Demurrage Free Period, Reefer in Transit	Days			8.5	8.5			8.5	8.5
Import Fee	Per container	135	162.5	135	162.5	130	162.5	130	162.5
Container cleaning	Per container	17	23	17	23	18	29	17	23
Export	**Basis**	**Dry**		**Reefer**		**Dry**		**Reefer**	
		20'	**40'**	**20'**	**40'**	**20'**	**40'**	**20'**	**40'**
THC (General Purpose-GP)	Per container	98	175			91	165		
THC Open Top/Flat Rack (OT/FR)	Per container	141	232			125	222		
THC Reefer	Per container			145	234			138	221
Security charge (ISPS charge)	Per container	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Export fee	B/L	89	89	89	89	89	89	89	89

Source: Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala ports

Critical Issue

Terminal handling charges (THCs) are part of the evolution of the container trade in the liner shipping industry. They are charges collected by shipping lines to recover from the shippers the cost of paying the container terminals

for the loading or unloading of the containers at the port of shipment or destination. The shippers at the origin port of shipment pay the THC at the port of loading, which is defined as the Origin THC. The consignees or buyers of the cargo pay the THC on the discharge port of destination, known as the destination charge or Destination THC. The THC varies by the carrier or shipping line, and is not the same even for ports served by the same shipping line due to the costs or market situation associated with the ports. It also differs by type of container. The study observed various THCs by shipping lines for the General Purpose (GP) container, which are compared with the ports terminal handling charges for offloading and loading (stevedoring) as indicated in the Table 15 below.

Table 15: Terminal Handling Changes and Stevedore Charges in US Dollars, April 2012

Shipping Line	**Beira**				**Nacala**			
	Dry		**Reefer**		**Dry**		**Reefer**	
	20'	**40'**	**20'**	**40'**	**20'**	**40'**	**20'**	**40'**
Maersk	90	150	150	200	85	150	150	200
MSC	105	175	135	235	100	170	125	235
CMA CMG	95	175	150	250	90	160		
PIL	80	150	125	200	90	170	125	200
Average THC	**93**	**163**	**145**	**234**	**91**	**165**	**142**	**228**
Beira port stevedore	**80**	**144**	**100**	**180**				
Nacala port stevedore					**74**	**133**	**85**	**153**

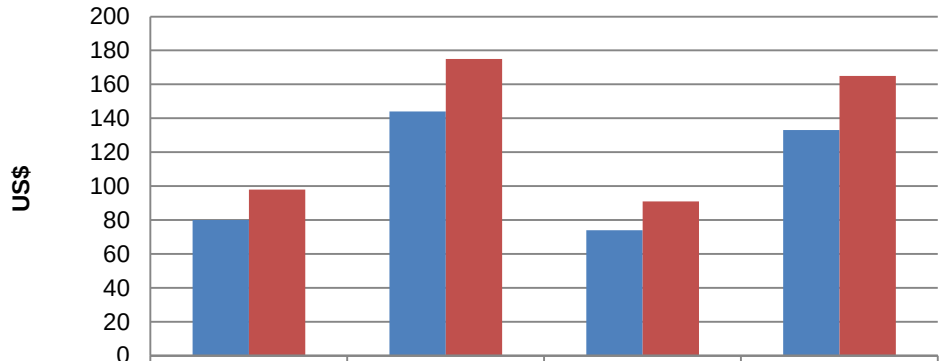
Source: Cornelder, CDN, Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala Ports

There is a clear range of charges with significant differences between the carriers. The charges have been compared to the port charges for discharging and loading the cargo on board the ship, which are collected by the shipping lines through an invoice to the shippers. Nacala port has lower THCs compared to Beira port. The difference however, is small and does not influence shipper's decision to shift from one port to the other.

In theory, one would expect the shipping lines to charge shippers or recover an equal amount charged by ports or stevedore companies for offloading or loading, plus a slight mark-up for the cost of the charge collection. The critical issue here is that, the mark-up costs are very high, which are in turn compounded by the shippers on their exports and imports. The overall effect is high costs on corridor operations. As for exports, these are costs added on their door steps as they go out to compete in the international markets. It is possible that the shipping lines to add such mark-ups to compensate for loss of enough revenue due to inadequate levels of trade, especially for exports. The terminal handling charges are likely to increase in the future as carriers will attempt to mirror their own terminal costs by passing on the increases.

A graphical view of variance of the average local THCs and stevedoring charges observed at Beira and Nacala ports for the dry cargo and reefer containers are indicated in Figures 8 and 9 below.

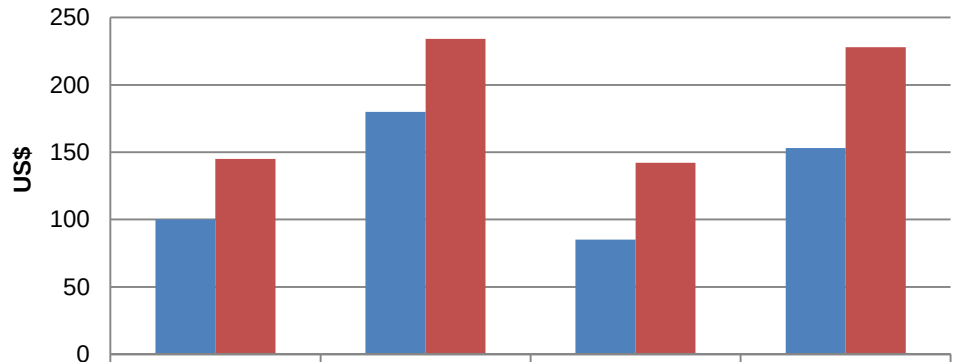
Figure 8: Terminal Handling Charges for Dry Cargo Container



	Beira 20'	Beira 40'	Nacala 20'	Nacala 40'
Port stevedoring charges	80	144	74	133
Shipping line average THC	98	175	91	165

Source: Cornelder, CDN, Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala Ports

Figure 9: Terminal Handling Charges for Reefer Container



	Beira 20'	Beira 40'	Nacala 20'	Nacala 40'
Port	100	180	85	153
Shipping line (average)	145	234	142	228

Source: Cornelder, CDN, Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala ports

Further analyses in Table 16 below indicate that, there a variance of US$18 per 20' foot container and US$31 per 40' foot container for dry cargo, which is 22% more than the terminal handling charges levied by Beira port. At Nacala port, shipping lines THC collects US$17 per 20' container and US$32 per 40' foot container of dry cargo, more than the port stevedoring charge. This represent a variance of 23% and 24% respectively collected.

Table 16: Terminal Handling Charges/Stevedoring (Dry cargo) US$

	Beira		Nacala	
	20'	**40'**	**20'**	**40'**
Port	80	144	74	133
Shipping line (average)	98	175	91	165
Variance	18	31	17	32
Variance (%)	22%	22%	23%	24%

Source: Cornelder, CDN, Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala Ports

The variances are much higher for reefer containers. Shipping lines at Beira port collect US$45 per 20' reefer container and US$54 per 40' foot of reefer container, which represent 45% and 30% respectively of THCs being more than the port stevedoring charges. Variances at Nacala port have even bigger margins of US$57 per 20 foot reefer container and US$75 per 40' foot reefer container, which represents a high 67% and 49% of shipping line THCs collected being more than the port terminal handling charges.

Table 17: Terminal Handling Charges/ Stevedoring (Reefer) US$

	Beira		Nacala	
	20'	**40'**	**20'**	**40'**
Port	100	180	85	153
Shipping line (average)	145	234	142	228
Variance	45	54	57	75
Variance (%)	45%	30%	67%	49%

Source: Cornelder, CDN, Maersk, CMA-CMG, MSC, PIL shipping lines calling at Beira and Nacala ports

2.0 BEIRA AND NACALA PORTS PRODUCTIVITY AND EFFICIENCY ASSESSMENT

2.1 Introduction

Mozambique's port sector has undergone significant structural changes since the late 1990's. The country port reforms have been brought on such by factors as globalization, and international trade, containerization, private provision of port services, regionalization of activities 2, and concentration of resources. Thus, it has become imperative to measure port performance in order to increase the country competitiveness in international port services.

The objective of this chapter is to assess the productivity and efficiency of the Beira and Nacala Ports. The assessment examines the two ports from three dimensions:

1) The gate;
2) The terminal; and
3) Quay.

Overarching these dimensions is a process analysis, which examines the movement of a container from the gate through to the container terminal and onto the ship and vice versa through the port. Our analysis relies on a number of port productivity indicators and performance measures to assess each port's capacity and efficiency. These indicators that bring into focus our three dimensions and which are used throughout the ports industry.

2.2 Profile of Beira and Nacala Ports System

Port of Beira

The Port of Beira is one of three major Mozambican ports, including Maputo and Nacala Ports located along the country's Indian Ocean coastline; other minor ports include Pemba, and Quelimane. The Port of Beira is situated on the Púngue river estuary and is the second largest port in Mozambique with 12 quays. For the most part, Beira is essentially a transit port, handling import and export cargo destined for Zimbabwe, Malawi, Zambia, DRC and Botswana. The entrance of the port is 27 Km from the open water and is made through a channel called Macuti Channel. This channel was dredged in 2011 to -8.5 m CD by 120 m wide at the narrowest point and has buoys and lighting system.

Port of Nacala

The Port of Nacala was concessioned to CDN and recently VALE, the Brazilian mining concern. Nacala is one of the deepest natural ports in the Africa. It is certainly one of the best natural harbors in Eastern Africa. Nacala serves the province of Nampula and would be the main gateway to Malawi if railways in this landlocked country were had not underinvested in its track

infrastructure, rolling stock and equipment, rending it unable to provide transport service commensurate with international standards.

Figure 10: Location Map of Beira and Nacala Ports

Navigation and Entrance Channel

To allow larger vessels to enter Beira Port, CFM undertook a dredging program between August 2010 and July 2011. The purpose was to increase the Beira Port's entrance channel depth from about 2.2 meters to between 8.5 meters below CD, and reset the design width from 60 m to a minimum of 200 meters.

Nacala Port

The Nacala Port is located at the extreme south of the Bay of Bengo (see Figure 10 above). The port's channel depth of 14 meters creates navigational conditions, which allows vessels of any size to enter and depart 24 hours a day. However, berths have restrictions ranging from 8 to 14 meters. These characteristics make Nacala the largest natural deep-water port on the East African coast.

In January of 2005, the Government of Mozambique (GOM) under a public private partnership arrangement entered into a concession agreement with Corredor de Desenvolvimento do Norte (CDN), a private company. The initial terms of the agreement provided that majority shares (51%) in CDN were to be owned by Sociedade do Desenvolvimento do Norte (SCDN). The concession agreement further provided that the remaining shares (49%) be held by the state railway company Portos e Caminhos de Ferro de Moçambique (CFM).

Opened to traffic in October 1951, the Nacala Port currently has a General Cargo Terminal, able to handle 2.4 million tons of cargo annually. The port also eight warehouses covering a total surface area of 21,000 square meters.

The container terminal berth is 372 meters in length. The Port also has a terminal for liquid bulk cargo. The Port not only serves Mozambique's hinterland but also the transit traffic originating and or destined to the neighboring landlocked countries of Malawi and Zambia.

The Nacala Port's natural deep-water harbor and sheltered position, except along the quay, imposes no restrictions on ship movement or size with the exception of alongside the quay. Upon request, the Nacala Port permits berthing and unberthing 24 hours a day. Pilotage is however compulsory, ships being boarded two nautical miles 237º from the Nacala lighthouse, unless strong winds are blowing, in which case pilots then board within the bay.

Table 18: Institutional Arrangement of Beira and Nacala Ports

Function	Description	Corporate Entity
Ownership	Beira Port Concession: Public 33%; Private 67% Nacala Port Concession: 49 (CFM)%; Private 51	CFM & Cornelder CFM, Vale & SCDN
Structure Type	Concession. Towage, pilotage, dredging and buoyage at Beira still under CFM. Cornelder concession covers land operations only.	CFM & Concessionaire
Regulation	Application of laws and rules in order to facilitate and regulate port production and service provided by port authorities	CFM
Landlord	Management of real estate including port land area	CFM
Planning and Marketing	Strategic and long-term planning for terminal development, including capital investments for infrastructure and superstructure	CDN and Cornelder
Port operations	Allocation of berths and coordination services to berthed and un-berthed vessels,	CDN, Cornelder and CFM
Terminal operation / Cargo handling	Loading and unloading of vessels, warehousing, intra-port transport, transfer operations	CDN, CFM and Cornelder
Ancillary services	Towage, fire protection, repairs, etc.	CDN, CFM and Cornelder

Source: Cornelder, CDN, CFM

Port Services

Both Cornelder as the tenant and CFM as the landlord offer port services at the Port of Beira. Caminhos de Ferro de Mozambique (CFM) provides two types of port-related services:

- Maritime services; and
- Operator of the oil terminal.

Maritime services consist mainly of harbor operations, including tugboat operations. At present, CFM operates two-tug boats. Both tug boats are under repair: one in South Africa and another in Beira. To maintain its harbor operational capacity CFM leased a tugboat “KS Salvo” from Singapore. Pilotage and mooring is under CFM as well. Dredging is managed by EMODRAGA and buoyage by INAHINA.

Cornelder de Mozambique (CdM or Cornelder) operates the container and general cargo terminal under a 25-year management contract with CFM. As indicated, in Table 18, under this agreement the equity ownership is divided between Cornelder with 67% and CFM as representative of the Government of Mozambique owns 33%.

Port Operations

Table 19: Port Operations

	Beria Port	**Nacala Port**
Working Hours	365 Days, 24 Hours /Day	365 Days, 24 Hours /Day
Office Hours	0730 - 1730 Hours	(07:30-12:00/13:30-17:00)
Time Zone	GMT/UTC +2 Hours	
Pilotage	• Equipped with a pilot boat and a line boat • Available 24 hours a day • Pilotage is compulsory at all times • Advanced notice of 72 hours required	• No restrictions on ship movements or size due to deep water harbor • Berthing and unberthing is possible 24 hours a day upon request • Pilotage is compulsory
Towage	• Tug assistance is compulsory • 2 tug boats of 2200 hp each	• One tug boat with 2300 hp • One pilot boat
Arrivals	• Vessels must advise Beira Port Control of their ETA • Draft and LOA, 48 hours	• Agents advise Nacala Port of ETA of their vessels
Security	• ISPC compliant	• ISPC compliant

Source: Cornelder, CDN

2.3 Shipping Lines Serving Beira and Nacala Port

Six shipping lines serve the Port of Beira as Table 20 shows and also six international shipping lines serve the Nacala Port. A brief note on each shipping line serving the Ports of Beira and Nacala follows Table 20 below.

The following describes the shipping line serving Beira and Nacala Ports:

- Maersk, the largest container shipping line in the world provides services to the Ports of Beira and Nacala;
- Mediterranean Shipping Company (MSC), the second largest container shipping line, serving the Ports of Beira and Nacala;
- CMA-CGM is the world's third largest container shipping line serving the Ports of Beira and Nacala;
- Fairseas International is a regional coastwise shipping line that provides service to the Ports of Beira and Nacala;
- Pacific International Lines (PIL) ranks 19 among the world container liner service. PIL operates container liner services covering the Far East, Europe, Black Sea, Canada, and the Indian sub-continent, Red Sea/Gulf, East Africa, South/West Africa, Australia, New Zealand, East Coast of South America and West Coast of USA. PIL provides container liner services to the Ports of Beira and Nacala; and
- Safmarine is a business unit of Maersk. The company provides sea transportation of cargo to and from Africa, the Middle East and the Indian subcontinent, as well as to North and South America, Europe, Mediterranean and Asia. Safmarine provides cargo services to both Beira and Nacala Ports.

Table 20: Shipping Lines Serving Beira and Nacala Port

Shipping Line	Liner services	Beira Port	Nacala Port
CMA CGM	Container	●	●
Fairseas International	General Cargo	●	●
Maersk Mozambique, Lda	Container	●	●
MSC	Container	●	●
PIL	Container	●	●
Safamarine	Container	●	●

Source: Cornelder, CDN, 2012

2.4 Port Infrastructure and Facilities

This section presents Beira and Nacala Ports' infrastructure and superstructure in terms of terminal types, capacity and berths.

Beira and Nacala Port Capacity

It should be noted that upon review of this report, Cornelder informed the assessment team that the container terminal capacity is now 175,000 after

significant investment in handling equipment as well as in additional stacking area of 17 ha, as opposed to 100,000 TEUs when the terminal was commissioned in 1992. Further investment in two brand new gantry cranes and additional land side equipment in 2012 should bring Beira Port Container terminal capacity to 400,000 TEUs per annum.

As for Nacala, the terminal capacities should experience great expansions throughout years to come. Tables below summarize the terminal capacities at both Beira and Nacala ports.

Table 21: Beira and Nacala Port Terminal Capacity

	Beira Port	Nacala Port
Container Terminal (TEUs)	175,000[1]	75,000
General Cargo Terminal (metric tons)	3,000,000	2,000,000
Liquid Bulk Terminal (metric tons)	2,500,000	400,000
Dry bulk terminal - coal (metric tons)	6,000,000	18,000,000[2]

Source: Cornelder, CDN, 2012

Beira Port Terminals

Table 22: Beira Port Terminal Facilities

Terminal	Capacity	Operator
Oil	2,500 SWT to 50,000 DWT tankers	CFM
General Cargo	3,000,000 MT	Cornelder
Cold Storage	1590 MT	CFM
Grain Silos	Phase I 30,000 tons, Phase II 60,000 tons[1]	BGT
Container	175,000 TEUs	Cornelder
Coal	6,000,000 MTPA	Cornelder

Source: Cornelder, 2012

Mozambique Fertilizer (MoFertilizer) has established a fertilizer blending plant about one kilometer from the port to avoid port congestion, and meet its customer need to respond to increasing demand for fertilizer in neighboring countries.

Oil Terminal

The dedicated quay for oil tankers was inaugurated in 1994 and spans for 264 m of length. It has the capacity of loading vessel of between 500 and 2.500 DWT and unload vessels of between 2.500 and 50.000 DWT. The terminal annual capacity is 2,500,000 MT. The terminal is equipped with 4 loading / unloading arms as follows: Jet Avgas - 16"; Diesel - 16"; Petrol - 16"; and Fuel Oil - 12". The terminal is also linked to a large tank farm by four pipelines.

Cold Storage Terminal

This terminal has a capacity for 1,100 tons at temperatures of 1.5 to 4.5 degrees centigrade, and for 490 tons at temperatures of minus 9 to minus 20 degrees centigrade, respectively. The terminal is equipped with electrical forklifts for handling the cargo.

Nacala Port Terminals

Table 23 below shows the three terminals at the Nacala Port. The facilities include a general cargo terminal and a container terminal operated by CDN; and a liquid bulk terminal operated by CFM. The Nacala Port has four general cargo berths (one of which serves as a POL berth) and two container berths. Bunkering is available by road tanker with a pipeline at the general cargo berths. With the exception of the liquid bulk terminal, which is operated by CFM, CDN operates both the general cargo and the container terminals. The liquid bulk terminal has a capacity of 400,000 tons. The terminal is connected to a tank farm by a 3.5 km pipeline.

Table 23: Nacala Port Terminal Facilities

Terminal	Terminal Area	Capacity	Quay length	Operator
Liquid Bulk	--	400,000 MT	Handled at General cargo quay	CFM
General Cargo	101,000 m^2	2,000,000 MT	600 meters	CDN
Container	7,700 m^2	75,000 TEUs	390 meters	CDN

Source: CDN

Nacala Port's container terminal has an annual handling capacity of 75,000 TEUs with storage capacity of 3,750 TEUs. At full capacity, i.e., stacking 3 high for full containers and 4 high for empties, the container terminal can handle 6,722 TEUs, including 72 reefer boxes. The container terminal can also accommodate large shipping vessels. It has a quay that extends 372 meters in length, has two berths and a maximum draft of 14 meters. CDN has contracted with Terminais de Norte (TN) to provide stevedoring and handling services at container terminal, as well as operate an empty container depot facility some 2 kilometers from the Nacala Port.

The Nacala Port's general cargo terminal has eight warehouses with a total covered storage area of 21,000 square meters capable of storing 50,000 tons. The general cargo terminal's open storage area of 80,000 square meters provides the port with additional storage capacity. The general cargo terminal has a quay length of 610 meters with a maximum draft 7 to 10 meters.

Beira and Nacala Port Berths

Table 24 below shows the number of berths, the berth lengths and depths at Beira and Nacala Ports. From a vessel arrival standpoint, Nacala Port clearly has an advantage in terms of ability to accommodate large vessel due to its 14 meter berth draft at its container terminal.

Table 24: Berths at Beira and Nacala Ports

	Number Of Berths	Number Of cranes	Total Berths length (Meters)	Maximum Draft (Meters)
Beira Port	12	10	1,914	9 to 12 m
Nacala Port	6	2	982	7 to 10 m and 14 m

Source: Cornelder, CDN, 2012

As Table 25 below indicates, Beira Port has significantly more equipment to deploy in its cargo handling operations and drive its port performance than does Nacala Port. Moreover, not only does Nacala Port lack adequate equipment to support its handling operations but the equipment the port has is consistently unavailable almost 65 percent of the time. This is due to repeated mechanical failures and lack of maintenance and spare parts. This situation adversely affects the port's productivity and efficiency and produces a spiraling down effect, whereby its stacking, loading and discharging capacity is reduced.

One way the Nacala Port attempts to address its equipment shortage is to give priority to quayside operations (e.g., vessel loading and off-loading) once a vessel arrives at the port rather than to terminal operations. Although this is a stopgap measure, the results has often been an increasing usage of the ship's gear to load and off-load containers. Nonetheless, it does not fundamentally address the port's lack of equipment and availability problems which cause delays along the port's entire value chain, including delays at the quay, delays at the container terminal and delays at the port's gate and vice–versa. See Table 25 and Figure 11 for a more full description of the impact the lack of equipment and equipment availability has port productivity and efficiency.

The lack of equipment for port operations, especially gantry and mobile cranes and the increasing usage of ship's gear has been repeatedly pointed out in studies by the World Bank and PMAESA as a widespread and a prevailing problem. This is considered a major factor in driving low port productivity and efficiency in many ports in sub-Saharan Africa. See: World Bank's AICD report.

2.6 Port Equipment

Equipment at Beira Port

Table 25: Beira and Nacala Ports' Equipment, Capacity and Availability

Beira Port				**Nacala Port**			
Equipment	Units	Capacity	Availability (%)	Equipment	Units	Capacity	Availability (%)
Ship to Shore Gantry Crane	2		88.3	Forklifts	7	42 tons	75%
Rail-mounted Gantry	1		99.5	Forklifts			
Forklifts	8	45 tons	65.3	Forklifts	4	2.5 to 16 tons	30–35%
Forklifts	4	42 tons	60.0	Tractors	2		70%
Forklifts	5	25-32 tons	81.8	Trailers	2	75tons	
Forklifts	2	16 tons	88.0	Rail-mounted Gantry	1	25 tons	0% (45%)
Forklifts	2	9 tons	65.3	Bobcat	2		100%
Forklifts	22	≤ 7 tons	76.3	Front end loader	3		100%
Tugmasters	17		69.5	Bagging Plant	2		
Pay loaders	4		48.0	Vacuvator	2	25TPH	95%
Shunting tractors	2		94.3	Pilot Boat	0		
Mobile Crane Grove	2		69.8	Small Work Boat	1		75%
Mobile Crane Gottwald	2		80.3	Tugboat	2	1100/2300 BHP	75%
Mobile Crane Mantsinen	1		93.0	Cargo Funnel	6		100%

Source: Cornelder, CDN, 2012

2.7 Port Charges and Fees

Table 26 below shows that there are substantial differences between Beira and Nacala's Ports in the levels of container handling charges compared to South African ports. South Africa's ports tend to favor export containers in that the ports charge two times what it cost to handle 20-foot and 40-foot imported containers compared to export containers. And by contrast, the Port of Beira's

tariff rate policy is different, whereby the average container handling charges are virtually the same for import and export containers.

It is clear that port charges are undoubtedly an important factor, but shippers tend to be more concerned with such indirect cost such as those associated with delays, loss of market share, loss of customer confidence and loss opportunities that result from inefficient service. Moreover, port charges typically account for only a small proportion of overall costs in international trading. See report section on value chain cost analysis.

Container Terminal Handling Charges

The Port of Beira imposes various charges on different type of containers handled by the port (e.g. such as empties, full TEUs and FEUs, reefers, and abnormal containers) for discharging, loading, transshipment, and hatch opening and closing. Additional terminal charges include storage if the container has to be stored. The basic container handling charges indicated in Table 26 are charges for stevedoring and for shore handling for imports and export containers. At Beira Port, stevedoring charges for containers with agricultural products, mineral products, or cargo not elsewhere enumerated is US$ 80.00 for a 20-foot full container load (FCL) or less than full container load (LCL). The stevedoring charge for a 20-foot reefer container is US$100.00 per container. Empty containers are US$70.00 per container. Stevedoring charges at Beira Port for a 40-foot container also varies. For a 40-foot container consisting of agricultural products, mineral products, cargo not elsewhere enumerated and reefer containers, the stevedoring charges are US$144.00 and US$180.00 for a 40-foot reefer container.

As Table 26 below shows, container terminal handling charges on average are different at the Port of Nacala than those at Beira Port. For example, a 20-foot box, the stevedoring charges varies between US$85.00 to US$ 68.00, depending on whether the box is empty or full. Stevedoring charges for a 20-foot container is US$ 74.00. As would be expected stevedoring charges for reefers and abnormal containers are more expensive than a 20-foot container at US$85.00 per TEU. Shore handling charges at Beira Port for a 20-foot box is US$185.00, for agricultural products, US$165.00 for mineral products, and US$255.00 for FCL cargo not elsewhere enumerated and US$55.00 for a LCL container.

Shore handling charges for a 20-foot container at Nacala Port, which consists of loading, and discharging the container are between US$96.00 and US$310.00 depending on whether or not the container is a FCL or LCL shipment, and what type of cargo is being shipped. The cost of loading a 20-foot container whose contents consist of mineral products is US$152.00. For agricultural products, the cost is US$197.00, and for reefer containers the cost is $310.00 per 20-foot box, and for non-enumerated goods the loading costs is US$231.00. The handling cost to discharge a 20-foot container also varies by a wide margin from US$96.00 to US$310.00 by the container cargo type. For agricultural products, the cost is US$197.00. For containers with non-enumerated goods the cost is US$ 231.00, and for reefer containers the cost

to load is $310.00 per 20-foot box. Nacala Port charges US$231.00 to discharge a 20-foot FCL container, US$96.00 to discharge a LCL container and US$310.00 to discharge a reefer container.

Table 26 below aggregates the stevedoring and shore handling charges for each type of container and for each type of cargo shipment and then compares the handling costs between Beira and Nacala, as well as South Africa's ports terminal handling charges.

Table 26: Comparison of Some Container Terminal Handling Charges, 2012

		Imports		Exports		Storage[1]		Reefer[2]	Empty	
		20' TEU	**40' TEU**	**20' TEU**	**40'TEU**	**20' TEU**	**40' TEU**	**Reefer**	**Empty 20' TEU**	**Empty 40' TEU**
THC's	Beira Port	US$195.00	US$504.00	US$190.00	US$505.00	US$5.00	US$9.00	US$405.00	70.00	126.00
	Nacala Port	277.00	498.00	277.00	498.00			395.00	68.00	115.00
	South African Ports	323.00	645.00	160.00	321.00			395.00	11.00	11.00
Variance	Beira v. Nacala	-29%	+1.0%	-31%	+1.0%					
	Beira v. South Africa	-40%	-22.0%	+19%	+57%					
	Nacala v. South Africa	-14%	-22%	+19%.0	+57%					
	SA Import v. Export TEUs	+49.2%	+50.1%							

[1] Storage rates are per day after the free days have been used.

[2] Reefer containers charges are the handling costs for a FEU plus the stevedoring costs.

Source: Cornelder Tariff Book, CDN Tariff and Transnet Port Terminals Tariffs, 2012

Our analysis of published tariffs for terminal handling charges and other services for Beira and Nacala Ports indicate some variances in prices for certain services. For such services as stevedoring and handling of a 40-foot container, the price variance is in the range of 8 percent. Beira Port's handling charges tends to be slightly higher than those of Nacala Port, but not by a wide margin. By contrast, the combined services (stevedoring and shore handling) for a 40-foot reefer container at Nacala Port are about 1.0 percent cheaper than at Beira Port. By comparison, the price gaps are not large between the two ports. The exception, as Table 26 shows is the price gap for 20-footer import container at Beira Port, which is 29 percent cheaper than at Nacala Port. Similarly, as Table 26 above reveals, average container handling charges for a 20-foot export container is about 31 percent cheaper at Beira Port than at Nacala Port. Reference here is made to the average container terminal handling charges for Beira and Nacala Ports to avoid a commodity by commodity analysis of TEUs for which data are unavailable.

Comparing the terminal handling charges of the Mozambican ports with those of South Africa we find that South Africa's pricing strategy for terminal handling charges favors export containers. The terminal handling charges for 20-foot and 40-foot export containers are half the price of an import container (respectively US$160 versus US$323 and US$320 versus 645) from South Africa's ports. Moreover, terminal handling charges for export containers at South African Ports are more competitive than at Beira or Nacala Ports. As revealed in Table 26 above, the average terminal handling charges for a TEU and a FEU at Beira port are respectively 19 percent and 57 percent more expensive than comparable size containers at South African ports. For a 20-foot export container the average handling charge at Nacala Port is about 73 percent more expensive and for a 40-foot export container its 55 percent more expensive than at South African Ports.

2.8 Port Throughput

Beira and Nacala Ports classify their cargo throughput in several ways that includes international, transit and cabotage traffic; import and export traffic; general cargo (i.e. liquid bulk and dry bulk); and container traffic by national, international, and by commodities. Below we will examine each port's traffic performance for the past five years to discern any possible trends.

Table 27: Traffic Trends for Beira and Nacala Port Throughput

		2000	**2005**	**2010**	**2015**[1]	**CAGR**
Beira Port						
	Containers (TEUs)	34,500	54,300	105,700	280,000	14.9%
	General cargo excluding coal (*metric tons)*	620,000	840,000	1,200,000	2,840,000	10.7%
	Liquid bulk cargo *(metric tons)*	1,118,199	830,879	1,254,631	N.A.	1.2%
	Dry bulk - coal (*metric tons)*				6,000,000	

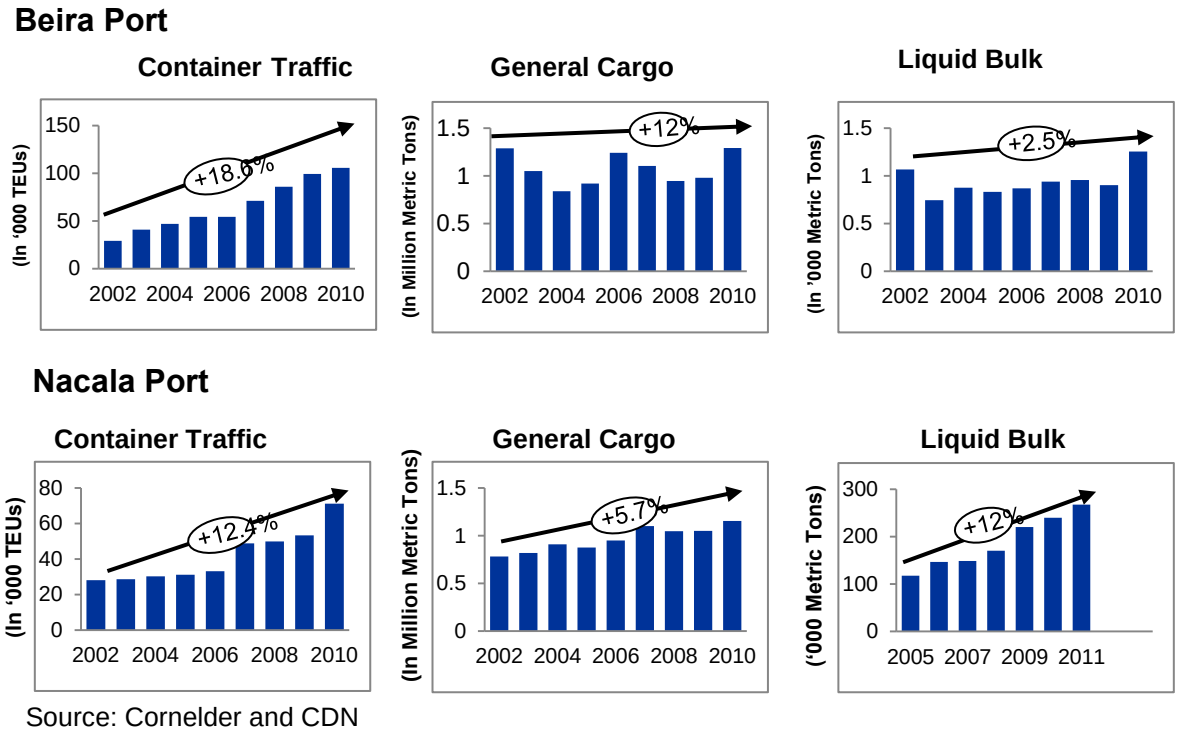
Nacala Port						
	Containers (TEUs)	25,307	32,171	71,112	450,000	10.9%
	General cargo (*metric tons)*		875,400	1,155,970	20,000,000[2]	
	Liquid bulk cargo *(metric tons)*	N.A.	117,600	239,400	331,842	
	Dry bulk - coal (*metric tons)*				18,000,000	

Notes [1]: Beira Port's containers and general cargo forecast based on Cornelder's four-year traffic forecast, 2012. [2]: Total projection for general cargo and liquid bulk.

Sources: Cornelder, CDN, CFM-C, CFM-N, 2012

Container traffic demand projections for Nacala Port were derived from forecasts prepared by JICA in 2011. However, our conservative estimate indicates that given the traffic trends (12.8 percent compound annual growth rate (CAGR) over past 6 years and expected continued growth in demand for container services at the Nacala Port, the port can expect to handle at least 62 percent more or 145,000 TEUs in 2015 than it does today. And given the expected increase in agricultural and forestry exports, a more likely scenario is approaching 200,000 TEU over the next five years.

Figure 11: Beira and Nacala Ports Throughput by Cargo Type



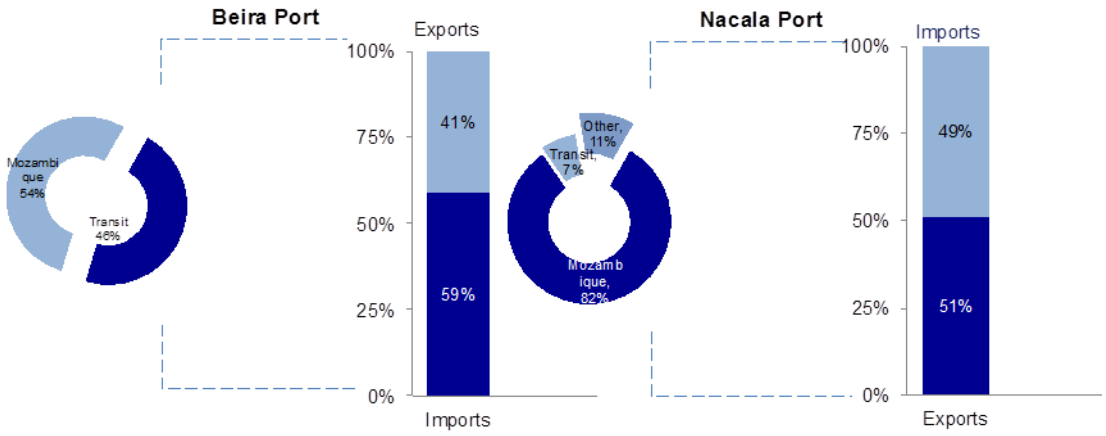
Source: Cornelder and CDN

Beira Port's Throughput

As Table 27 and Figure 11 below indicate, Beira Port over the past ten years experienced a remarkable growth in its container and general cargo traffic. Between 2002 and 2011, Beira Port's container traffic grew by a CAGR of about 18.6 percent. And over the same period general cargo increased from 1.29 million metric tons in 2002 to 1.9 million metric tons in 2011, a CAGR of 12 percent. During the same period liquid bulk cargo experienced modest growth with a CAGR of only 2.5 percent. Taking the total throughput as whole, container traffic at the Port of Beira represents 45 39 percent of the total volume followed by general cargo and liquid bulk cargo at 28 and 27 percent, respectively.

Further analysis of Beira Port's container traffic performance in 2011 as presented in Figure 12, reveals that Mozambique national traffic accounts for 54 percent of the laden throughput while transit traffic represent 46 percent. In 2011 Beira Port handled some 38,943 empty containers or 24 percent of the 160,222 containers going through the port. However of the laden containers 59 percent (71,880 TEUs) were imports and 41 percent (49,399 TEUs) were exports.

Figure 12: Beira and Nacala Port Container Traffic Shares, 2011



Source: Corneldor, CDN, Infrastructure Analytics, 2012

A similar analysis for container traffic shares for export, import, transit and national traffic shares for Nacala Port is shown in Figure 12 above. In 2011 Mozambique national traffic accounted for 82 percent of the Nacala Port's throughput. This was followed by other movements at 11.3 percent and transit container traffic at a modest 7 percent. And of Nacala Port's total laden throughput some 53 percent (40,493 TEUs) represented export container traffic in 2011. This was followed by imports which were 49 percent (39,072 TEUs). In 2011, empty containers were 11 percent (10,149 TEUs) of Nacala Port's total traffic base of 89,714 TEUs.

Nacala Port's Throughput

Nacala Port has also exceeded its container terminal capacity of 75,000 TEUs. But unlike Beira Port, it has not fully addressed the port's potential capacity problems by expanding the container terminal facility. In 2011 Nacala Port handled 89,714,000 TEUs, which is 119.6 percent of capacity and 39.6 percent above the benchmark terminal utilization rate of 80 percent. This compares to the average terminal utilization worldwide of 66.5 percent for 2010 (see Drewry Maritime Research, "Global Container Terminal Operators 2011"). The 80 percent utilization rate is when ports typically decide to expand capacity. Container traffic demand projections for Nacala Port indicate a 12.8 percent CAGR over past 6 years.

Domestic, International and Transit Traffic

As Figure 11 above reveals, over the past ten years from 2002 to 2011, Nacala Port throughput has generally increased at a robust pace. For example, container throughput as a whole accelerated at a CAGR in excess of 12 percent over the past ten years. By comparison, general cargo experienced only modest growth with a CAGR of 5.7 percent. And by contrast, liquid bulk cargo kept pace with the container traffic by growing at a CAGR of 12 percent.

The above analysis of Beira and Nacala Ports' traffic focused on the volumes and the growth in annual throughput of containers, general cargo and liquid bulk cargo. Below we disaggregate each port's container throughput in order to gain insights into the productivity and efficiency at the port's gate, terminal and quay operations.

Beira and Nacala Port Traffic Forecasts

Traffic projections made available were of medium-term traffic forecasts i.e., projections made for 3 to 4 years as shown in Table 28 below.

Table 28 presents Cornelder's traffic forecasts for the years 2012 to 2015 for Beira Port. The table reveals that future demand for port services although expected to moderate slightly from previous years will continue at a relatively robust pace. The CAGR for container traffic is expected to be about 10 percent compared to some 12 percent over the previous decade. And despite a modest increase in general cargo traffic, the CAGR for such traffic from 2012 to 2015 will likely be 68.2 percent.

Additionally, liquid bulk cargo for the Nacala Port as shown in Table 28 is forecast to be well below its 12.4 percent CAGR observed over the previous five years. Nevertheless, liquid bulk cargo is still expected to accelerate at a CAGR of 4.3 percent through 2015.

These are all promising results for the Port of Beira should such forecasts materialize. Such traffic demand definitely implies the need to increase the port's terminal capacity from current levels of 175,000 TEUs. In order to catch up with demand and rebalance to an 80 percent container terminal utilization rate (TEUs to total capacity), over the next five years Beira Port will need to add container terminal capacity at a rate of 37 percent per year. This amounts added capacity of

250,000 TEUs. Additionally, productivity and operational efficiency improvements are also imperative in all phases of Beira Port operations to meet this demand.

Table 28: Cargo Forecasts for Beira and Nacala Ports

Beira Port	**2012**	**2013**	**2014**	**2015**	**CAGR**
Containers ('000 TEUs)	190	220	245	280	10.2 %
General Cargo ('000 MTs)	2.1	2.4	2.6	2.8	7.7%
Liquid Bulk ('000 MTs)	N.A.	N.A.	N.A.	N.A.	N.A
Nacala Port					
Containers ('000 TEUs)[1]	101.2	114	129	145	12.8%
General Cargo ('000 MTs)[2]	2.5	9.5	15.01	20.0	68.2%
Dry Bulk ('000 MTs)				18.00	
Liquid Bulk ('000 MTs)	280.1	296.4	313.6	331.8	4.3%

Notes 1: Forecasts were derived from estimates prepared by JICA for CFM and MOTC. Cargo forecasts provided by CDN as the calculated CAGR indicate are exceedingly high and require documentation of the assumptions and their model before the figures should be accepted for the report. It is highly questionable that such acceleration in cargo traffic can be achieved either on the demand or the supply side. 2: Total projections for general cargo

Source: Cornelder, CFM-C and CFM-N, 2012

CDN provided traffic projections prepared for the MOTC by JICA in 2011. The forecast were estimated for years 2020 and 2030 for three scenarios, which are a steady state or current productivity scenario, a base case scenario and a high productivity scenario. For purpose of this assessment we used the JICA base case scenario to derive our estimates of TEU forecasts over the period from 2012 to 2015 as shown in Table 28 above.

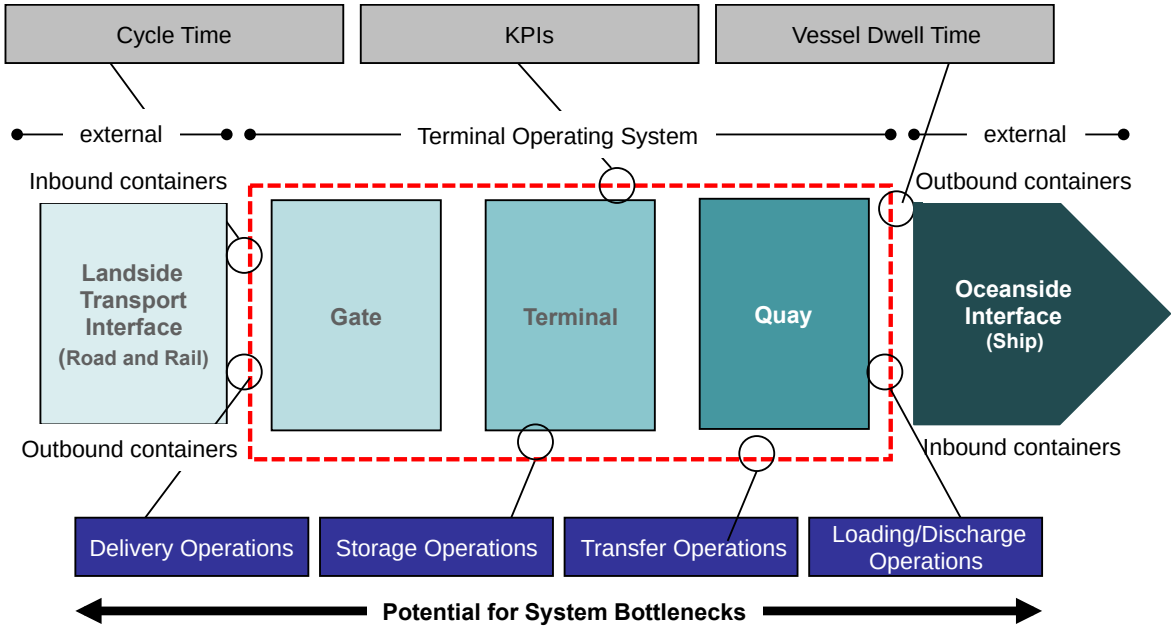
Also presented in Table 28 are the forecasts for Nacala Port's container, general cargo, and liquid bulk cargo traffic from 2012 to 2015. As Table 28 reveals container traffic is forecast to increase from about 90,000 TEUs in 2011 to about 145,000 TEUs in 2015. This represents a compound annual increase of 12.8 percent per year. As will be discussed later in the section on capacity analysis, to meet such demand forecasts requires CDN to expand its container terminal capacity from current levels of 31,790 TEUs per year by 2015 in order to sustain a capacity utilization rate of 85 percent.

Similarly, the forecast for general cargo is estimated to increase at a CAGR of 68.2 percent over the next three years. This represents an increase from 2.5 million metric tons in 2012 to in excess of 20.5 million metric tons by 2015. Much of the increase in general cargo traffic will be attributed to coal exports.

2.9 Port Operations, Productivity and Performance

Presented below are the main productivities and KPIs for Beira and Nacala Ports. For ease of reference and analysis of the results, we have selected a common set of indicators as presented in Table 29 below. The indicators are directly related to the major components of a port's asset base and operations, including the port's: 1) gate; 2) terminal; 3) quay; 4) ship, 5) equipment, and 6) labor. Each of these variables interacts to drive port productivity and efficiency. Figure 13 below presents a conceptual illustration of the main areas of the Beira and Nacala Ports. Our evaluation measured the performance of the terminal operating system (TOS) in terms of productivity and efficiency. Our approach evaluated how each component impact on port productivity and efficiency of port operations as measured by these select key performance indicators.

Figure 13: Conceptual Rendering of a Maritime Port Terminal Operating System



Source: Illustrated by Infrastructure Analytics, 2012

Figure 13 illustrates our conceptual model of a terminal operating system (TOS). The figure also illustrates our analytical approach to how we assessed the productivity and efficiency of Beira and Nacala Ports. This conceptual rendering identifies the key areas where ports experience bottlenecks, and where inefficiencies and productivity losses typically exists. Conversely, the model also identifies opportunities where efficiency gains and productively improvements can be made. Although port and vessel channel accessibility are also important areas of consideration and will be addressed, they were not the main focus of this report.

The core of our analysis focuses on maritime port capacity and operations in the following three areas:

- Gate;
- Container terminal; and
- Quay.

We selected KPIs to measure how well port operations were being performed in each of these three areas. Overarching the KPIs were two other important variables to measure port performance. These were equipment availability and labor productivity.

The approach adopted for this assessment were primarily concerned with endogenous (internal) factors i.e., factors such as investments, resource allocation, labor-capital mix, technology, etc. that are more likely to be within the span of control of the port operators Cornelder and CDN, than not. And while external factors (exogenous) factors such as the enabling environment, technology, containerization, the business environment, international market conditions offer scope for considering recommendations, such factors were not hypothesized in this assessment as being critical drivers of productivity or efficiency at either the Beira or the Nacala Port. Although, we note these external factors have played an important role in transforming national ports from a public utility monopolistic model to a market-sensitive commercial model. The main issue which this assessment focused on is the performance of Beira and Nacala Ports.

Gate

Gate operations involve delivery or receipt of containers prior to moving to the terminal's dedicated stacking area for loading onto the ship. In the case of Beira and Nacala Ports, the delivery process involves several steps. These include manually presenting several documents for review and approval by four separate offices involving, the gate, customs, port security, and operations. Copies of the documents referenced above can be found in the Annex section of this report.

Queuing is one of several activities outside of Beira and Nacala Port's container terminal gate that leads to port congestion. Some queuing can be attributed to Custom's compulsory scanning of all cargo Nacala Port and selective scanning at Beira and prior to clearing for shipment. This often leads to congestion between the port entrance and container terminal gate at both ports.

As illustrated in Figure 13, each of the four port operations unless properly managed and appropriate yard equipment utilized, presents the opportunity for bottleneck to occur in the port independent of external factors on the landside or on the waterside.

Port access at both Nacala and Beira Ports is constrained by inadequate entry and exit lanes. Although future development plans, at the Beira Port plans calls for expanding port access by adding a new entrance, the current configuration for both ports is a single lane for entry and exits. The effects of which can be observed by the amount of congestion caused by queuing to enter the container terminals.

Terminal

Terminal or yard operations mainly involve two types of activities, namely, storage (stacking of containers) and transferring (horizontal transport) containers. Horizontal transport refers to the movement of containers between the ship and the shore, between the stacking area and the landside operation.

Containers are transferred from the quay to a storage area in the terminal and stacked while waiting to be transferred to a land transport mode (road or rail). Conversely, the reverse flow of containers in terminal operations typically involves pre-positioning or stacking containers in dedicated terminal storage areas for loading onto ships. In addition to loading and off-loading ships or transfer to ground transport, stacking containers to pre-position for transfer to a ship or to store and await transfer to ground transport is an important aspect of container terminal operations. Stacking containers, usually require a number of pieces of equipment. Among these are straddle cranes, rubber tire gantry cranes or RTGs, rail mounted gantry cranes, reach stackers, and top and side lifters, etc. Equipment typically used for horizontal transfers includes a yard tractor, a prime mover, a yard trailer and chassis or utility trailer, and forklifts. Much of this equipment is absent from Nacala Port's terminal operations.

Quay

Quayside operations involve discharging containers from the ship to a container terminal or loading containers to a ship berthed at the quay. This operation involves transferring containers from the quay to the ship and versa using either the ship's gear (ship crane) or a mobile crane or a ship to shore crane.

Many of the KPIs described in Table 29 below reflect measures port operators use to manage port. These performance indicators can be grouped into four categories: a) Service; b) Output; c) Utilization; and d) Productivity.

- **Service** – truck cycle time, container dwell time, service time, and vessel dwell time are regarded as service indicators;
- **Output –** cargo throughput (TEUs, general cargo and liquid bulk); ship rate
- **Utilization –** berth occupancy measured as a percent is a utilization indicator, and hours of equipment in service per day divided by the total equipment hours;[1] and
- **Productivity –** gross and net productivity per vessel hour; TEUs per hour gross and net hours, TEUs per day gross and net; TEUs and general cargo throughput per employee; gross and net tons per gang hour; tons per hour at berth, tons per hour in port.

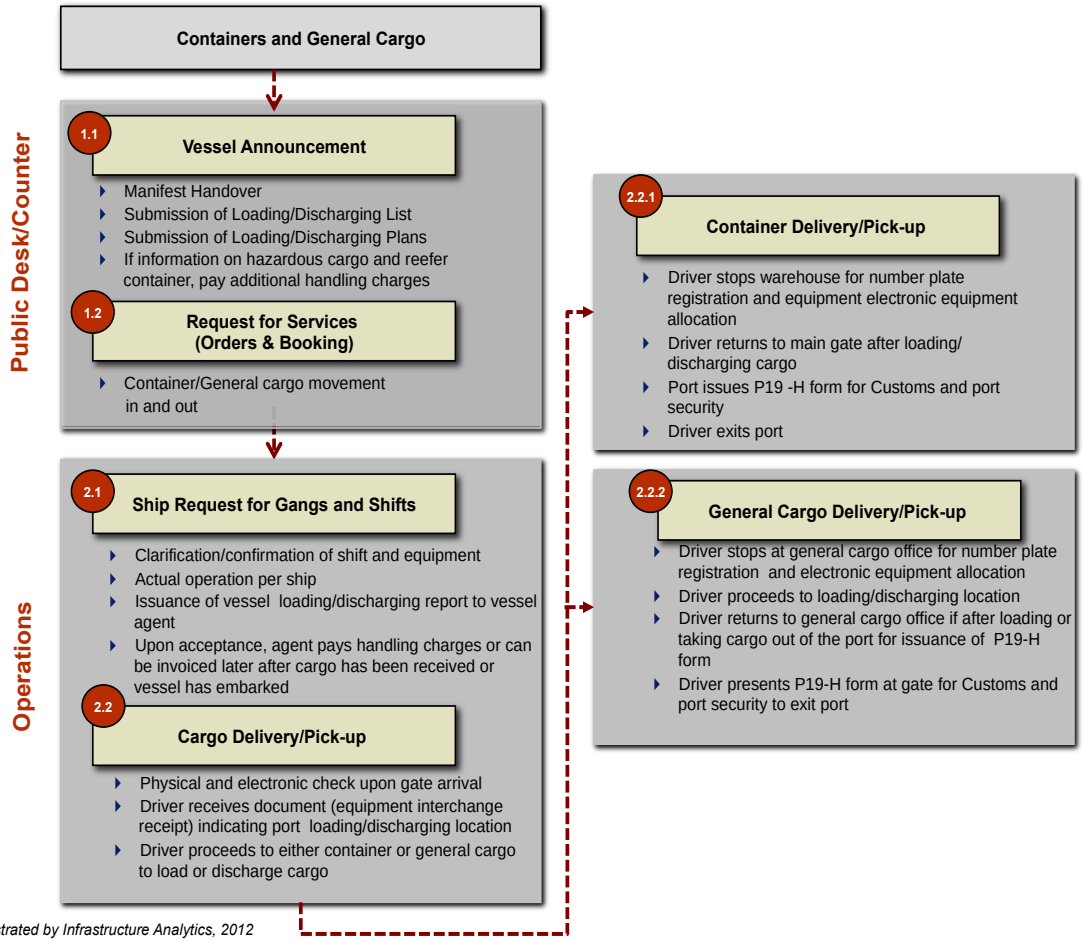
Although the above list is not all-inclusive, it does contain a wide range of indicators to measure port performance. However, no industry consensus has emerged as to which KPIs are the most important to measure.

[1] The Nacala Port as part of its movement of ships and daily operations provides a daily report of its equipment with the designation available or unavailable to each shipping line.

Figure 14 illustrate the process for delivering and picking-up a container and general cargo at Beira Port. As the figure illustrate, this is a very cumbersome and antiquated process for port operation. It requires the driver to deliver important documents to the port gate and to manually distribute documents to Customs, port security and operations. This illustration clearly shows that Beira Port can gain significant benefits from a Single Electronic Window based on an EDI system, as well a modern vehicle booking system, both of which are in widespread use in modern ports.

As previously stated, the assessment encompassed four types of port operations extending from the landside gate to the terminal to quay to the vessel at the waterside. These include: a) delivery operations at the port's gate; b) terminal storage operations; c) transfer operations between the terminal and quay; and d) loading and discharging operations between the quay and the ship. As in Table 29, we have selected KPIs to measure the performance for each type of port operation.

Figure 14: Container and General Cargo In-take and Out-take Process at Beira Port



Source: Illustrated by Infrastructure Analytics, 2012

Table 29: Typical Performance Indicators for Maritime Terminals

Indicators	Description
Arrival rate	Number of ships arriving during a month, divided by number of days in the month
Turn-round time	Turn-round time - Total time between arrival and departure for all ships, divided by number of ships
Service time	Total between berthing and departure for all ships, divided by number of ships.
Waiting time	Total time between arrival and berthing for all berthing ships, divided by number of berthing ships
Tonnage per ship	Total tonnage worked for all ships, divided by the total of ships
Fraction of time berthed ships worked	Total time that berthed ships were actually worked, for all ships, divided by the total time between berthing and departure.
Number of gangs employed per ship per shift	Total gross gang time, divided by total time that berthed ships was actually worked.
Tons per ship hour in port	Total tonnage worked divided by total time between arrival and departure.
Tons per ship hour at berth	Total tonnage worked, divided by total time between berthing and departure
Tons per gang-hour	Total tonnage worked, divided by total gross gang time
Fraction of time gangs idle	Total idle gang time, divided by total gross gang time
Yard density	Measures how effective the port space is used
Number of TEUs per Hectare	Measures how effective the port uses its land

Source: UNCTAD

For this research, we used two analytical methods to the conduct this port assessment. The first was a comparative analysis, which mainly looked at how the KPIs compares between the two ports. The second method was a benchmarking analysis that compares Beira and Nacala Ports to their peers.

2.10 Comparative Analysis of Port Performance

The performance indicators referenced in Table 30 below comprises both input measures (labor and equipment) and output measures such as the number of containers handled, number of ship calls or arriving ships. It is worth noting that wide variations exist in the standardization, number and use of KPIs by port operators.

Table 30: Beira and Nacala Ports' KPIs, 2010 and 2011

		2010	2011		
Performance Category	**Indicators**	**Beira Port**	**Nacala Port**	**Beira Port**	**Nacala Port**
Gate	Truck Cycle Time (hours)	6.8	6.5	4.1	N.A.
Terminal	Throughput (TEUs)	105,700	71,112	160,222	89,714
	Throughput (million metric tons)	1.44	1.155	2.148	1.354
	Crane moves per hour	8.6	8.0	9.7	9
	Dwell times (days)	19.45	26	18.25	26
	Terminal area (m^2)	200,000	59,100	200,000	59,100
Quay	Berth Occupancy (%)	51.4	35.4	62.3	66
	TEUs per meter of Berth length	167	192	254	242
	Crane moves per hour over the quay	8.6	8.0	9.7	4.0
	TEUs per Vessel hour (Gross)	8.6	8.0	8.0	8.0
	TEUs per Vessel hour (Net)	10.4	10.0	17.3	89.0
	Arrival rate (# of ships)	296	145	347	156
Vessel	Service time (hours)	N.A.	42.2	N.A.	2
	Vessel Dwell time (hours)	N.A.	61.8	N.A.	56.0
	TEUs moves per Vessel hour (Gross)	8.6	8.0	12.7	12.0
	TEUs moves per Vessel hour (Net)	10.4	10.0	17.3	9.0
	Average Operational time (hours)	N.A.	42.8	N.A.	54.0
	Turnaround time (hours)	N.A.	61.8	N.A.	84
Equipment	Availability (%)	77.1 %	33%[1]	76%	34%
Labor	Number of Employees	467	239	502	223
	Throughput per employee (TEUs)	226	298	319	400
	Throughput per employee (metric tons)	5,850.	4.843	,8,106	15.5

NA-Not Available

[1] Note: Derived from CDN's daily operations, ship arrival and 24 hour work schedule for April 10, 2012

Source: UNCTAD, Cornelder, CDN

Despite the general perception as a more efficient port, an analysis of the performance of Beria and Nacala Ports as shown in Table 30 above, the KPIs indicate Beira Port performed only marginally better than Nacala Port does in the past two years. This is in spite of Beira Port's advantage in equipment, technology and management resources. Beira Port has an advantage in equipment availability, berth occupancy rate, terminal area, and in TEU and general cargo throughput. But this has not translated into a superior operational performance compared to Nacala Port. The KPIs for both ports are virtually even in such key areas of efficiency such as dwell time, truck cycle time, crane moves per hour, and TEUs per vessel hour (gross and net).

One of the key issues undermining a better quay side performance at the Port of Beira is that this is remarkably a tidal port, whereby vessels can only enter and exit the port at high tide. Thus, knowing that a given vessel would only be able to depart say after 10 hours or several days when the right tide occurs, most of the equipment would be taken out from same vessel in case the cargo volume didn't justify a big mobilization, thereby affecting vessel productivity. On the other hand, prior to dredging campaign completed in August 2011, the Port of Beira was mostly demanded by small and old fashion vessels which were more difficult to operate, hence negatively impacting on vessel productivity. This situation changed dramatically after August 2011.

2.11 Productivity and Efficiency Analysis

Although the above analyses are straightforward and a useful comparison of the two ports, it is not without limitations. This is because the analysis is not suitable for a full comprehension of what drives port inefficiencies due to the differences in the importance of the various KPIs.[2]

Gate Productivity

A key indicator used to measure the performance of a port's gate is truck cycle time. Cycle time can be broadly defined as the time it takes a truck to enter and exit the port's gate or from A-check to P-check, including the time to drop off and the loading time for a container. According to the World Bank, the cycle time for ports in sub-Saharan Africa is one of the highest in the world. As shown in Table 31 below cycle times for the Mozambican Ports exceed those of other regions by a wide margin.

[2] There are a number of inter-related aspects and operational activities that occur in a port, which cannot be captured by a single performance indicator. Because of this, the port industry developed a wide range of operations KPIs to measure port efficiency. These indicators cover all aspects of the port, and to varying degrees, emphasis and importance. However, no industry consensus has emerged on which indicators are the most important. Thus, the presence of so many efficiency indicators raises problems of evaluating and comparing overall efficiency across ports.

Table 31: Comparison of Truck Cycle Times

Port	Cycle Time (in hours)	Best in Class Comparison
Beira	4.1[1]	3 times more inefficient
Nacala	6	6 times more inefficient
Maputo	4	4 times more inefficient

Note[1]: Figure presented is 2011 data, early indications are that Beira Port through the 1st and 2nd Quarters of 2012 has reduced truck cycles times to 3.2 hours. Although this benchmark is still high compared international benchmarks, it is an indication that Beira Port is making progress in reducing truck cycle times.

Source: World Bank Study, Cornelder, 2012

Two key factors which have contributed to Beira Port's high truck cycle time is that the port allows trucks to wait for cargo inside the port, ostensibly to avoid congestion outside the gate and because of security reasons. While both are plausibly, explanations of factors that have increased truck cycle times at Beira Port neither policy is a best practice in modern port operations.

Terminal Productivity

To evaluate the productivity of the Ports of Beira and Nacala container terminals we used container dwell time as the primary performance metric.

Container Dwell Times

Cargo dwell time is the time cargo spends in port from discharge to delivery for imports (inbound) and from receipt at the gate to loading on ship for exports (outbound), and measured in days or hours. The main common indicator recorded for most ports is the dwell-time for containerized cargo. However, dwell time can also be recorded for the break-bulk and bulk cargo.

Container dwell time = Days/Containers (monthly and annually), measured separately for:

- Import full, export full and empties for 20' and 40' foot; and
- Average (overall).

It is important to compute total imports, exports and empties dwell time per country (local and transits)

Table 32: Container Dwell Times at Beira Port, 2011

	Imports			**Exports**			
TEU Type	Target	Actual	% Variance	Actual	% Variance		
Full Transit TEUs	15	14.5	-3.5%	25.6	+60.0%		-
Full National TEUs	15	16.7	+11.5%	16.1	+7.2%	-	-

Source: World Bank Study, Cornelder, 2012

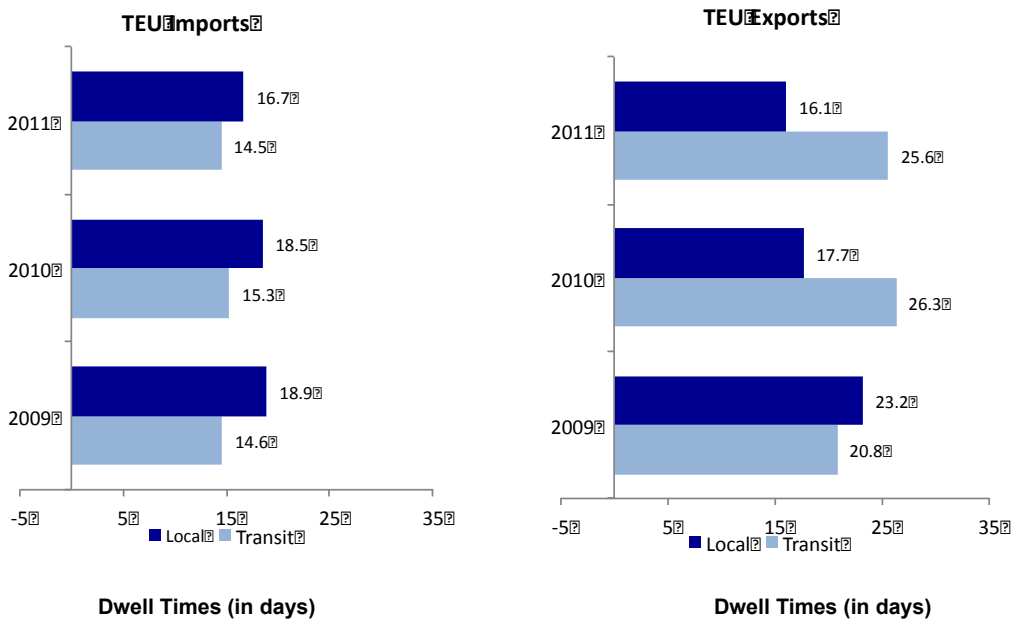
In 2010 Cornelder set 15 days as the target dwell time for all containers except empties, which are set at 20 days. The results as shown in Table 32 indicate that Cornelder has had mixed results in meeting its dwell time targets. The port was off the mark by as much as much as 60 percent for export transit cargo. Correspondingly, import containers exceeded the target dwell time by as much as 11.5 percent for national container cargo and approximately 16.7 percent for transit cargo.

One of the main challenges most ports in sub-Saharan Africa face, and indeed in both Beira and Nacala Ports in terms of productivity is container dwell times. As illustrated in Figure 15, in 2011 the dwell time for import containers ranged from almost 16 days for local containers to as much as 22 days for transit containers. Similarly, dwell times for export containers at Beira Port in 2011 were even higher than their import containers. The dwell times for transit and local export containers were 25.6 days and 16.1 days respectively. In order words, in 2011 export containers, which contribute to export earnings, remained in the Beira Port 51 percent (8 days) longer than local import containers.

Container Dwell Times at Beira Port

The Port of Beira appear to be making significant headway when it comes reducing dwell times for transit imports and export containers as Figure 15 shows, Beira Port for the past year that dwell times for local export containers, while still high did show some improvement. The average dwell times for local export decreased from 19.4 days in 2010 to 18.25 days in 2011. The first and second quarters of 2012 also show improved dwell time performance, which are respectively, 14.5 and 14 days. Despite the significant improvement in dwell time performance over the past two and a half years, Beira Port's dwell time remains remarkable high relative to the international benchmark of seven days.

Figure 15: Container Dwell Times at Beira Port



Source: Cornelder, Infrastructure Analysis 2012

Cornelder as the operator of the Port of Beira is quite aware of the impact high dwell times have on port capacity and, in turn, its throughput. In response, Cornelder has as of 1st April adopted a two-part strategy to reduce container dwell times. Cornelder's strategy entails: a) using a pricing mechanism and b) reducing the number of free days for container storage.[3] Container storage rates have been increased and the number of free days reduced.

Container Dwell Times at Nacala Port

Table 33 and Figure 16 present the dwell times for transit, local and empty containers that passed through the Nacala Port in 2011. Despite some moderation from the previous two years dwell times at Nacala Port, especially transit traffic remains remarkably high. For example, the dwell times for transit import and export containers are respectively 16 and 10 days. And although these dwell times as Table 33 shows compare favorably to those of Beira Port's export container dwell times they are still too high from an international competitive standpoint as we will present later in this report.

Although three years of data on dwell times as shown in Figure 16 doesn't make a trend, it does indicate the direction of the data. What the data series on dwell times suggest is that dwell times for transit import and export container cargo has

[3] South Africa's Port of Durban adopted a "punitive" pricing strategy to reduce high container dwell times at Durban in the 1990. This strategy was coupled with a communication strategy to raise port users' awareness and stimulate user involvement to build consensus and undertake agreed actions.

declined over the past three years and by as much as 53 percent for export transit containers and 50 percent for import transit containers.

Table 33: Container Dwell Times at Beira and Nacala Ports, 2011 (in days)

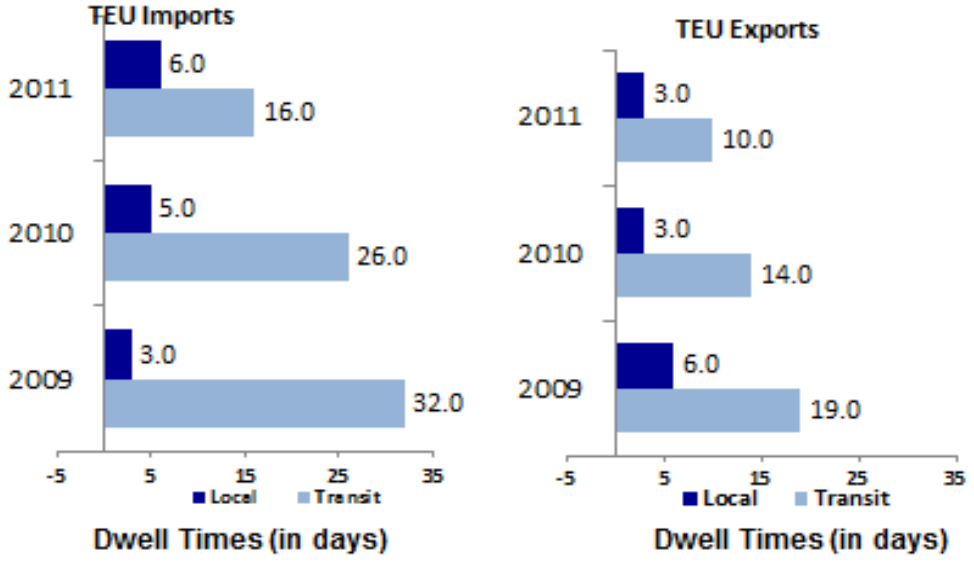
		Imports	Exports	
Beira Port				
	Transit	14.5	25.6	
	Local	16.7	16.1	
	Empties[1]	33.5	33.5	
Nacala Port				
	Transit	16	10	
	Local	6	3	
	Empties	13	16	

Note [1]: Beira Port does not disaggregate its empties containers by imports and exports.

Source: Cornelder, CDN, Dickie, 2012

To gain a better insight into container dwell times, the Assessment team conducted an analysis of Nacala Port's container terminal records from March 1 to March 31, 2012. The analysis, which is revealed in Figure 16, indicates that of 366 containers entering the container terminal on March 1, 55 percent or 201 containers exceeded the number of free days granted by the ports. The number of days for container dwell times ranged from three days to as many as 30 days. And of those TEUs that remained in the terminal, 178 or about 49 percent had been in the container terminal for 30 days. What this analysis suggests is that on a given day in March (March 1) about one in two containers entering the terminal remained there for approximately 30 days. If this is a typical pattern and remains so, it has enormous implications for future port productivity and efficiency, especially terminal efficiency. These results are in line with Dickie (2012) who found a range of 25 to 30 days transit container for average dwell times.

Figure 16: Container Dwell Times at Nacala Port



As previously mentioned, two factors need to be considered as adversely affecting the dwell times for full containers at both Beira and Nacala ports. One is that customs authorities use the port terminals for confiscated cargo, thus increasing the overall container dwell time, as such cargo tends to stay for months before is actually uplifted. The second, which is more applicable for Beira, is related to constant short shipment of full export containers prior to dredging of the entrance channel. Due to drought restrictions at sailing time, dozens of containers were constantly short shipped out of the confirmed booking, thereby pushing high the export containers dwell time. As far as empty boxes are concerned, shipping lines tend to have a high inventory at marine terminals awaiting exports booking, given the limited capacity of the existing small container freight stations around the ports. This is changing lately as a result of additional investments in container freight stations.

Quay Productivity

The lack of equipment is one of many factors that may be contributing to excessive dwell times at the Port of Nacala. Other potential factors, as World Bank studies have demonstrated, is the propensity of local merchants to use sub-Saharan Africa's ports for warehousing and storage of their merchandise due to its cheapness and the unavailability of warehousing and storage facilities outside of the port.

And while excessive container dwell times at both Nacala and Beira Ports in the past decade may not have had a major impact on port capacity due to underutilization, this situation is rapidly changing.

Nacala Port, for example, exceeded its terminal capacity by 19.6 percent (89,718/75,000 TEUs) in 2011, and will exceed its projective terminal capacity utilization (101,158/ 75,000 TEUs) by about 34.9 percent in 2012.[4]

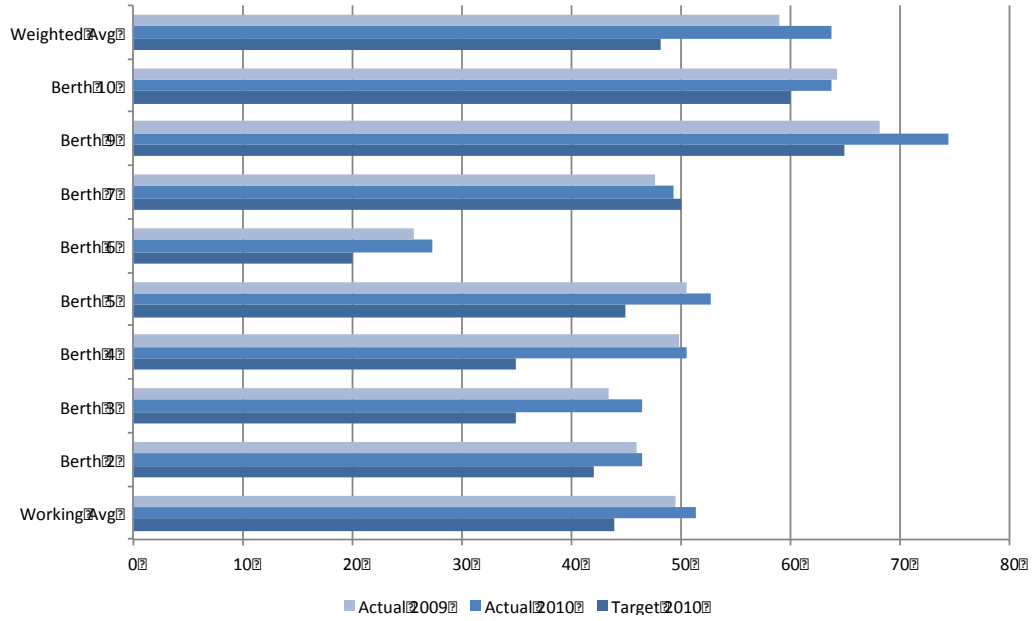
A recent World Bank study of dwell times in several sub-Saharan Africa countries found that extensive dwell times were, in part, being caused by small firms using port terminals to store and manage their inventory.[5]

The long-run effects of such an operations strategy can be devastating for a port, because it is devoid of a vision for the port, lacks a coherent strategy and is unlikely to encompass a well-conceived port development and investment plan to meet future port traffic demand or international competition.

Berth Productivity at Beira Port

Berth occupancy is defined as the proportion of time that a vessel occupies a berth. Typically, a berth occupancy rate of between 60 and 80 percent per berth is the port industry's practice in order to avoid vessels waiting and time delays. As shown in Figure 17, each of the berths at Beira Port with the exception of Berth numbers 9 and 10 are below what would be desirable to avoid increasing vessel-waiting time.

Figure 17: Beira Port Berth Occupancy Rates, 2010



Source: Corneldor, Infrastructure Analytics, Analysis, 2010

[4] A typical rule of thumb in port operations is to increase terminal capacity when utilization reaches 80 percent of capacity.

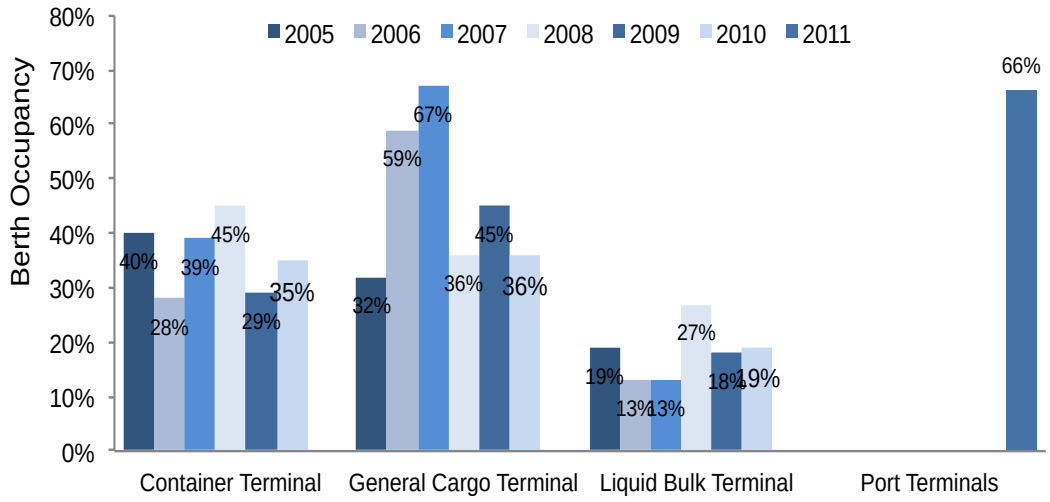
[5] See M. Beuran et.al. (2011) "The Impact of Demand on Cargo Dwell Time in Ports in SSA", World Bank: Washington, DC

Comparable data as in Figure 17 was not available for year 2011. However, in 2011, the average berth occupancy rate for all berths at Beira Port was 62.3 percent. This berth occupancy rate is just inside the band of between 60 to 80 percent, a common international benchmark used by port operators.

Berth Productivity at Nacala Port

As can be seen in Figures 17 and 18, Beira and Nacala Ports collect data on berth occupancy in different formats. Beira Port's berth occupancy data seek to measure the productivity of each berth, while Nacala Port measures berth performance by terminal. Nonetheless, the berth performance of Nacala Port is well below international standards, which is 60 to 80 percent for berth occupancy.

Figure 18: Nacala Port Yearly Berth Occupancy Rates by Terminal



Vessel Operations

Vessel operations are another important measure of port performance. Vessel arrivals are one of our starting points to evaluate how well vessel operations are being performed at the port's quayside. As Table 34 indicate, despite some unevenness the six-year trend for vessel arrivals show modest increase from 2005 to 2010. Both Beira and Nacala Ports had increases in vessel arrivals of 2 percent and 0.7 percent respectively. During the same period an average of 284 vessels per year called at Beira Port (excluding the Oil Terminal) and 242 at Nacala Port. Table 34 below shows the annual ship arrival rates for Beira and Nacala Ports from 2005 to 2011.

In evaluating the vessel performance at the quay, we examined vessel turnaround times at Nacala Port for which data were available. Vessel turnaround time, which is the time a vessel stays in the port, is mostly a function of the volume of cargo. However, in the case of Nacala Port others factors may come into play, given the port's equipment handling problems. Figure 19 shows the results of our analysis of

vessel arrivals with turnaround times. As traffic increased for container vessels at Nacala Port, vessel turnaround times improved. Similarly, service times were also shown to have time improved. Despite the positive trends during the period studied discussed above, we must invoke a word of cautions. Although a number of factors may be at play, the average vessel turnaround time of 67 hours at Nacala Port is still remarkably high. Shipping lines tend to be interested in minimizing turnaround times. On the other hand, port operators are interested is maximizing throughput, which requires lowering of ship turnaround times. Undoubtedly, shipping lines perception of Nacala Port's turnaround times affects their decisions to provide service to the port and at what frequency.

Table 34: Vessel Calls at Beira and Nacala Ports

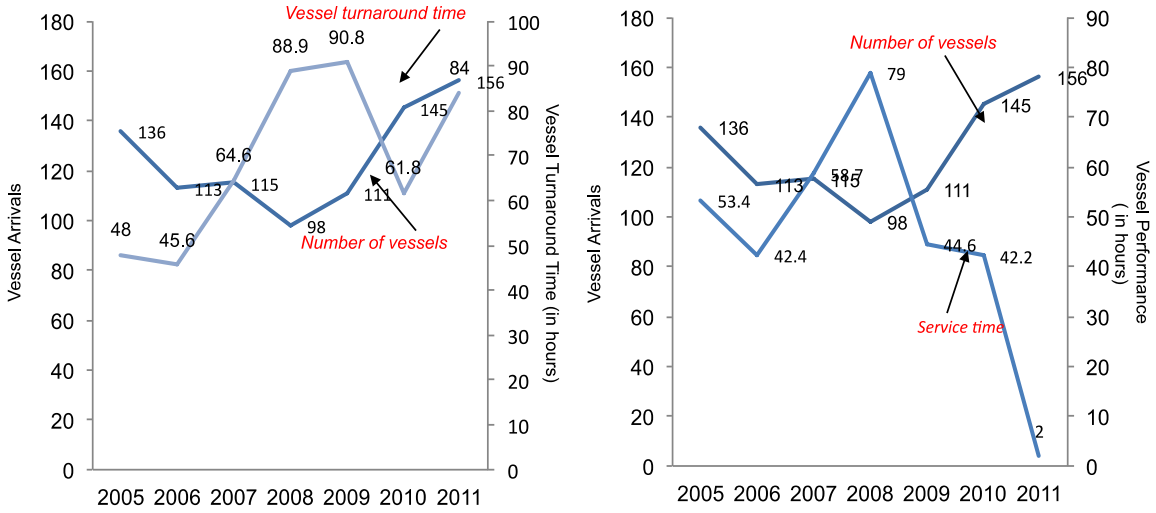
Beira Port (Excluding Oil Terminal)				**Nacala Port**			
	All Vessel Calls[1]	TEUs per vessel	Tons per vessel	Container Vessel Calls	TEUs per vessel[2]	General Cargo vessels	Tons per vessel[3]
2005	265			136	229	76	9,796
2006	297			113	293	67	12,076
2007	304			115	389	73	13,036
2008	254			98	508	49	17,876
2009	285			111	479	57	18,421
2010	296			145	490	53	21,800
2011	347			156	575		
Average	293			125	423		

Notes [1:] Figures are for all ships calling at Beira Port. [2]: Figures represent container vessels only and does not differentiate between imports versus exports TEUs [3]: Includes only general cargo.

Source: Cornelder and CDN, 2012

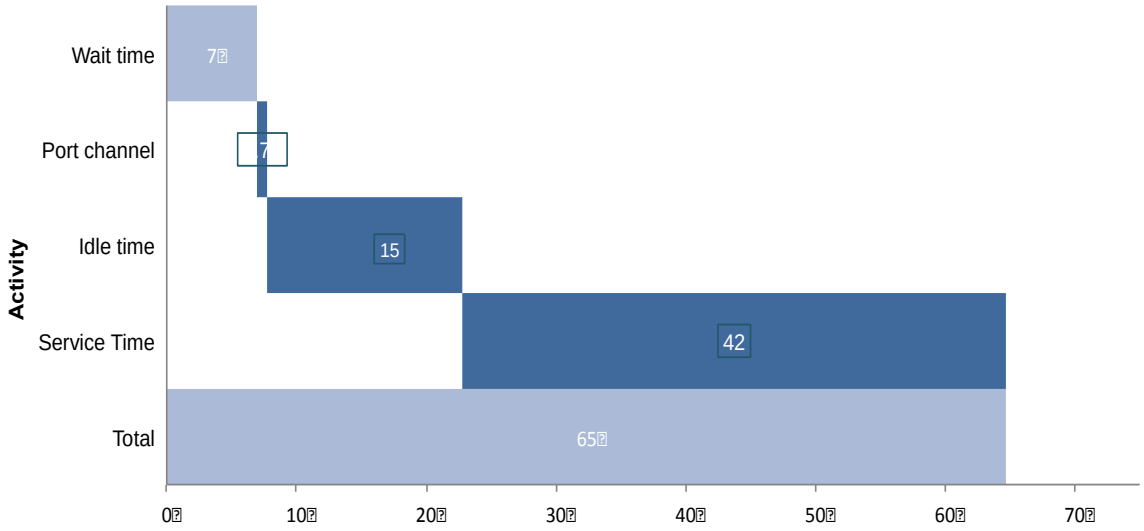
Further analysis of vessel operations can be summarized by Figure 20 below in which we asked the question, what other factors account for high vessel turnaround times at the Nacala Port. As Figure 20 illustrates, almost 25 percent of the time in the port or berthing time is idle time or non-productive time. Often vessel idle time can be attributed to factors such as labor stoppage and equipment availability.

Figure 19: Nacala Port Vessel Performance, 2011



Source: CDN, Infrastructure Analytics Analysis, 2012

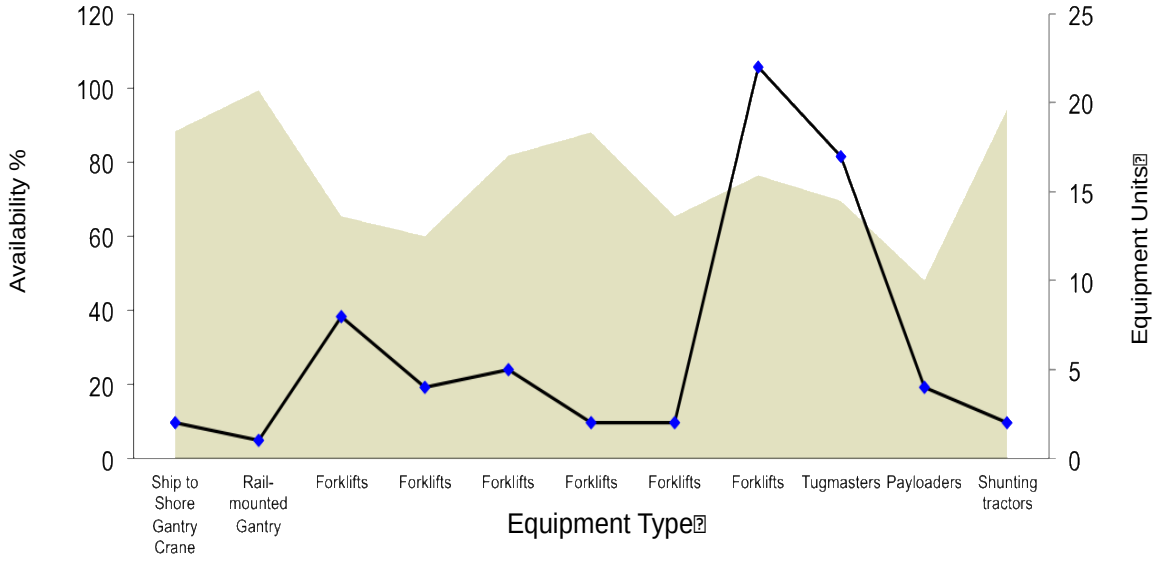
Figure 20: Vessel Performance at Nacala Port



Equipment Productivity

As illustrated in Figure 21 Beira Port not only has an extensive inventory of equipment but also a relatively high equipment availability rate. The average availability rate for all of Beira Port's equipment was 77.1 percent in 2010. In 2011, Beira Port average equipment availability rate experienced a modest decline to 76 percent. Although this equipment availability rate is reasonable, efforts should be made to increase it to the international benchmarks of between 90 to 95 percent for tractors and trailers and between 80 to 90 percent for cranes.

Figure 21: Beira Port Equipment Availability



The availability of port handling equipment presents a significant challenge for the Nacala Port compared to Beira Port. A study by Dickie (2012) shows the equipment availability rate for Nacala Port to be less than 35 percent on average. Our own research conducting during the assessment mission to Nacala Port confirms Dickie's findings.

Labor Productivity

Beira Port with 502 employees in 2011 has more than twice as many direct employees as Nacala Port, which has 223 employees. With the exception of the Port's direct staff, consistent and reliable data on the labor force, especially stevedoring labor, at Beira and Nacala Ports were difficult to obtain. In part, this was attributed to the fact that both port operators outsource their stevedoring operations to privately owned companies. All use contract day labor to make up work gangs in order to perform stevedoring work. Similarly, at Nacala Port CDN has contracted out all of its stevedoring operations to one provider, Terminals do Norte. Both Beira and Nacala Ports hold daily meetings each morning at 10:00 hours) with the stevedoring companies and the shipping lines. These daily meeting are used to review the daily work schedule, such as what ships will loading or discharging cargo, how many gangs will be required, and what equipment is available, etc.

Nacala Port uses a proxy measure for its labor productivity KPI, which is throughput measured in the number of containers per employee and general cargo expressed in thousand metric tons per employee as shown in Table 35. Studies by Drewry Shipping Consultants have demonstrated a relatively constant productivity benchmark of about 1,000 TEUs per employee (including operational, administrative and management staff) for various container terminal throughput levels from 150,000 to 600,000 TEUs per year. In the case of Beira and Nacala

Ports, not being able to determine stevedoring staffing levels makes it virtually impossible to definitively measure of labor productivity against this benchmark.

Table 35: Nacala Port Throughput Per Employee

	Port Employees	Container Throughput per Employee	General Cargo throughput per Employee (in '000 MTs
2005	140	222	5.318
2006	159	212	5.187
2007	169	264	5.631
2008	209	238	4.192
2009	239	223	4.393
2010	239	298	4.834
2011	223	403	6.076
Average	193	242	4.909
CAGR	8.1%		2.3%

Source: CDN, 2012

Table 35 above shows that over the six-year period from 2005 to 2011 the Nacala Port's staff grew by an annual rate of 8.1 percent, while the container throughput per employee was increasing at an annual rate of only 5 Percent. Similarly, the results for general cargo over the same period indicate an increase in general cargo throughput per employee. Nacala Port's general cargo throughput per employees increased at a CAGR of 2.3 percent between 2005 and 2011. What these results reveal is that CDN was adding staff at pace that exceeded the ports annual throughput for both containers and general cargo. In other words, the Nacala Port was getting less for more when it perhaps should have been reducing staff or growing staff at rate in line with the port's throughput.

A more conventional KPI for labor productivity is output measured in tons or TEUs per gross or net gang hour gross, which Cornelder uses at Beria Port.

Table 36: Beira Port Productivity Per Gang Hour, 2010

	Bagged Cargo	Bulk Cargo	Granite	Steel	Scrap	General Cargo
Tons/Gang Hour (Net)	26.4	41.9	61.8	-	23.6	20.4
Tons/Gang Hour (Gross)	21.9	33.8	48.6	-	21.9	15.8

Source: Cornelder, 2012

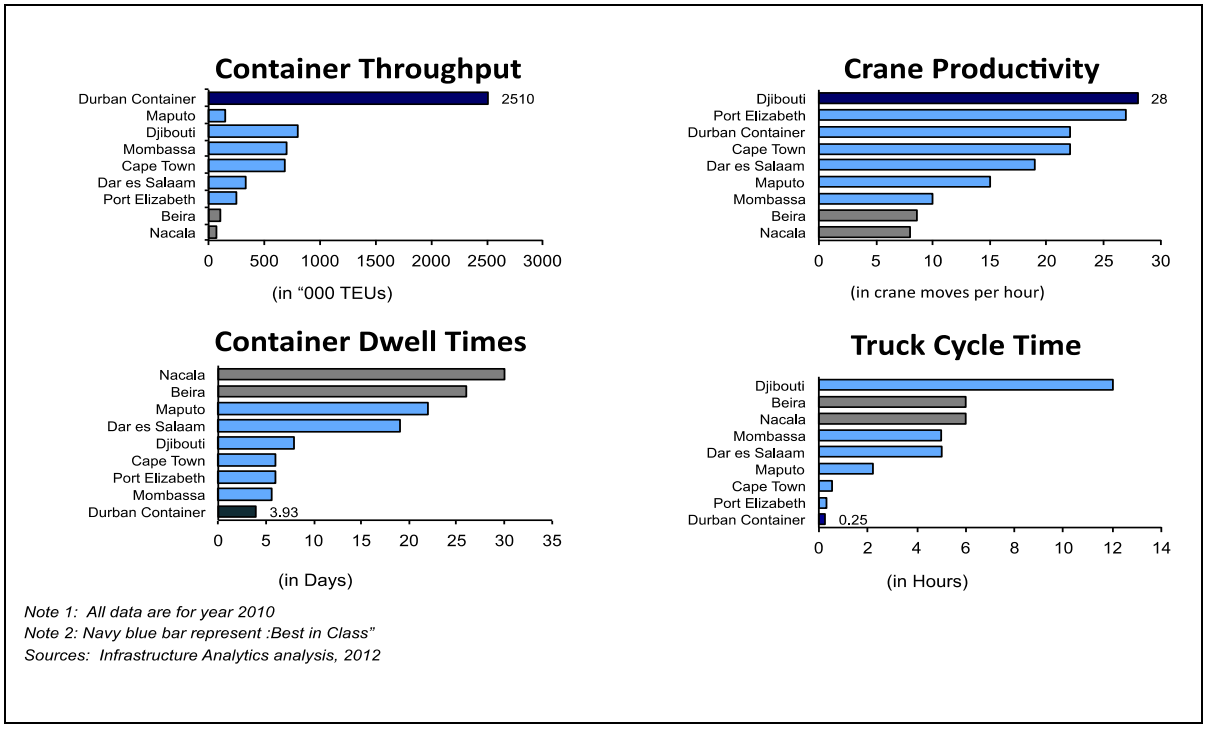
Benchmarking

A benchmark was carried out to assess the productivity and efficiency of the ports in eastern and southern Africa against three KPIs of Beira and Nacala Ports. The KPIs that were considered are the crane productivity, container dwell time and truck cycle time. The results of the benchmark analysis as shown Figure 22 below indicate that the performance of Beira and Nacala Ports were well below that of their peer group in east and southern Africa. However, more recent data provided by Beira Port indicate that truck cycles times in 2011 and the first and second quarters of 2012 had begun to show marked declines to 4.1 hours and 3.2 from 6.8 hours in 2010.

The Port of Beira is a tidal port with a tidal range of 0-7.2m. Before dredging (completed in August 2011) when the channel had a draft of -2m CD, vessels could not come into the port for a considerable amount of days per month and maximum sailing draft varied from day to day. Change in sailing draft had effect on maximum containers that could be loaded in the port, and changing vessels operation plans and vessel productivity. However, since mid-2011 the channel has been dredged to -8m CD allowing vessels with drafts of 12-14m. With larger and more modern vessels calling the port after dredging, effective vessels planning was made possible, increasing vessel productivity. Vessel waiting for tide though present was also reduced significantly after dredging. Although vessels can sail at any day of the month, they still have to await high tides, leading to more time in port.

The type of vessels handled have relation with vessel productivity as achieving high productivity on large cellular vessels is much easier than on small feeder vessels due reasons which includes:

Figure 22: Port Performance Benchmark Dashboard



Note 1: All data are for year 2010
Note 2: Navy blue bar represent :Best in Class"
Sources: Infrastructure Analytics analysis, 2012

- Frequent bay changes: Big vessels have hundreds of containers per bay, while feeder vessels have very few, meaning that cranes need to be repositioned much more frequently;
- Stability: Small vessels are unstable during loading, making positioning in cell guides difficult; and
- Gear interference: Small geared vessels often obstruct gantry crane movement, where some bays cannot be loaded without constantly shifting the gantries.

Before dredging, Beira was mostly served with very small non-cellular vessels. After dredging vessel size has increased, with a mixture of small and larger vessels, which is expected to drive vessel productivity.

Further details of the benchmarking analyses are presented in Annex 3.

2.12 Planned and Future Port Development

Beira Port Container Terminal

To address what is undoubtedly a major challenge both today and well into the future is port capacity. As previously indicated, Beira Port's container terminal throughput has grown to 60 percent above its 1992 design capacity of 100,000 containers. However since 1992 Beira Port has undergone some changes and by 2011 the container terminal capacity is estimated by port management to be 175,000 TEUS. See Table 37 below for projection on TEU volumes and terminal capacity. And with continued growth of about 12 percent per year over the next four years, expansion of Beira Port's container terminal capacity will need to expand at an average 26.6 percent year over year to achieve under an 80 percent capacity utilization rate and accommodate some 280,000 TEUs forecast for 2015.

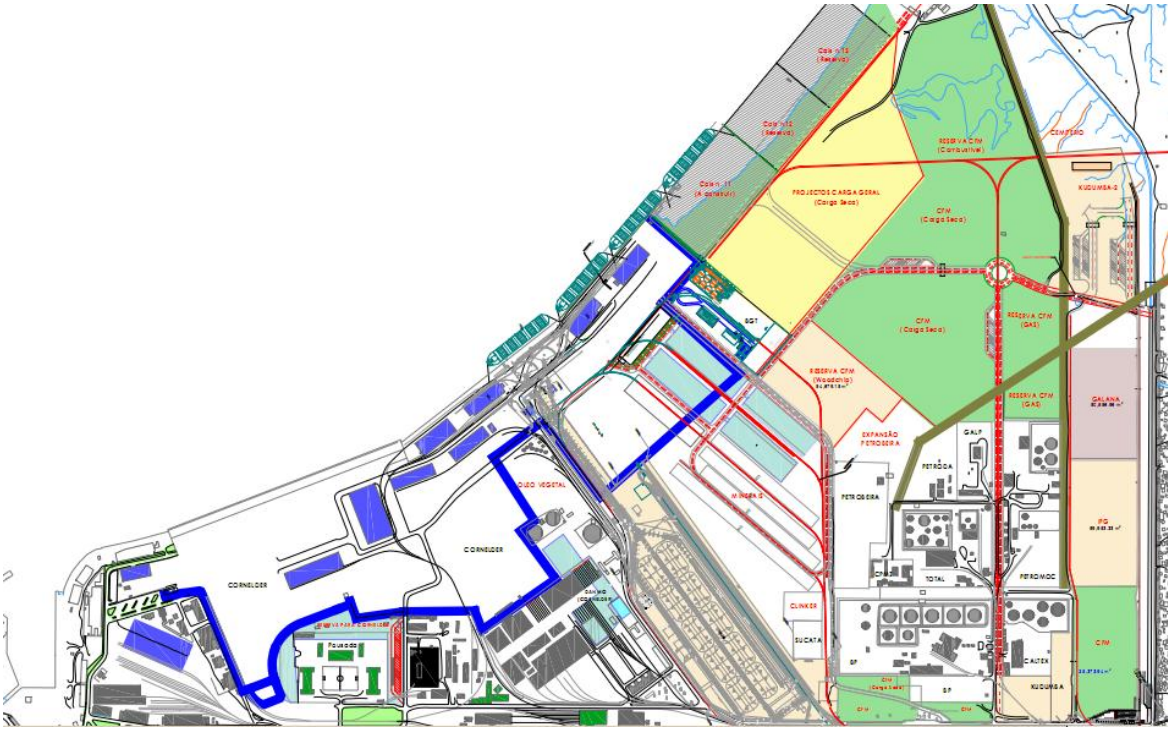
Table 37: Beira Port Container Terminal Expansion

	Past Years		**Projections**			
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Estimated Capacity	100,000	175,000	221,206	313,373	443,172	450,000
TEU Volumes	105,600	160,000	190,000	220,000	245,000	280,000
Capacity Utilization	106%	91%	86%	70%	55%	62%
Y/Y Expansion	-	75,000	46,606	91,767	129,799	6.828
Average Yearly Expansion (TEUs) 75,000						

Source: Cornelder, 2012

Figure 24 below illustrate the capacity analysis of Beira Port. Current plans are to increase capacity to between 400,000 and 450,000 TEUS by year 2015.

Figure 23: Beira Port Master Plan



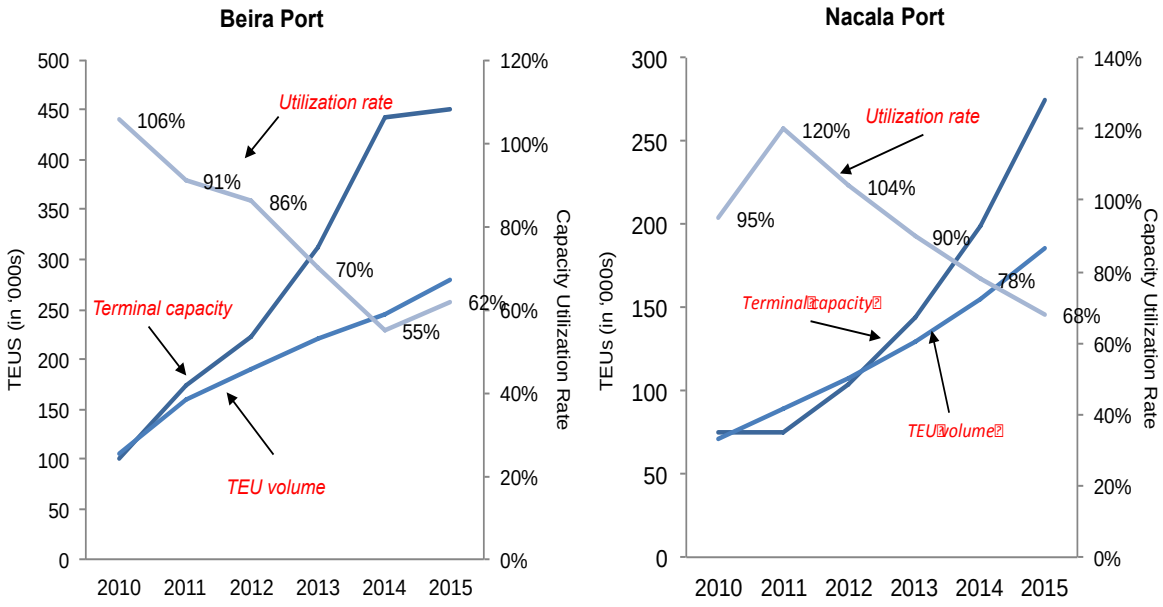
Source: Cornelder, and CFM, 2012

Cornelder has already begun an aggressive expansion plan, as part of its port development plan, to add container terminal capacity, as well as provide additional gate access. However, terminal space or the size of the storage yard is only one aspect that affects terminal capacity. Quay capacity and handling and transfer operation including loading and discharging cargo also are major factors influencing terminal capacity. So in addition to more terminal capacity Cornelder is also adding two ship-to-shore gantry cranes.

Bulk Cargo Terminal

To accommodate the increasing demand for bulk cargo, Beira Port is expanding its bulk terminal capacity by adding 3 new quays. The port will also add capacity for 3 new dry bulk terminals for fertilizer, coal, chrome, manganese, and other minerals, and a fourth terminal for bunkering. The largest of these is the new coal terminal with a capacity to handle 18 million metric tons per year and berth ships of 60 DWTs. The grain terminal currently has 30.000 tons storage capacity. Phase II will add a further 30.000 tons. A sugar terminal is in the early planning stages.

Figure 24: Beira and Nacala Ports Capacity Analysis



Planned and Current Development at Nacala Port

CDN's current and future plans for the development of the Nacala Port have not been made publically available at the time of writing this report. It is expected, however, that such plans will be soon released and that rehabilitation work will commence in 2013. Much of what CDN intends to undertake were to be recommendations from the study initiated in 2010 by the JICA[6]. Initial reports indicate the investment plan was to include paving of the terminal area, repair of the quays and acquisition of terminal handling equipment. Vale, the international mining concern recently acquired a controlling interest in the Nacala Port by securing equity through an equity purchase arrangement with CFM, SDCN and CDN. Vale now has 80 percent controlling interests in CDN. The company has investigated the possibility of converting the container terminal at Nacala Port whose berth has a draught of 14 meters to the general cargo terminal whose berths' draughts are between 7 to 8.5 meters. See Figure 24 below for a layout of the Nacala Port. The proposed plan would allow coal exports of up to 70,000 tons per month to take place from a deeper berth and allow larger vessels to berth. This is intended as an interim measure while the new coal terminal is being built, which is estimated to take three years.

6 JICA recently released its Inception Report in March 2012 but no indication was evident that an investment program for Nacala Port of the scale being mentioned by informed sources was included in the report.

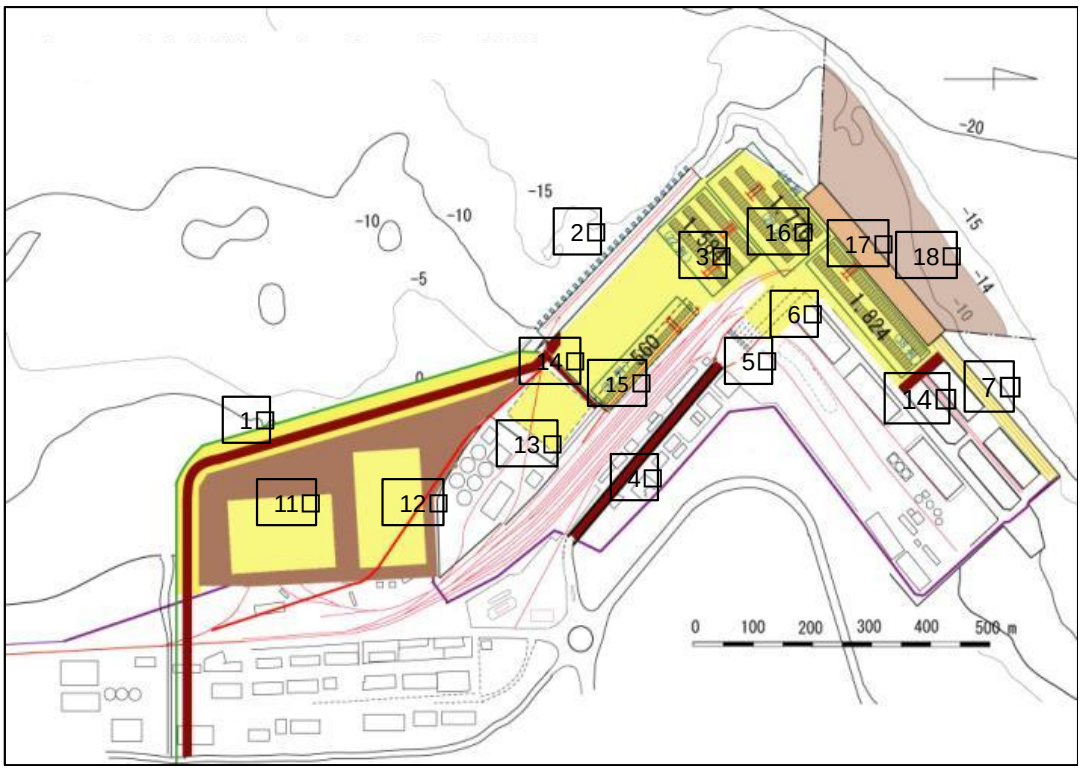
Table 38: Indicative Nacala Port Container Terminal Expansion Scenario

	Past Years		Projections			
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Capacity	75,000	75,000	75,000	143,614	198,731	275,000
TEU Volumes	71,112	89,719	101,158	114,056	128,598	144,994
Capacity Utilization	95%	120%	135%	99%	72%	53%
Y/Y Expansion	-	-	-	40,652	62,686	96,663
Average Yearly Expansion (TEUs) 66,667						

Source: CDN, 2012

Table 38 above presents an expansion scenario for Nacala Port to address the port's current capacity utilization situation. The scenario is based on traffic forecast derived from estimated prepared by JICA in 2011. Given the projected container demand and desire to maintain a comfortable capacity-utilization rate, we undertook to re-balance Nacala Port's capacity utilization rate to below 80%. Table 38 shows the results of this analysis and also is illustrated in Figure 23 above.

Figure 24: Nacala Port Layout and Planned Development



Ref	Planned Port Improvements		
1	By-pass Access Road,	11	Landfill and ground leveling
2	Installation of Fenders	12	construction of rail track
3	Foundation of RTG's (South Warf),	13	Ground leveling
4	Widening of Entrance Road	14	Repair of yard and road pavement
5	Gate construction	15	Rail container terminal
6	Pavement road in the port	16	Container yard Pavement (North Wharf)
7	Pavement of Apron & Loading arm for Petroleum	17	Reconstruction of wharf (320m x 40m)
8	Equipment (Reach Stacker 4, Yard chassis 12, RTG 2)	18	Dredging (-14m) and soil disposal
		19	Equipment (RTG 2), Mobile Crane (100t)

Source: CDN and JICA, 2012

2.13 Legal and Regulatory Framework

Legal and Regulatory Framework (Laws and Decrees)

Article 12 of Decree No. 22/2000 of 25 July 2000 delegates to the Ministry of Transport and Communications (MTC) the responsibility to represent the Government of Mozambique with respect to concession contracts. In practice, this responsibility has been assumed principally by CFM. CFM under both the Beira and Nacala concessions serves simultaneously as a shareholder and a supervisor of the Government's interests. In effect, CFM in its capacity as shareholder, has been serving as the regulator of the concession. For example, CFM monitors performance standards; observe regulatory safety and environmental standards, public interests, terms of the contract, public social obligations, etc. The legal and regulatory framework that governs the relationship between the Government of Mozambique and CDN is memorialized in the Concession Agreement between the parties. However, as have been reported, performance indicators are not provided for in the terms of the Beira or Nacala Concession agreements.

Beira Port Management Contract

The Port of Beira Container and General Cargo Terminals are a terminal management model between CFM and Cornelder de Mozambique. It provides for Cornelder to operate containerized and general cargo terminals at the Port of Beira. The agreement was signed in 1997 for a period of 25 years. The terms of the agreement provide for CFM to retain full port authority responsibilities. In this and the other concession, the use of expatriate staff is permitted when no national candidate is available, "not only for the efficient running of the terminals" but also to train Mozambican staff.

Nacala Port Concession Agreement

In 1998 the GOM with CFM undertook to the jointly concessioning both Nacala Port and rail system by entering into a concession agreement with Corridor de Desenvolvimento do Norte (CDN). A consortium led by Sociedad de Desenvolvimento do Corredor de Nacala (SDNC) entered into negotiations and agreements were signed in 2000 for the two concessions, port and railway. Both concession were to be managed by a new company, Corridor de Desenvolvimento do Norte (CDN). However, the two concessions did not come into operation until January 2005. Recently (September 2008) the two foreign members of CDN sold their interest in the company to national investors. This is a master concession, where within the Area of Jurisdiction the concessionaire exercises port authority functions including all marine services. Also, the ***w***ithin the Area of Jurisdiction the concessionaire "shall enjoy a right of preference", to be exercised within 60 days, if the Government decides to undertake port development.

Regulation by Contract

Since the late 1990's and early 2000s, Mozambique has lacked a clear regulatory structure to govern its ports and railways, both of which operate under the terms of concession arrangements. So, in effect the Government of Mozambique has been relying on the concession agreements as the regulatory vehicle to govern its ports. Given the increasing demand for access to port facilities and services as well as railway services, it has become imperative that Ministry of Transport and Communications move as expeditious as possible to establish an independent regulatory agency. This will enable the Government of Mozambique to better, monitor, remedy and adjudicate performance issues like those that occurred on the Sena Line Concession.[7]

Regulatory Issues

It is not known yet given the fact that both Beira and Nacala Ports operate under concessions agreements how the terms of the agreements will be affected by the introduction of a regulator, or how the agreements will be implemented and monitored henceforth. Some terms will undoubtedly need to be renegotiated.

[7] In 2002, the Government issued a tender for the management of the Beira rail system (both the Sena line and the Beira-Zimbabwe line). The World Bank supervised the tendering process and received five bids, which resulted in the awarding of a concession contract to two Indian companies Rites and Ircon International (both owned by the Government of India). To implement the terms of the agreement the two companies formed the consortium Ricon. The Beira Railroad Company or Caminhos de ferro do Beira (CCFB) was also formed, whereby 51% of the shares were to be held by Ricon and 49% by CFM. The terms of the concession agreement stipulated that the entire railway system should be rehabilitated by January 2009. The agreement also provided for Ricon to manage CCFB and be the main contractor to rebuild the Sena line. In 2010, CFM terminated the agreement due to Ricon's unsatisfactory performance. The case remains to be adjudicated. The events and circumstances surrounding the eventual termination of this concession agreement is a classic case as why it is imperative to have independent regulatory oversight.

This is especially evident given the fact that both ports are monopoly enterprises. Regulation of economic and technical areas such as pricing, operational performance, safety, etc. are likely to be the most challenging regulatory issues to be addressed in establishing the authority of the regulator. Additionally, terminal handling charges, access to port facilities and services, accountability and transparency, etc. will also emerge as important regulatory issues with which the regulator must also have authority over.

SWOT Analysis of Beira and Nacala Ports

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis of both Beira and Nacala Port's operations were conducted to highlights the strengths and opportunities that can be further leveraged or exploited for possible interventions by donor organizations. The intention here was to identify measures needed to increase port throughput, improve port productivity and operational efficiency, along with identifying each port's weaknesses that must be overcome, their threats to managed, as well as their strengths to build upon and opportunities to exploit. Taking into account the analyses in the foregone sections and based on the insights revealed, the two SWOT analyses presented below are intended to inform the scope and type of strategic opportunities and interventions suitable, and indeed viable to aid in improving port productivity and operational efficiency at Beira and Nacala Ports.

As the SWOT analysis in Table 39 below shows a number of internal factors i.e. strengths and weaknesses that both Cornelder and CND can build upon and overcome, while at the same time cope with a number of external opportunities and threats.

Table 39: SWOT Analysis of Beira Port

Strengths	Weaknesses
• Location and cost - location to Asia and Middle East markets • Security – ISPS compliant • Regional connectivity – shortest distance to east and central African land-locked countries via Indian Ocean • Dredged channel that can allow loaded vessels up to 60,000 DWT • Excellent connectivity to international markets through leading shipping lines • Strong commercial orientation	• Low productivity and efficiency (average of 9 moves per hour) • High dwell times • Lack of integrated logistics to support vehicle booking and advances cargo information
Opportunities	**Threats**
• Favorable economic and political environment	• Increased regulatory oversight • Few direct shipping services

• Forthcoming regulatory reforms and structure • Expansion potential for containers, general cargo, and liquid and dry bulk (e.g. coal) • Increase throughput in containers, general cargo, and liquid bulk cargo traffic • Introduce a port management system linked to an advanced container information management and tracking system • Single Electronic Window System for information exchange	• Poor hinterland connectivity due to degraded assets in roads, railway and pipeline • Channel siltation, requiring constant dredging • Frequent power outages, resulting in damages to sensitive high tech equipment such as gantry cranes. • Weak internet network, impacting on fluid and continuous communication

Table 40: SWOT Analysis of Nacala Port

Strengths	Weaknesses
• Location and strategic position - location to Asia and Middle East markets) • Nature deep-water port, which accommodates larger vessels • Regional feeder port • No restrictions on ship size or movement, except quay side	• Low productivity and inefficient port operations • Frequent power outages • Weak internet network, impacting on fluid and continuous communication • Degraded infrastructure and superstructure • Lack of cargo handling equipment • Lack of a business plan, including a market strategy and demand analysis, and KPI targets to manage operations • Lack of an integrated logistics system
Opportunities	**Threats**
• Favorable economic and political environment • Forthcoming regulatory reforms including regulatory structure • Potential to increase throughput in containers, general cargo, and liquid bulk cargo traffic (especially coal and forest product production • Potential to become major transshipment hub • Improve port access through better long-ranging planning • Introduce a port management system linked to an advanced container information management and tracking system	• Development of the Container Export Terminal, which may make exports less competitive due to added costs • Increased regulatory oversight, leading to loss of operational control • Few direct shipping services • Poor hinterland connectivity due to degraded assets in roads and railways

3.0 CUSTOMS VALUE CHAIN ANALYSIS

3.1 Introduction

Customs clearance procedures are an important part of the entire logistics chain of international trade. Hence, customs regulations, infrastructure, management systems, related fees and other invisible costs at which the clearance formalities are accomplished bear a significant weight in the overall logistics performance.

This chapter assesses the service level that customs clearance provide at the Ports of Beira and Nacala and the corridors served by these ports. In doing so, it establishes the operations, regulations, and procedures related to the application of customs services. Further, it reviews the compliance of related regulation and documentation with regards to what has been established by SADC related instruments. It summarizes the costs involved in customs clearance, highlights the main issues encountered in the same ports during the survey, as well as discusses possible way forward.

3.2 SADC Main Instruments on Customs Clearance

Mozambique is a member of SADC and signatory of SADC Protocol on Trade Instruments. The main purpose of this key instrument is to:

- Foster liberalization of intra-regional trade on basis of fair and mutually equitable as well as beneficial trading arrangements;
- Stimulate efficient production within the region in line with the present and dynamic comparative advantages;
- Establish improved climate for domestic, cross border and foreign investment;
- Bring about an accelerated economic development, diversification and industrialization of the region; and
- Ultimately establish a Free Trade Area in the SADC region.

3.3 Mozambique Regulatory and Legal Framework

The regulations guiding the provision of customs clearance services in Mozambique are shown in the Table 41 below.

While the legislations referred to above tend to be comprehensive, they are sometimes interpreted and applied differently on goods clearance across the country. One of the contributing factors to this in most cases is partial repealing of some legislations or instruments with provisions running in conflict with previous legislations. There is confusion when users have to apply two or more legislations or regulations concurrently.

3.4 SADC Main Instruments on Customs Clearance

Mozambique is a member of SADC and signatory of SADC Protocol on Trade Instruments. The main purpose of this key instrument is to:

- Foster liberalization of intra-regional trade on basis of fair and mutually equitable as well as beneficial trading arrangements;
- Stimulate efficient production within the region in line with the present and dynamic comparative advantages;
- Establish improved climate for domestic, cross border and foreign investment;
- Bring about an accelerated economic development, diversification and industrialization of the region; and
- Ultimately establish a Free Trade Area in the SADC region.

Table 41: Mozambique Customs Regulations

Legislation and Regulations	Regime Area	Targeted Activity and concerned stakeholders
Ministerial Diplomas 25/2012 of 12th of March	Local and transit imports and exports	Costs associated with the use of Single Electronic Window System (SEWS)
Ministerial Diplomas 16/2012 of 1st of February	Local imports and exports.	• Define processes and documents • Define customs regimes • Standard fees and penalties
Ministerial Decree 75/2009 of 15th of December and Ministerial Decree 10/2006 of 5th of April	Local and transit cargo	• Scanning of goods
Law 6/2009 of 10th of March	Local cargo	• Approves the text of customs tariff schedule • Provides preliminary instructions on its application
Ministerial Diploma 21/2003 of 19th February; and Decree 38/2002 of 11th December	Local and transit cargo	• Regulates determination of customs value merchandise
Ministerial Diploma 10/2002 of 30th of January	Transit imports and exports	• Define processes • Transit bond • Documentation • Procedures
Service Order Nr 04/GD/DGA/2012	Exports at Nacala	• Requires all export cargo to be handled via NCL for customs inspection
Service Order Nr 03/GD/DGA/2012	Local and transit imports and exports	• Customs brokers and transit agents

Source: Government Gazettes (various)

In addition to the above Protocol, the SADC region has approved the instruments in Table 42, some of which Mozambique has already adhered to.

Table 42: SADC Main Customs Related Instruments And Mozambique Adherence Status

Instrument	Purpose	Mozambique Status
Rules of Origin	Specify the criteria used to certify goods to benefit the preferential terms of SADC Protocol on Trade	Yes
Customs Tariff Nomenclature	Harmonization of SADC customs tariff nomenclature	Yes
SADC Transit Management System	• Automated and integrated customs declaration filing / SEWS • Management of transit bonds	Partial
Regional Transit Bond Guarantee	Development of regional transit bond guarantee	No
Harmonized System 2007	Provides for harmonization of system nomenclature	Yes
World Trade Organization	Goods valuation system	Yes
Customs Model Act	Development of a Customs Model Act for Member States aligning to same	Yes
SADC Customs Documents	• Standardized • Customs declaration • Certificate of origin • Transit control form	Partial
Simplified Procedures	• Pre-clearance of goods • Post-clearance audit • Risk management • Standardized security measures for granting Authorized Economic Operator	Partial
SADC Integrity Plan	Adherence to specific code in regards to transparency and honesty	No
Customs to Business Partnership Forum	Continued consultation and communication between customs and users	No

Source: USAID (2011), Audit of the Implementation of Regional Customs Instruments and International Convention, October 2011.

As shown in Table 42 above, Mozambique has made significant achievement with regards to implementation of SADC Customs related instruments, although there are crucial instruments the country is yet to implement. Some of the limitations for full compliance to what has been agreed by SADC

countries are more of a regional issue than a particular case of Mozambique. For instance, the transit bond guarantee can only be applied along the corridors once all the countries sharing the same corridor are ready to do so. More recently, Mozambique has begun implementing the Single Electronic Window System (SEWS), which will considerably cut the time lead for customs clearance. This is very positive measure that is discussed in the following section.

3.5 The Implementation of SEWS in Mozambique

The introduction of the SEWS clearance process in Mozambique for local cargo is a part of comprehensive SADC regional approach to harmonized customs clearance procedures in the southern African region. Among other the many positive benefits gained from implementing the SEWS include the following:

- Reduced customs clearing steps and therefore lead time;
- Reduced need for hard copies and stamps;
- Harmonized and standardized clearing processes;
- Reduced need for multiple entry of data into different systems;
- Reduced risk of errors while filing the customs declarations; and
- High quality and centralized statistic data.

Table 43 below summarizes the major concerns raised by users in regards to SEWS implementation.

Table 43: User Concerns on SEWS Implementation Process in Beira and Nacala

Issues	Remarks/Consequences
Limited prior consultation with stakeholders	Customs has not given enough lead time to for consultation, training, and implementation. Instead, all were undertaken concurrently Difficulties in synchronizing SEWS and shipping line systems for electronic transmission of manifest Lengthy manual transmission of manifest into SEWS at initial stage Increased risk of error while manually transmitting the manifest Increased customs clearance time lead
Inadequate transition period from TIMS to SEWS (despite legislation providing for same)	Both Customs and users, including banks, not yet ready to smoothly implement the SEWS High slowdown of clearance operations Increased shipping line and port storage costs
Imposition of high prerequisites for customs brokers assistants	Redundancy of various assistant customs brokers

(university degree or high technical school related to customs clearing; at least 5 year experience in customs clearing)	Increased pressure on customs clearing staff Increased fixed costs for customs brokers related to highly qualified labor
No pre-clearance allowed, in view of sequential vessel entry number requirement at port for customs clearance	Non-adherence to simplified SADC procedures Possibility of high costs associated with port storage and shipping line demurrage charges that could be avoided
High SEWS usage fees, particularly for local imports	Increased costs to shippers Increased prices in local market

Source: Customs brokers, transporters, shipping lines, customs, clearing and forwarding agents, ports

The SEWS is in initial implementation stage and faces many challenges. Among the challenges are:

- Logistical constraints as customs officials and users had to put off their time for training;
- Synchronization between the shipping lines operating systems and that of the SEWS was literally non-existent; and
- Inability of shipping lines to transmit the vessel manifests into the SEWS.

The above are just some of difficulties in Maputo, where after more than 6 months of piloting the SEWS. Moreover, the system is not integrated with the scanning services being undertaken by Kudumba, a private concessionaire, where port users using their banks would easily make payments through the system for scanning.

The system will offer many advantages when banks will be connected. Only one bank is reported to be presently connected. Shippers with accounts in other banks must issue checks to be deposited into Customs and SEWS concessionaire account or instruct transfer from their bank to where the Customs and SEWS operator accounts are lodged. This is a lengthy process which usually takes three days before funds are credited to Customs and SEWS operator. This has a direct impact on clearance lead times.

Furthermore, vessel manifest have to be digitized manually into the SEWS, it is common the lodged customs declarations to be pending waiting for completion of manifest transmission, also with obvious additional costs to shippers. Nevertheless, all these are short-run constrains, as at a later stage they will be overcome and thus the full benefits of SEWS achieved.

It is worth noting that Customs clearance times have not been a major problem at Beira and Nacala ports, as the process even before SEWS took 1-2 days. And by comparison, clearance times at Beira and Nacala Ports are by far better than customs clearing times in East Africa ports, which are 3 to 4 days.

The following were the observed clearing time for the month of January 2012 as shown in Table 44.

Table 44: Customs Clearance Lead Times

Clearance time lead	Within 24 hours	Within 48 hours	Within 72 hours	Over 72 hours
Number of declarations handled	954	305	72	160
Percentage cleared	64%	20%	15%	11%

Source: Mozambique Customs

3.6 Customs Clearing Procedures and Documentation Requirement

Unlike many countries, customs clearance in Mozambique is done through licensed customs brokers (referred to as depatchantes) and not by transit or freight forwarding agents. Only a depatchante is authorized to interact with customs authorities for goods clearance purposes. However, freight forwarding agents are authorized to effect clearance as long as they employ a dedicated and licensed customs broker and upon application to customs authorities at central level. Customs clearance procedures and documentation required differ slightly from one regime to another and from one means of transport to another.

Table 45: Documentation Requirement for Customs Clearance

DOCUMENT	SHIPMENT TYPE	REMARK
Commercial Invoice	Imports, Exports and Transit	None
Packing List	Imports, Exports and Transit	None
Bill of Lading	Imports and Transit	None
Certificate of Origin	Imports and Exports	For exports it is mandatory and is issued by the Chamber of Commerce. For imports it is only relevant for goods which benefit a special treatment for duties and other government levies, as a result of bilateral or multilateral agreements.
Duty Exemption Certificate	Imports	For goods imported under duty exemption granted at the project approval by Promotion Investment Center (CPI). Goods to be imported under the project must have been filed with CPI while submitting the project.
Phyto-Sanitary Certificate	Imports, Exports and Transit	This is usually required for grains and other food stuff.
Quality Certificate	Exports	This is issued by relevant line ministry and is required for specific products such and timber and fisheries.

Pre Shipment Inspection Certificate	Imports	Applies for goods on the positive list such as used vehicles, tyres, medicines, frozen poultry, etc.
Bill of Entry	Transit Export	Refer to any sort of customs declaration filed at origin of goods in the landlocked country.
Customs Memorandum (M76)	Transit Exports	Only applicable to transit export goods delivered to port by road.
Rail Advice Notice	Local and Transit Exports	This applies for transit export delivered to port by rail
Bank Guarantee or Bank Transfer Bordereaux	Exports	Exporter must prove that goods intended for export have been paid for by relevant buyer abroad
Stuffing Report	Local and Transit Exports	Except for transit containers arriving in port already stuffed, all containerized cargo must attach the stuffing report issued by customs at place of stuffing while applying for customs clearance. Prior to stuffing, application for customs attendance must be lodged with relevant authorities besides customs, depending on goods involved.
International Trading License	Imports and Exports	Import or Export license, whichever is the case. These licenses are issued by the Ministry of Industry and Trade
Special Licenses	Imports and Exports	These apply for controlled goods such as rifles, fisheries, forest, wild life, minerals, etc. Same are issued by the respective ministries.

Source: Customs, customs brokers, clearing and forwarding agents, shippers, transporters

Table 45 above is a summary of documentation requirement and applicable shipment type for conventional imports and exports and transits conveyed by rail, road from inland origin or to final landlocked destination.

Under the SEWS, the shipper hands over all the applicable documents to nominated customs broker. The broker enters into the system and fills in the declaration with all the required information and then uploads all the shipping documents, which will be submitted to Customs along with the declaration. For exports, the shipper must obtain the booking confirmation from the relevant shipping line prior to proceeding to the port operator. The vessel name and voyage number must be entered into the system while submitting the customs declaration. The whole clearing process for both imports and exports can take 1-6 hours. Figure 25 depictures the clearing process of domestic cargo (Imports and Exports) clearance through SEWS.

A schematic view of SEWS process is indicated in Figure 25 below.

As mentioned in Table 45 above, the pre-clearance of goods is not allowed in Mozambique. This issue is further discussed in this section.

Full pre-clearance of goods has not been authorized in Mozambique. The law provide issue of “contramarc”, which is the sequential entry number of means of transport at a given customs border in Mozambique. Every vessel calling at Mozambican ports is assigned the respective order number at entry point while proceeding to berth, without which customs clearance cannot be accomplished. With the SEWS, the declaration cannot be transmitted to customs with empty field provided for same, as it will just not be processed. However, for export cargo, Contramarca is not required for customs clearance purposes.

While it would be reasonable to think that the contramarca could be assigned a few days prior to berthing in line with the expected time of arrival and expected time of berthing, Mozambique Customs concerns are that in some cases berthing or even vessel calling at a particular port can be delayed or even cancelled at last minute for specific reasons and thus render the assigned entry number erroneous. However, with the introduction of the SEWS, it would also be reasonable to expect that the contramarca can be assigned and in case of vessel delay or cancellation an adjustment to the sequential entry numbers could automatically be generated and relevant amendment notes sent to customs files for declarations already processed, while also sending to concerned shippers. This would alleviate pressure to customs authorities for clearing of goods on each vessel arrival, as shippers would possibly spread their applications for same across several days before actual vessel berthing.

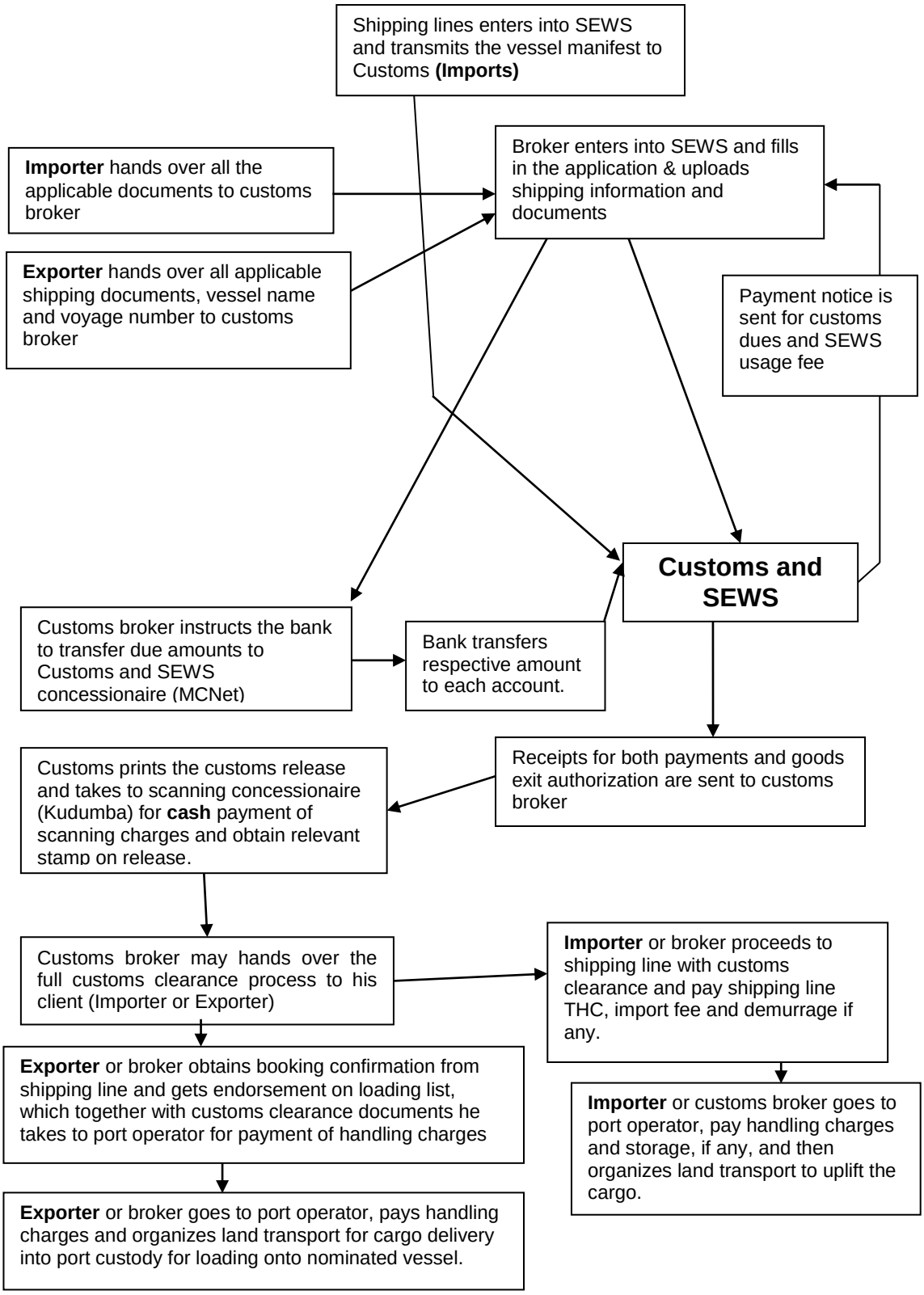
3.7 Applicable Costs for Customs Clearance

3.7.1 The Pre-Clearance Issue in Mozambique

As mentioned in Table 45 above, the pre-clearance of goods is not allowed in Mozambique. This issue is further discussed in this section.

Full pre-clearance of goods has not been authorized in Mozambique. The law provide issue of “contramarc”, which is the sequential entry number of means of transport at a given customs border in Mozambique. Every vessel calling at Mozambican ports is assigned the respective order number at entry point while proceeding to berth, without which customs clearance cannot be accomplished. With the SEWS, the declaration cannot be transmitted to customs with empty field provided for same, as it will just not be processed. However, for export cargo, Contramarca is not required for customs clearance purposes.

Figure 25: Customs Clearing Process for Domestic Cargo (Imports and Exports)



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3.8 Applicable Costs for Customs Clearance

Applicable charges to customs related clearances include:

- Customs brokers agency fee;
- Clearing and forwarding agency fee; and
- Customs charges
    - Document clearing,
    - SEWS, and
    - Scanning.

3.9 Customs Brokers Agency Fee

As indicated above, licensed customs brokers are the only entities allowed to interact with customs authorities for clearance purposes. Agency fees for the service vary greatly from one broker to another, depending on negotiation and cargo volume involved. For local cargo, fees are usually assessed on basis of percent value of CIF (imports); and FOB (exports), but are hardly 1.5% of the respective value of the declaration. However, in most cases because of competition, fees are negotiated below 0.75% and even much as to 0.2% for exports (depending on the total shipment volume involved). For transit cargo, flat rates are applicable per each customs declaration, but also vary from one customs broker or clearing agent to another and in some cases attached to cargo quantity (pro rata per metric ton or container).

3.10 Customs documentation clearing charges

The charges payable to Customs are summarized in Table 46 below.

Table 46 Fees Due To Customs for Clearing Cargo (in US$)

Type of activity	Imports	Exports	Transit or Transshipment	Remark
Standard Declaration (unitized cargo)	9.09 Flat Rate	9.09 Flat Rate	18.18 Flat Rate	Unitized Cargo including Containers
Standard Declaration (bulk cargo)	9.09 Flat Rate	9.09 Flat Rate	0.004 / Metric Ton	Bulk Cargoes
Customs Administrative Fee (Taxa de Serviço Aduaneiro)	Not Applicable	Not Applicable	1.82	Apply to All Cargoes, Per Standard Declaration
Assistance for Stuffing / Stripping	1.39 Per Hour	1.39 Per Hour	1.39 Per Hour	Business Hours Only. Double Rate Applies For Over Time
Customs Escort	45.45 Per Day	Not Applicable	45.45 Per Day	2x Rate to Machipanda; 3x Rate to Zóbue; 4x Rate to Calómue and Cassacatiza. Escort Per Truck, But Usually Convoy of 3 Trucks
Cancellation or Correction of Declaration	1.82	1.82	Not Available	Fees Introduced in Light of SEWS
Entry or Exit From Bonded Warehouse	Not Applicable	Not Applicable	0.004 / Metric Ton	Bulk and Break Bulk Cargoes

Source: Government Gazette, Nr 5, 1st Series; 01/02/2010; Interview with Customs Authorities

Most of the customs clearance fees as shown in Table 46 above are flat rate fees per declaration and not based on the goods Cost Insurance and Freight (CIF) or Free on Board (FOB) value.

3.10.1 SEWS Charges

The use of the newly introduced SEWS imposes charges that are invoiced to shippers as indicated in Table 47 below. The fees are payable to the Mozambique Community Network, SA (MCNet), the Government's concessionaire to run the system.

Table 47: SEWS Usage Fees

	For Customs Declarations with FOB Value (in US$)			
Customs Regime	Less Than 500	From 501 Up To 10,000	From 10,001 Up To 50,000	Over 50,000
Imports	5	24	64	0,85 % on FOB
Exports	24			64
Transit and Other Regimes	24			

Source: Government Gazette, Nr 10, 1st Series; 12/03/2012

There are two charging schemes in SEWS. One scheme involves Transit cargo, which is charged per declaration at a flat rate of US$24. The other scheme involves user charges for exports and imports on SEWS, which are based on FOB values and not at flat rate per the number of declaration. The critical issue is that the effort made in clearing goods does not vary with the value of goods. In this regard, it becomes appropriate to charge usage as per declaration and not value of the transactions. SEWS is not based on this criterion. For instance, an importer bringing goods with FOB value amounting US$100,000 is expected to pay US$850.00 as SEWS usage charge. Another importer bringing goods with FOB value of US$10,000 will pay US$24. The two transactions will undertake the same process in SEWS with the same amount of effort. The charging system, which require review seems punitive to the importers with high valued commodities.

3.10.2 Scanning Charges

As part of the clearing process and in line with SADC regulations, Mozambique has introduced scanning for all cargo entering or leaving the country through main ports and airports. The following are charges for scanning goods.

Table 48: Scanning Charges

Customs Regime	Cargo Type/ activity	Goods /commodity	Charge in US$
Import	Container	Full containers	100
		Empty containers	7.50
	Bulk	General cargo in break-bulk and bulk, including liquid bulk: rice, maize, wheat, vegetable etc.	1.70
		Minerals: fertilizer, cement, clinker, alumina etc.	0.90
		Magnetite mineral	0.25
		Other cargo: fish, beans	0.90

	LCL	Uplift using vehicle of up to 5 tons	15
		Uplift using vehicle between 5-15 tons	50
		Uplift using vehicle of over 15 tons	100
	Vehicle	New vehicles	50
		Used vehicles	30
	Parking	Delay fee	24
Export	Container	Full containers	50
		Empty containers	10
	Bulk	General cargo in break-bulk and bulk, including liquid bulk	0.75
		Minerals in general	0.40
		Used metals (scrap)	1.90
		Others	1.90
		Bulk or break-bulk sugar	0.62
		Citrus	0.75
		Cereals	0.75
	Parking	Delay fee	24
Transit	Container	Full containers	25
		Empty containers	10
	Bulk	General cargo in break-bulk and bulk, including liquid bulk	0.75
		Minerals in general iron or zinc rolls, ferrochrome, iron ore	0.75
		Coal and magnetite	0.20
		Others: fruit, wood chemical composite	0.90
		Sugar	0.75
		Steel	0..60
	Vehicles	vehicles	5
	Parking	Delay fee	24

Source: Mozambique Customs

Scanning charges for local full import container are US$100 per box, while export container scanning fees are US$50. Full transit containers are charged lower scanning fee of US$25 per box.

Local fertilizer import in bulk or break bulk fee is US$1.70 per metric ton. Local and transit export sugar related scanning fee is US$0.75 per metric ton.

Scanning fees are imposed on all consignments although not all cargo is scanned. Study observed, on a given day in March of 2012, only 90 (or less than 22%) were actually scanned out of the total of 415 trucks that scan operator recorded and invoiced. This charging principle imposes added costs

to shippers and increases the prices of export commodities that compete in international markets. The percentages could be lower during the peak season when the capacity is highly constrained.

3.11 Infrastructure, Management Systems and Operational Efficiency of Customs

Customs infrastructures are generally in good state of repair, although the physical space seems to be limited in both ports of Beira and Nacala. Major customs facilities and services limitations are summarized in Table 49 below.

Table 49 Summary of Customs Major Operations Challenges

Issues	Ports	Consequences
Limited space	Beira (Transit and Oil Terminal offices) and Nacala (all)	Inadequate archives Low productivity
Many office locations across port perimeter	Beira	Frequent need to travel over 1 km to complete some clearing processes Increased clearance lead time
Constraining location of scanning facilities	Beira and Nacala	Port congestion Traffic jam Increased port transit time leading shipping line demurrage, port storage and vehicle standby costs Increased risk of accidents
No transit bond guarantee	Beira and Nacala	Risk of customs revenue loss Costs & pressure staff for customs escorts Increased costs for placing alternative bank guarantees along the corridors
Limited customs opening hours at customs physical inspection bays, which opens at 7.30 -15.30. However, customs remain open in other areas.	Beira and Nacala	Increased demurrage and vehicle standby costs
Lack of stakeholder forum leading to inefficient communications with users	Beira and Nacala	Increased misunderstandings between users and customs Procedures not adequately followed Difficulties when introducing new customs procedures Reduced speed in customs clearing processes

Limitation of internet connectivity	Beira and Nacala	The system is in internet based while services are not fully developed. Internet failure or limited access will slow customs processing causing backlog of uncleared cargo and congestion.
System dependent on continuous electricity supply	Beira and Nacala	As there are no reliable alternative of power supply at both Beira and Nacala, in case of outages customs clearance will slow leading to congestion
Lack of current account for payment of scanning charges	Beira and Nacala	Increased time lead for customs clearance, as transit agents and customs brokers have to get pro forma invoice from scanning concessionaire (Kudumba), then go back to their offices, issue bank checks and then return to Kudumba.

Source: Customs, customs brokers, clearing and forwarding agents, shippers, transporters

In the case of Beira Port, the customs offices that are located at the general cargo and container terminal gate and office at the Oil Terminal have limited spaces for Customs and clearing agents' to conduct business. However, there is a project to build new offices to accommodate the staff at the Oil Terminal and possibly to house the Transit Department. Problem of limited space may be improved slightly with the introduction of the SEWS, as this will drastically reduce the need for users to directly contact the customs offices.

4.0 CORRIDOR PERFORMANCE

4.1 Introduction

The logistics corridor performance analysis uses three variables that define the performance of transportation networks: time, costs, and reliability. Reliability is defined as the range of time in which an activity can be completed. It reflects a range of time with respect to the average time it takes to complete each part of the logistics chain. The higher the value of the reliability indicator the greater the variation and the likelihood of long delays.

The analyses divide the transport network into modes, nodes and links. Links are route segments by road, rail, or pipeline transport systems, while nodes represent the port and border crossings.

4.2 Transit Time Analyses

Critical path review for transit time includes the port clearance time, travel time (driving time), and border clearance time. Cargo that is not delivered directly from ports is cross-hauled to the warehouses and CFSs before being delivered. The transit times at weighbridges and checkpoints are insignificant, and taken into the account.

4.2.1 Port Transit time

Ports have high dwell times that impact on the overall clearing time for the goods. The clearing processes which account for different dwell times are not the same for exports, imports and transits.

A local import process for a fertilizer product at Beira port involves the process given below.

Fertilizer import process (local):

- Pre-clearance: receiving original Bill of Landing and payment of local charges for shipping line.
- Shipping line submit manifest to customs 24 hours before the ship arrives.
- Cargo owner through an agent submit documents to despatchante (registered customs broker) for customs processing.
- Despatchante assess the documents received, which includes:
    - Original B/L;
    - Release from shipping line;
    - Packing list;
    - Commercial invoice;
    - Cargo manifest; and

    - Other specific documents e.g. on fumigation or sanitary certificate may be required.
- Despatchante make request for authorization to move cargo (a request made with from customs to allow cargo to enter and leave Mozambique).
- Customs processing, which takes 1-2 days average, and involves:
    - Acceptance and registration documents;
    - Payment for customs service (US$20 per container unit and US$0.1 per ton for break-bulk);
    - Check information for verification with manifest and declaration; and
    - Verification of all type of information and processes involved.
- Depatchante collect processed documents and submit them to cargo owner/agent to move cargo out of port.
- Cargo owner, through and agent move to port for clearance with port and collect stamps for authorization to collect cargo.
- Arrange transport and move to port to collect cargo.
- At port (container terminal), undertake the following processes at gate and loading stack yard:
    - A-Check (administrative check); and
    - P-Check, and move cargo out of port (container terminal). Also involves collecting relevant stamps from customs.

An examination of the overall logistic time at port for 20’ foot import containers is given by looking at the time of ships arrival to the time the cargo is discharged and cleared out of port by focusing on the following activities areas:

- Outer anchorage upon ships arrivals: ships waiting time outside port;
- Port entry: channel time;
- Berth: waiting time at berth;
- Berth: operation/ service time;
- Stacking yard: storage time;
- Customs and agent;
- Stack yard: terminal handling for loading; and
- Gate.

It is important to note that transit time will not be the same for break-bulk and bulk cargoes because of different clearing processes, transit time for exports and imports though in the same cargo category will also be different. Table 50 below with information available from Nacala port gives for on average time spent by an import transit 20’ and 40’ foot containers inn every activity area.

The analyses confirms that most of the cargo for 20' and 40' foot containers spends on average 75% or 336 hours (14 days) of their time alone in storage yard than in any other area of the port at Nacala. The dwell time which is defined as the time from discharge to the quay to the gate takes on average 366.7 hours, or not less than 15 days. This accounts for 82% of the cargo transit time from the ships arrival to the gate. In total, containers at Nacala take an average clearing process of 449.45 hour, which is 19 days from ships arrival to gate delivery.

Table 50: Transit Time from Ships arrival to Gate for an Import 20' and 40' Foot Containers for 2011

Activity area	Average time (hrs.)	Minimum time (hrs.)	Average time (hrs.)	Maximum time (hrs.)	Minimum time (hrs.)
Outside port after arrival-waiting time			7	1.5	3
Port channel time			0.75	1.5	0.5
Berth: waiting time at berth			15	48	4.5
Berth: Operation/ service time			60	80	26
Stack /storage yard	480		336	1440	120
Customs and agent	24	12	24	72	12
Stack yard: terminal handling for loading			0.2	0.5	1
Gate	6.8		6.5	12	3
Total			449.45	1655.5	170

Source: CDN, 2012

4.2.2 Road and Border Transit Time

The driving time is reflective of distance as destinations with longer distances have longer driving time. However, shorter destinations may take longer time if roads are in poor conditions, less facilitation of transport at border points, and more taken at weighbridges and road blocks. The routes on Beira and Nacala corridors seem to be affected by all these factors and therefore driving time is not consistent with increases in distance.

All routes on Beira corridor are affected by the poor road condition from Beira to Inchope (135km). The short section accounts for 3-4 hours of driving time. The study also established poor road sections on Napula-Cuamba-Mandimba-Lichinga. The route is in bad condition and impact heavily on maintenance costs and transit time, and therefore not used for transits to Malawi.

A route with more border crossings tends to take longer time to destination than a shorter route with no or one border crossing. Even for routes with

nearly same distances, the number, conditions and clearing processes at borders are different. This explains why some routes though with shorter distances have longer transit time, especially in Beira corridor. Cargo moving on Beira-Blantyre (870km) and Beira-Lilongwe (988km), which are longer routes, takes transit time of 2 days, which is similar period taken for Beira-Harare (559km), which is shorter. This is because customs at Forbes border in Zimbabwe require all customs formalities to be completed at the border for cargo coming into the country. This includes payment of customs duties, which in most cases tied down the cargo owners. The process may take longer for goods not pre-cleared.

Customs clearance at Zambia borders also require customs formalities to be completed at the borders. Transit times for routes into Zimbabwe and Zambia therefore are longer.

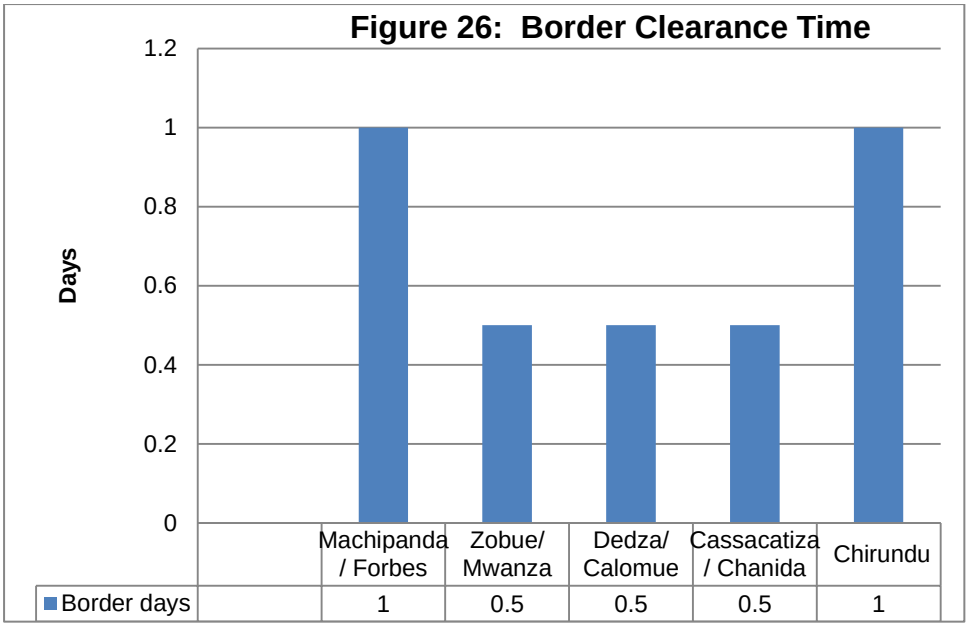
Transits to Malawi are cleared by customs at the point of their destinations in the country, and therefore cargo take short time at the borders. A summary table of average transit times by road and at borders for various routes on Beira and Nacala corridors is shown in Table 51 below.

Table 51: Transit Time Through Beira and Nacala Corridors

Route	Distance (km)	Driving time	Border
Beira-Chimoio-Tete	586	1	
Beira-Chimoio-Machipanda	288	0.5	0.5
Beira-Chimoio-Machipanda-Mutare	296	1	1
Beira-Chimoio-Machipanda-Mutare-Harare	559	0.5	1
Beira-Chimoio-Machipanda-Mutare-Bulawayo	900	2	1
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka	1115	2.5	2
Beira-Chimoio-Tete-Cassacatiza/Chanida-Lusaka	1300	3	0.5
Beira-Chimoio-Tete-Zóbue/Mwanza-Blantyre	812	1.5	0.5
Beira-Chimoio-Tete-Dedza-Lilongwe	950	1.5	0.5
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Ndola	1372	3	2
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Kitwe	1382	3	2
Nacala-Nampula-Milange	1000	2	1
Nacala-Nampula-Milange-Blantyre	1150		
Nacala-Nampula-Milange-Blantyre-Lilongwe	1500	3	1

Source: ANE, Transporters, Clearing and Forwarding Agents at Beira and Nacala

A graphic view of clearance time at borders is indicated in Figure 26 below.



Source: Transporters, clearing and forwarding agents at Beira and Nacala

4.2.3 Total Transit Time

For the producers, manufacturers, traders, industries, importers and exporters competing in the international markets, analyses of total logistic time is important because what adds to the cost is the inventory of time taken to clear goods at the port, storage and transportation.

Analyses of the overall logistic time as shown in Table 52 below indicate that cargo spends much of the time at port than at any other part of the logistic transport chain.

Table 52: Total transit time for import transit 20' container (2011)

Route	Distance (km)	Transit Time				Port Transit time %
		Dwell time	Driving time	Border	Total	
Beira-Chimoio-Tete	586	15	1		16	94%
Beira-Chimoio-Machipanda	288	15	0.5		15.5	97%
Beira-Chimoio-Machipanda-Mutare	296	15	1	1	17	88%
Beira-Chimoio-Machipanda-Mutare-Harare	559	15	0.5	1	16.5	91%
Beira-Chimoio-Machipanda-Mutare-Bulawayo	900	15	2	1	18	83%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka	1115	15	2.5	2	19.5	77%
Beira-Chimoio-Tete-Cassacatiza/Chanida-Lusaka	1300	15	3	0.5	18.5	81%
Beira-Chimoio-Tete-	812	15	1.5	0.5	17	88%

Zóbue/Mwanza-Blantyre						
Beira-Chimoio-Tete-Dedza-Lilongwe	950	15	1.5	0.5	17	88%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Ndola	1372	15	3	2	20	80%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Kitwe	1382	15	3	2	20	80%
Nacala-Nampula-Milange-Blantyre	1150	16	3	0.5	19.5	80%
Nacala-Nampula-Milange-Blantyre-Lilongwe	1500	16	3.5	0.5	20	78%

Source: ANE, Cornelder, CDN, Transporters, Clearing and Forwarding Agents at Beira and Nacala

Cargo delivered to destinations inside Mozambique has an average high 95.5% of its time inventoried at the port. This includes cargo being delivered to Tete, chomoio, and Machipanda, which have port accounting for 94% and 97% of their overall logistic time. There is lesser time for cargo stay at Nacala port than Beira port, though still high with port accounting for 78% to 80% of the overall logistic time. The ports have, by far, the greatest range of time variation in the transport logistics chain and are therefore the most unreliable part of the logistic chain. A shipper with documentation ready and truck available can be cleared immediately by the port leading to a short stay of cargo at port. Cargo can also overstay due to problems related to, on import side:

- Port operation inefficiencies;
- Documentation problems/delays (either due to port agent, or importer/ exporter);
- Unavailability of immediate shipping opportunities to connect to intended destination of export cargo;
- Foreign currency problems (e.g. prevalent over the last year for Malawian customers);
- Using the container yard as a warehouse;
- Unavailability of trucks; and
- Waiting for cheaper trucks (where shippers wait picking up cargo until they can find the cheapest truck with a backload or just to avoid hiring a truck at a peak demand moment).

For Exporters the major reasons are:

- Early delivery to make use of available truck;
- Late documentation (due to various actors) causing short shipment;
- Vessel delayed berthing (due to shipping line or port);
- Container Short Shipped (due to shipping line); and
- Port operation inefficiencies.

The dwell time, which is a measure of cargo stay at the port, expresses the general inefficiency of the logistics chain with the importer/exporter as one of the largest contributor.

On the other hand, the road transport is the most reliable part of the chain and account with a close range of 0.5 to 1 day for additional time on the route. Travel time varies with the number of border crossings and length of delay for border clearance. The route to Lusaka from Beira port which has two borders to cross at Machipanda/Forbes and Chirundu, takes 19.5 days for import cargo delivery compared to 17 days to Lilongwe with a similar distance. Because of poor road condition, road transport on Nacala corridor account for a comparatively high proportion of time of cargo held while being transported. Driving time for import cargo delivered to Blantyre and Lilongwe through Milange are on average 19.5 days and 20 days, which accounts for 15% and 18% respectively of the total logistic transport time as shown in Table 53 below.

Table 53: Contribution to Transit time in Percentage

Route	**Distance (km)**	Percentage (%)		
		Port	Driving	Border
Beira-Chimoio-Tete	586	94%	6%	
Beira-Chimoio-Machipanda	288	97%	3%	
Beira-Chimoio-Machipanda-Mutare-Harare	559	88%	6%	6%
Beira-Chimoio-Machipanda-Mutare	296	91%	3%	6%
Beira-Chimoio-Machipanda-Mutare-Bulawayo	900	83%	11%	6%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka	1115	77%	13%	10%
Beira-Chimoio-Tete-Cassacatiza/Chanida-Lusaka	1300	81%	16%	3%
Beira-Chimoio-Tete-Zóbue/Mwanza-Blantyre	812	88%	9%	3%
Beira-Chimoio-Tete-Dedza-Lilongwe	950	88%	9%	3%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Ndola	1372	75%	15%	10%
Beira-Chimoio-Machipanda-Mutare-Harare-Chirundu-Lusaka-Kitwe	1382	75%	15%	10%
Nacala-Nampula-Milange-Blantyre	1150	82%	15%	3%
Nacala-Nampula-Milange-Blantyre-Lilongwe	1500	80%	18%	3%
Nacala-Nampula-Cuamba-Mandimba/Namwera-Liwonde-Blantyre				
Nacala-Nampula-Cuamba-Mandimba/Namwera-Liwonde-Lilongwe				
Average		**84%**	**11%**	**5%**

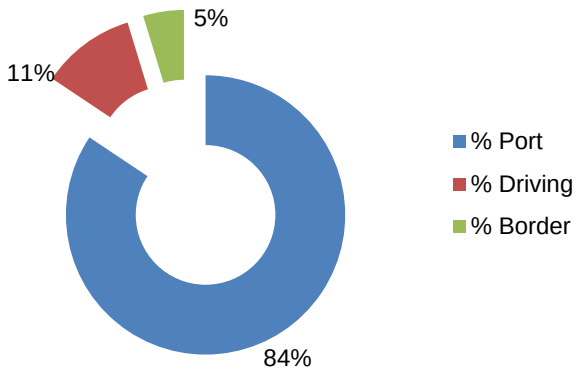
Source: ANE, Cornelder, CDN, Transporters, Clearing and Forwarding Agents at Beira and Nacala

Processes at borders account for significant time of the total logistic time for cargo on transit. Border points have share of transit time ranging from 3% to 10% in both corridors. Border clearance through Machipanda/Forbes and Chirundu borders for cargo destined to Lusaka account 10% of the total logistic transit time. The wide range of variance manifests inefficiency that can be corrected or improvement by implementation regional instruments on transport and trade facilitation.

The Figure 27 below summarizes the percentages of transit time for all routes observed on Beira and Nacala corridors.

The analyses confirm that ports account for the largest overall logistic time when cargo is being delivered to the regions with an average of 84% transit time at ports. Roads account for 11% of the total delivery time, while borders account for 5%.

Figure 27: Logistic Share of Total Transit Time



Source: Cornelder, CDN, Transporters, C&F

4.3 Cost Chain Analyses

Average transport prices are difficult to disaggregate because transport prices or freight rates and tariffs are dependent on several factors including the following:

- **Return cargo** — if backload is ensured, freight rates are lowered (price per ton-km);
- **Cargo types** — tankers, oil products, machinery, and containers are more expensive to transport than general cargo in bags;
- **Commercial practices/discounts** — there are often large discrepancies between published tariff schedules and what customers actually pay; and
- **Seasonal demand** — prices are seasonal and are highly sensitive to supply/demand, especially for certain export commodities and some imported finished goods.

The cost chain analyses looks at costs structure for moving goods through Beira and Nacala corridors, using various routes and alternative modes of transportation. To establish full costs, the study computes transport costs incurred at port, haulage/trucking and borders crossings. The costs which consider a case for 20' import transit container are presented below.

4.4 Port Clearing Charges

A typical total port logistic charges includes the shipping line local charges for THC, port terminal handling charges (stevedoring), shore handling, storage, scanning, weighing, and agency fee. For break-bulk, other charges includes bagging, wharfage and tallying. Table 54 shows an average port clearing charges for an import container at Beira and Nacala ports.

Table 54: Clearing Charges for a 20' Foot Import Container at Beira and Nacala Ports (US$)

Clearing charge	Beira port	Nacala
Average THC (GP) (shipping line)1	98	91
Shore handling (port)2	235	231
Import service charge (shipping line)	135	130
Scanning full/empty (customs)	35	25
Weighbridge (estimated 22 tons)3	0	48
Agency fee (clearing and forwarding)	120	120
TOTAL	**623**	**645**

Sources: Cornelder, CDN, customs, shipping calling at Beira and Nacala ports

Notes 1: Average local charges for various shipping lines for a General Purpose (GP) 20' container

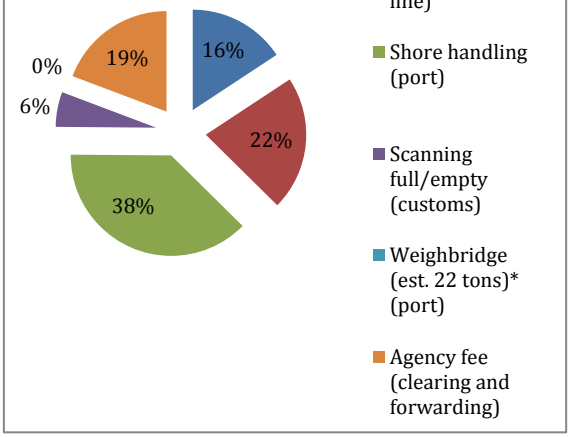
2: Shore handling for containerized fertilizer

3: Weighing is random at Beira, but all cargo is weighed at Nacala

Further analyses are made on the share of port clearing charges and indicated in Figures 28 and 29 below. When THC and import charges are added together, the shipping lines charges account for 38% and 34% of the total port clearing charges for Beira and Nacala ports respectively. The proportion is higher when various operational and administrative charges of the shipping lines are added.

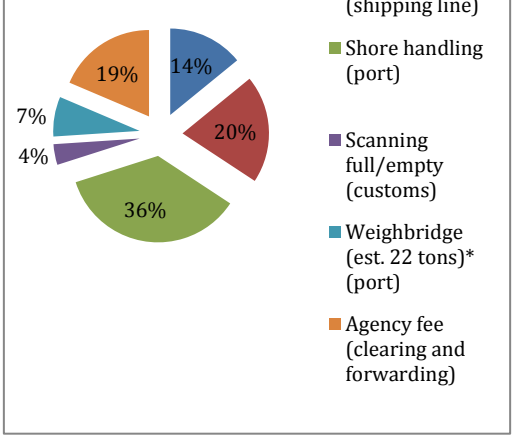
Charges incurred at the port may increase depending on services rendered to the cargo e.g. stripping and stuffing, removal of containers and chargeable moves. Charges shown in Table 55 below were observed at Beira port on an importation of fertilizer product in 20' foot container. The charges include cross-haul, which is the charge for transporting fertilizer from the port to the owner's warehouse to minimize on storage charges, and agency charge to recover costs on bank guarantee bond for transits

Figure 28: Beira port clearing charges



Sources: Cornelder, CDN, customs, shipping calling at Beira and Nacala ports

Figure 29: Nacala port clearing charges



Sources: Cornelder, CDN, customs, shipping calling at Beira and Nacala ports

Table 55: Clearing Charges for Fertilizer in 20' Foot Container Import at Beira Port (US$)

Clearing charge	Beira port
Stevedoring	80
Shore handling	235
Lift on/lift off	45
THC	110
Bill of lading release fee	175
Scanning full/empty	35
Bond fee – transit cargo	50
Agency fee (clearing and forwarding)	120
TOTAL	**850**

Source: Importers, Clearing and Forwarding Agents

Table 56 below also shows observed clearing charges for an import fertilizer in break-bulk and bulk at Beira.

Table 56 Clearing Charges for Break-bulk and Bulk Import Fertilizer at Beira Port (US$/metric ton)

Clearing charge	Bulk	Bulk to Bagged	Bagged	Remarks
Stevedoring	4.50	4.50	9.40	
Shore handling - direct	3.30	5.75	5.75	Applies to product transferred to owner/ agent warehouse (from under ship's gear directly on the means of transport)
Shore handling - indirect	7.50	9.10	9.10	Payable on fertilizer transferred to port warehouse (from under ship's gear directly to port storage warehouse)
Bagging	-	9.30	-	
Storage	3.00	3.00	3.00	Average rate
Wharfage	5.00	5.00	5.00	Based on average price for fertilizer (FOB value)
Cross haul	6.50	6.50	6.50	Applies to product transferred to agent warehouse
Handling in/out warehouse	6.75	6.75	5.50	Applies to product transferred to agent warehouse
Security / Customs escort	0.50	0.50	0.50	Applies to product transferred to agent warehouse
Agency	1.65	1.65	1.65	
Docs / communications	0.55	0.55	0.55	
Tallying	-	0.35	0.35	
Draft survey	0.20	0.20	0.20	
B/L fee	1.50	1.50	1.50	
Bond fee -transit cargo	2.00	2.00	2.00	
Scanning	0.75	0.75	0.75	

Source: Importers, clearing and forwarding agents

4.5 Trucking charges

Haulage Charges

Inland trucking charges are determined by the distance, transit time (period for cargo delivery), and factors impacting on transit time e.g. road condition. However, destinations with similar distance may have different charges depending on whether the cargo is an export, import, transit, local, and by cargo type (e.g. bagged or containers). Availability of backhaul is another factor that affects trucking charge. A summary of the average trucking charges observed in various routes on Beira and Nacala corridors are given in the Table 57 below.

Table 57: Average trucking charges for imports by cargo type on Beira and Nacala corridors

Route	Distance (km)	Trucking/Freight charges (US$)			Cost per ton (US$)			Cost per ton-km (US$)			US$ per TEU-km
		20' (22 tons)	40' (25 tons)	Break-bulk, 30 tons truck load	20' (22 tons)	40' (25 tons)	Break-bulk, 30 tons truck load	20' (22 tons)	40' (25 tons)	Break-bulk, 30 tons truck load	
Beira-Chimoio-Machipanda	288	1700	1700	1800	77	68	60	0.27	0.24	0.21	5.90
Beira-Chimoio-Machipanda-Mutare	296	1700	1700	1800	77	68	60	0.26	0.23	0.20	5.74
Beira- Machipanda-Mutare-Harare	559	2300	2300	2400	105	92	80	0.19	0.16	0.14	4.11
Beira-Machipanda-Mutare-Bulawayo	900	3200	3200	3750	145	128	125	0.16	0.14	0.14	3.56
Beira-Machipanda-Mutare-Harare-Chirundu-Lusaka	1115	3800	3800	3600	173	152	120	0.15	0.14	0.11	3.41
Beira-Chimoio-Tete	586	2300	2300		105	92		0.18	0.16		3.92
Beira-Tete-Cassacatiza/ Chanida-Lusaka	1300	4600	4600	5100	209	184	170	0.16	0.14	0.13	3.54
Beira-Tete-Zóbue/ Mwanza-Blantyre	812	2600	2600	2820	118	104	94	0.15	0.13	0.12	3.20
Beira-Tete-Dedza-Lilongwe	950	2700	2700	3100	123	108	103	0.13	0.11	0.11	2.84
Beira-Machipanda-Mutare-Harare-Chirundu-Ndola	1372	4200	4200	4300	191	168	143	0.14	0.12	0.10	3.06
Beira-Machipanda-	1382	4200	4200	4300	191	168	143	0.14	0.12	0.10	3.04

Mutare-Harare-Chirundu-Kitwe											
Nacala-Nampula-Milange-Blantyre	1150	4630	4630	4630	210	185	154	0.18	0.16	0.13	4.03
Nacala-Nampula-Milange-Blantyre-Lilongwe	1500	5556	5556	5556	253	222	185	0.17	0.15	0.12	3.70

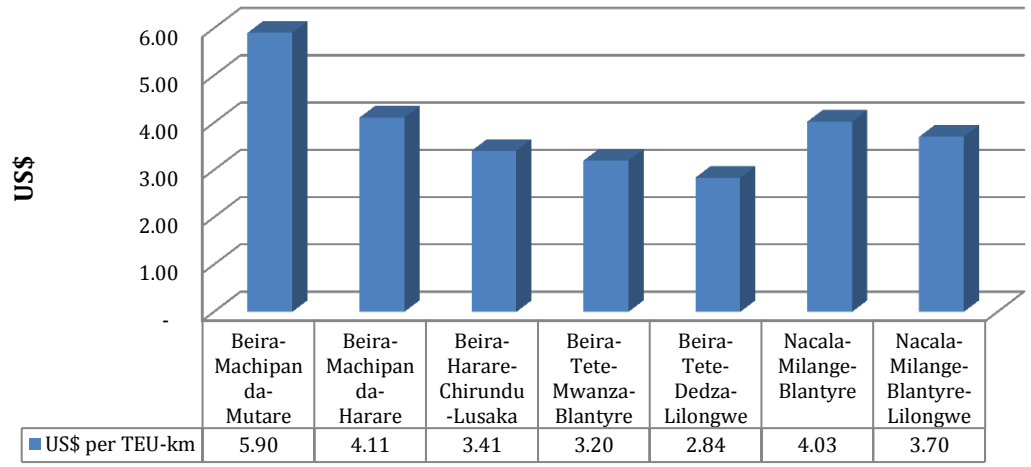
Source: Transport Companies and Clearing and Forwarding Agents Operating on Beira and Nacala Corridors

The most expensive routes or sections of moving goods along the corridors are Beira to Machipada, Beira to Mutare, and Beira to Harare. Transporting a container (TEU) on these routes costs US$5.90, US$5.74 and US$4.11 per TEU-km respectively, compared to US$2.84 per TEU-km and US$3.20 per TEU-km from Beira to Lilongwe and Blantyre respectively. This is associated to the high costs of poor road condition section between Beira and Inchope (135km), which are spread over a very short distance compared to routes with longer destinations. Further analyses reveal that, routes to Malawi through Beira corridor have lower costs of moving cargo compared to routes to Zimbabwe, Zambia and DRC.

4.6 Route Cost per TEU-km and per ton-km

Road transportation costs are very high on Nacala corridor. This is due to poor condition of road at Mocuba-Milange road section. Transportation of 20' container import on Nacala-Milange-Blantyre and Nacala-Milange-Lilongwe costs a high cost US$4.03 per TEU-km and US$3.70 per TEU-km. The Figure 30 below compares the routes.

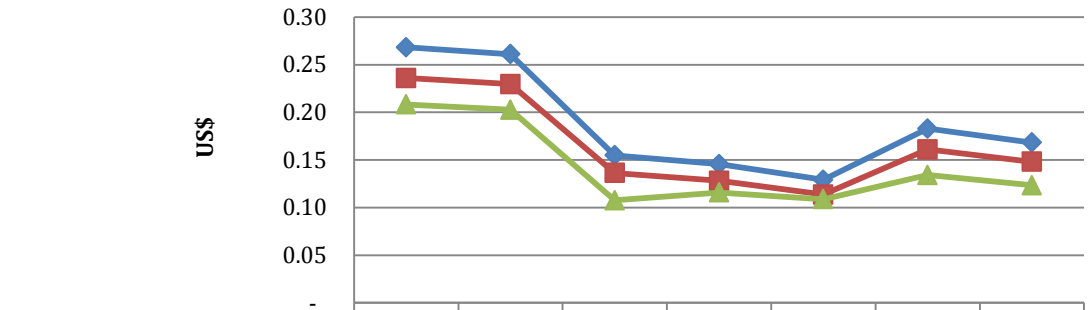
Figure 30: Route cost per TEU-km



Source: Transport companies and clearing and forwarding agents operating on Beira and Nacala corridors

Figure 31 below shows Beira-Dedza-Lilongwe and Beira-Mwanza-Blantyre having lowest cost of transporting break-bulk at US$0.11 per ton-km and US$ 0.12 per ton-km respectively versus the cost US$0.20 per ton-km for Beira to Harare. The high costs and high transit times on Beira-Harare route make the route inefficient. Transit of break-bulk on Nacala corridor to Blantyre via Milange is US$0.13 per ton-km. The costs are not the lowest and reflect the poor road condition between Mocuba and Milange border.

Figure 31: Route cost per ton-km



	Beira-Machipanda-Mutare	Beira-Machipanda-Harare	Beira-Harare-Chirundu-Lusaka	Beira-Tete-Mwanza-Blantyre	Beira-Tete-Dedza-Lilongwe	Nacala-Milange-Blantyre	Nacala-Milange-Blantyre - Lilongwe
20' (22 tons)	0.27	0.26	0.15	0.15	0.13	0.18	0.17
40' (25 tons)	0.24	0.23	0.14	0.13	0.11	0.16	0.15
Break-bulk, 30 tons truck load	0.21	0.20	0.11	0.12	0.11	0.13	0.12

Source: Transport companies and clearing and forwarding agents operating on Beira and Nacala corridors

4.7 Comparative Analyses

A comparative analysis is done for the road transport cost which account for the largest share of the total logistic transport. Table 58 below compares routes in Beira and Nacala corridors with other routes in the region. The analyses reveals that the Beira and Nacala corridor routes have more costs in moving goods when compared to other routes in Mombasa, Dar es Salaam and Maputo corridors.

Moving 20' foot import container (22 tons) from Beira to Harare and Lusaka costs US$4.11 per TEU-km and US$3.41 per TEU-km respectively, compared to much lower costs of US$2.04 from Maputo to Johannesburg, and lesser costs of US$2.67 per TEU-km from Dar es Salaam to both Kigali and Bujumbura. However, the Beira and Nacala corridors compares with Mombasa corridor, which high cost ranges of S$2.67 per TEU-km to US$4.00 per TEU-km.

Table 58 Comparison of Trucking Charges for 20' Container, 22 Tons

Origin	Destination	Distance (km)	Tariff/ trucking (US$)	US$ per TEU-km
Mombasa	Juba (via Nimule)	1,723	5,714	3.32
Maputo	Johannesburg	550	1,120	2.04
Dar es Salaam	Kigali	1,486	3,972	2.67
Dar es Salaam	Bujumbura	1,542	4,122	2.67

Mombasa	Kigali	1,700	6,500	3.82
Mombasa	Nairobi	430	1,300	3.02
Mombasa	Kampala	1,170	3,000	2.56
Mombasa	Bunjumbura	2,000	8,000	4.00
Beira	Harare (via Machipanda/Forbes)	559	2300	4.11
Beira	Lusaka (via Machipanda & Chirundu)	1115	3800	3.41
Beira	Lusaka (via Cassacatiza/Chanida)	1300	4600	3.54
Beira	Blantyre (via Zóbue/Mwanza)	812	2600	3.20
Beira	Lilongwe (via Dedza/Calomue)	950	2700	2.84
Nacala	Blantyre (via Milange)	1150	4630	4.03
Nacala	Lilongwe (via Milange)	1500	5556	3.70

Source: Transport Companies and Clearing and Forwarding Agents Operating on Beira and Nacala Corridors

Table 59 below gives an average transportation costs for all routes studied on haulage in Beira and Nacala corridors. The study observe a high average transportation costs of US$3.86 per TEU-km, and US$0.18 per ton-km, US$0.15 per ton-km, and US$0.13 per ton-km for 20’ foot, 40’ foot and break-bulk cargo, which compares as being high in the region.

Table 59: Average trucking costs for 20’ foot import container transit

Corridor	Average cost per ton (US$)			Average cost per ton-km (US$)			Average US$ per TEU-km
	20' (22 tons)	40' (25 tons)	Break-bulk, 30 tons truck load	20' (22 tons)	40' (25 tons)	Break-bulk, 30 tons truck load	
Beira	137.60	121.09	99.91	0.17	0.15	0.12	3.85
Nacala	231.50	203.72	169.77	0.18	0.15	0.13	3.87
Average	**184.55**	**162.41**	**134.84**	**0.18**	**0.15**	**0.13**	**3.86**

Source: Transport Companies and Clearing and Forwarding Agents

4.8 Border Costs

The data on border posts has been collected from the operators based in Beira and Nacala who have knowledge and regularly involved in cross border operations in the region as transporters, exporters, importers, traders, and clearing and forwarding agents. The study observed cost buildup at the borders, which are shown in Table 60 below. The costs includes road toll

fees, insurance, carbon tax, vehicle permit and port health as shown in the table below.

Table 60: Border Charges

Route	Border	Border Charges applicable (US$)					
		Toll fees (road user charge)	Insurance	Carbon tax	Vehicle entry permit	Port health	Total US$
Beira-Harare	Machipanda/Forbes	180	60	25	25	25	315
Beira-Blantyre	Zóbue/ Mwanza	66	50	0	30	0	146
Beira-Lilongwe	Dedza/Calomue	52	50	50	30	0	182
Beira-Lusaka	Cassacatiza/ Chanida	300	95	50	0	25	470
Beira-Lusaka	Machipanda/Forbes and Chirundu	480	155	75	0	50	760
Nacala-Blantyre	Milange		50	50	30	0	
Nacala-Blantyre	Madimba		50	50	30	0	

Source: Transport companies and clearing and forwarding agents operating on Beira and Nacala corridors

All countries involved are members of SADC but do not apply relevant facilitation instruments for border crossing. Instrument, they have different charging instruments which are not harmonized. Only road toll charge is standardized and applied according to distance. The charge however, includes vehicle return.

Table 60 above shows that all countries require acquiring insurance at the borders. Insurance costs range from US$50 at Malawi border to US$95 at Zambia border. Truckers pay two insurances for crossing the borders at Forbes in Zimbabwe and Chirundu on Zambia side for trucks destined to Lusaka from Beira. Carbon tax is levied by all countries in the corridors. The tax is issued against the damages caused by vehicles on environment from their emissions. Malawi and Zimbabwe require vehicle entry permits of US$30 and US$25, respectively. All countries except Malawi issue port health requirement of US$25. The study has noted that there are other border costs associated with immigration, customs and other agencies and actors at the borders which need to be established.

4.9 Total Logistic Costs for Roads

Breakdown and analysis of total transport costs as shown in the Table 61 below is as follows:

- Road transport charges accounts for 64 percent to 87 percent of total logistic transport costs for delivery of cargo in Beira and Nacala corridors. The range is similar to the ranges observed in other corridors in the region;
- Most critical is the high transportation costs of moving goods along the corridors, where Beira and Nacala corridors compares highly with other corridors in the region.
- Border post costs are between 5 percent and 15 percent. This range is higher than corridors in East Africa, where the border costs account for between 4 to 7 percent. Higher percent is observed on route from Beira to Lusaka, which has two border posts at Machipanda and Chirundu. The two border posts have high buildup of clearing costs, which account for between 10 and 12 percent of route costs from Beira to Mutare and Beira to Harare respectively; and
- Though ports are not the largest cost center, their share account for between 11 percent and 27 percent of the overall logistic costs.

Table 61: Total Logistic Costs in US$ for Beira and Nacala Corridors

Route	Distance (km)	Port charges	Trucking charges	Border costs	Total	Road share %
Beira-Chimoio-Machipanda	288	623	1700	0	2323	**73%**
Beira-Chimoio-Machipanda-Mutare	296	623	1700	315	2638	**64%**
Beira-Chimoio-Machipanda-Harare	559	623	2300	315	3238	**71%**
Beira-Machipanda-Harare-Chirundu-Lusaka	1115	623	3800	760	5183	**73%**
Beira-Chimoio-Tete	586	623	2300	0	2923	**79%**
Beira-Tete-Cassacatiza/Chanida-Lusaka	1300	623	4600	470	5693	**81%**
Beira-Chimoio-Tete-Zóbue/Mwanza-Blantyre	812	623	2600	196	3419	**76%**
Beira-Chimoio-Tete-Dedza-Lilongwe	950	623	2700	182	3505	**77%**
Nacala-Nampula-Milange-Blantyre	1150	645	4630	196	5471	**85%**
Nacala-Nampula-Milange-Blantyre-Lilongwe	1500	645	5556	182	6383	**87%**

Source: Cornelder, CDN, Customs, Transport Companies and Clearing and Forwarding Agents Operating on Beira and Nacala Corridors

4.10 Rail Haulage Costs

Beira corridor has three rail systems, which are namely, Beira-Machipanda line, Sena line, and Machipanda/Mutare-Harare line. The Beira-Machipanda and Sena lines are operated by CFM, while Mutare-Harare line is operated by Zimbabwe Railways. The railway lines have different charging rates as shown in Table 62 below. On Beira-Harare route, CFM charges transits from Beira to Machipanda border with Zimbabwe, while the Zimbabwe railways charge for rail transport from Machipanda/Mutare to Harare.

Charging in Nacala corridor is different as the CDN which operates the railways charge a through tariff from Nacala to Blantyre or Lilongwe. However, charging for export transits from Malawi to Nacala is charged by the rail system in Malawi.

Table 62 below gives various freight charges and costs analyses for an import container on the railway systems in the corridors.

At national level, the Nacala railway system has less cost to move goods than Beira railway system. Beira-Machipanda line cost US$1.47 per 20' foot container per km and US$2.93 per 40' foot container per km compared to Nacala-Lichinga line with US$0.96 per 20' foot container per km and US$2.34 per 40' foot container per km. The Beira-Machipanda line is also more costly in moving goods than moving goods from Machipanda to Harare with the cost US$1.00 per 20' foot container per km and US$2.01 per 40' foot container per km.

At international level, Nacala Corridor is more costly in moving goods than Beira Corridor. Rail haulage costs from Nacala to Blantyre and Lilongwe respectively are US$1.80 and US$1.96 per 20' foot container per km, compare to railage cost of US$1.24 per 20' foot container per km from Beira to Harare. Similarly, for 40' foot container, it costs US$3.59 and US$3.91 per km for railage from Nacala to Blantyre and Lilongwe respectively compared to US$2.49 from Beira to Harare.

Table 62: Railway Tariffs on 20' foot and 40' Foot Container in US$

	Distance (km)	US$ per Container		Cost per ton in US$, loaded[1]		US$ per TEU-km	US$ per FEU-km
		20' foot	40' foot	20' foot	40' foot	20' foot	40' foot
Beira-Harare	602	749	1498	34.05	53.50	1.24	2.49
Beira-Machipanda	317	465	930	21.14	33.21	1.47	2.93
Machipanda-Harare	283	284	568	12.91	20.29	1.00	2.01
Nacala-	795	762	1859	34.64	66.39	0.96	2.34

Cuamba-Lichinga							
Nacala-Blantyre	799	1435	2865	65.23	102.31	1.80	3.59
Nacala-Lilongwe	988	1936	3867	88.00	138.09	1.96	3.91

Source: CFM, CDN, 2012

Note [1]: 20 Foot Container Load of 22 Tons, and 40 Foot Container Load of 28 Tons

Comparative analyses on break-bulk have been made on Table 63 below. The analyses at national level indicate that the railage costs on Nacala railway system for break-bulk are lower than on Beira railway system. Cost per ton-km for rail haulage on Machipanda line is US$0.09 compared to US$0.06 on Nacala-Lichinga line. However, rail haulage costs for international transport indicate Beira railway system with lower cost for fertilizer category at US$0.09 per ton-km from Beira to Harare compared to US$0.10 per ton-km from Nacala to Blantyre and Lilongwe. The railway systems have similar costs for rice haulage at US$0.10 per ton-km.

Table 63: Railway Tariffs for Break-bulk in US$

	Break-bulk US$ per ton		US$ per ton-km, break-bulk	
	Fertilizer	Rice	Fertilizer	Rice
Beira-Harare	26.77	28.69	0.09	0.10
Beira-Mutare/Machipanda	22.04	27.98	0.08	0.10
Beira-Machipanda	31.50	29.40	0.10	0.09
Nacala-Cuamba-Lichinga	75.20	49.40	0.09	0.06
Nacala-Blantyre	80.14	80.14	0.10	0.10
Nacala-Lilongwe	96.58	96.58	0.10	0.10

Source: CFM, CDN, 2012

4.11 Road and Rail Transport Comparative Costs Analyses

A comparative analysis for road and railway haulage is given in Table 64 below. The analyses indicate that, it is cheaper to move cargo by rail than by road. For instance, cargo moved on Machipanda line from Beira to Machipanda cost US$1.47 per TEU-km compared to US$5.90 per TEU-km on road. Likewise for bulk, cargo moved to the same destination by rail cost US$0.09 per ton-km compared to US$0.21 on roads. This confirms the potential advantages for railways on economies of scale from large amounts of cargo and long distances. This potential has not been exploited by Beira railway systems as railways only account for 3% of the cargo moved on

transit, and about 10% on national cargo. Factors causing modal shift includes lack of availability of rail wagons and locomotive, high rail turnaround and underperformance of management.

Rail haulage costs on Nacala line are also lower than transportation costs by road. Rail haulage cost for 20' foot container is US$1.80 per TEU-km compared to US$4.03 per TEU-km on road from Nacala to Blantyre. Similarly, a rail transportation of bulk to Blantyre is US$0.10 per ton-km compared to US$0.13 per ton-km by road. Railway on this corridor accounts for 90% of transit traffic and exploiting economies of scale.

Table 64: Comparative Costs Analysis for Road and Railway Haulage

Route	Road				Railway			
	Cost per ton-km (US$)			US$ per TEU-km	Cost per ton-km (US$)			US$ per TEU-km
	TEU	FEU	Break-bulk		TEU	FEU	Break-bulk	
Beira-Harare	0.19	0.16	0.14	4.11	0.06	0.07	0.10	1.24
Beira-Chimoio-Machipanda	0.27	0.24	0.21	5.96	0.07	0.07	0.09	1.46
Nacala-Cuamba-Mandimba-Lichinga					0.04	0.09	0.09	0.96
Nacala-Cuamba-Mandimba-Blantyre	0.18	0.16	0.13	4.03	0.08	0.07	0.10	1.80
Nacala-Cuamba-Mandimba-Lilongwe	0.16	0.14	0.12	3.47	0.09	0.07	0.10	1.96

Source: Cornelder, CDN, CFM, customs, transport companies and clearing and forwarding agents operating on Beira and Nacala corridors

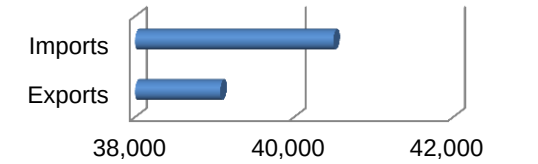
4.12 Logistic Costs of Handling Cargo at Special Export Terminal at Nacala

The container traffic handled at Nacala for 2011 is shown in the Figure 32 below. Exports which recorded 39,072 TEUs accounted for 49% of container traffic. Imports recorded 40,493 TEUs, which 51% of container port traffic. Figure 33 below show the distribution of exports by local and transit cargo for 2011. Local traffic from Mozambique dominates the traffic with 89%, while transit traffic accounts for 11% of the total traffic.

The Government of Mozambique, through the General Director of Customs, issued a service order (No. 04/GD/DGA/2012) of 18th January 2012 requiring operations related to exports through Nacala Port to be carried out at a special export terminal for customs control. A private operator, NCL & AFRICA, Import and Export Lda, owns the export terminal. The terminal started custom operations on 21st September, 2011January 2012, initially with local export cargo by road. The terminal is located about 9km from the port. The terminal handling equipment includes:

- 1 x 60 tons reach stacker;
- 3 x 50 tons mobile cranes;
- 1 x 5 ton front-end loader;
- 1 x 3 ton front-end-loader; and
- 6 x 30 tons horses and trailers for shunting.

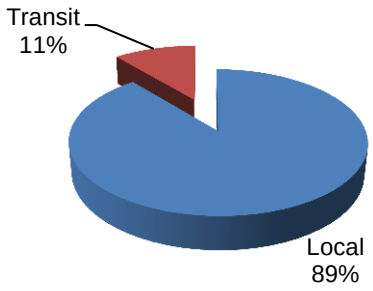
Figure 32: Container Traffic at Nacala Port in TEUs, 2011



	Exports	Imports
2011	39,072	40,493

Source: CDN

Figure 33: Nacala Exports TEUs, 2011



Source: CDN

Terminal operations include offloading, loading, removal, stripping, stuffing, and storage. The facilities also accommodate customs for their inspection and processing. The terminal total yard is 10 ha, in addition to 1 warehouse with a total of 1.000 square meters. In addition, 150 reefer plugs are being installed for perishable goods. From technical point of view, the terminal could relieve some of the port's container terminal capacity problem which was exceeded in 2011 when it reached 120 percent of its capacity. (See Section 2 for a fuller discussion of Nacala Port's capacity analysis). The terminal could also offer benefits that come from establishment of a container freight station (CFS). Such benefits typically include:

- Reduced transport costs through increased vehicle efficiency;
- Improved cargo delivery time through reduced dwell time;
- Increased saving by shifting cargo handling;
- Minimizing corridor risks: business, economic risk;
- Increasing business activities and employment;
- Reducing sea port congestions;
- Increased beneficial impacts on local and regional economic activities;
- Provides truck parking space/stations and cargo handling facilities; and
- Offers benefits to users, regional economy and national development.

However, improving corridor logistics and the wider benefits of a CFS have not been advanced by Customs as the justification for the export terminal, who view the use of the terminal as and customs control facility. Because of this, issues of monopoly control or inefficiency, market access, and excessive pricing that could arise from the lack of competition appear not to have been considered. NCL argues that as "expeditors" their operations are providing a service by streamlining the customs clearance process, especially for port

users with poor documentation result in delays in processing. However, this remains to be seen.

One of the major concerns is that the export terminal could result in higher tariffs to exporters. The following are the handling activities and charges at the NCL export terminal that are compared with applicable charges at the port as indicated in Table 65 below.

Table 65: Comparison of NCL Export Terminal and Nacala Port Charges, 2012

Activity	NCL	Nacala Port	Variance	Variance (%)
Terminal handling				
20 foot	284[1]	197	87	44%
40 foot	511	355	156	44%
Storage per day:				
Free period	3	7	4	
Daily rate between 4th -15th day (NCL)				
20 foot	10			
40 foot	18			
Daily rate on 16th day and after (NCL)				
20 foot	14			
40 foot	25			
Daily rate on 8th day and after (Nacala port)				
20 foot		7		
40 foot		13		
Additional movements				

Note[1]: Payments are made in Mozambique meticais where 1US$ = 27.5 meticais

Source: NCL & Africa, Import and Export Lda

Analyses indicates that the NCL handling charges are US$87 and US$156 higher than Nacala Port's handling charges for 20' foot and 40' foot containers, respectively. This is 44% more expensive in handling charges at NCL in both categories of containers.

Currently, the above charges only apply to local export cargo and do not include transit exports which accounted for 11% of the total exports TEU handled at the port in 2011 as shown in Figure 33 above. The terminal is also not equipped with reefer points and therefore does not handle reefer cargo. Cargo after inspection by customs at NCL export terminal is released to cargo owners for delivery to the port for exports. Cargo owners pay other logistic

costs that include cross-haulage to port, scanning, weighing, and port charges.

Additional logistic movements and handling costs have resulted from the requirement to clear export cargo through NCL terminal. For example, if a shipper booked cargo with a shipping line that does not ground empty boxes at NCL such as PIL, additional movements such as below will be generated at the shipper's costs:

- Organize and hire a truck to uplift the empty boxes from the relevant shipping line to NCL export terminal and ground the empty boxes;
- Hire a truck to load break bulk cargo from shippers warehouse and offload into NCL warehouse, where the cargo will be inspected by customs and then stuffed into container; and
- Arrange a truck to haul the full and sealed boxes from NCL terminal to the port terminal.

The shipper will incur additional cost of US$200 for every movement, with a total of US$600 per 20-foot container, and US$1,200 per 40- foot container. Previously, the shipper would have incurred the cost of only one round cross haul movement from the shipping line yard to its own warehouse for cargo stuffing, and then using the same truck deliver the full box to the port. In addition to the increased cross haulage costs, the shipper also risks damage of cargo while being double handled at NCL. The movement had advantage of minimal handling costs as most cargo except for heavy goods like timber; do not require offloading of container at shippers' warehouse.

Other concerns raised by shippers for cargo handling at NCL terminal are as follows:

- Risk of cargo contamination when mixing break-bulk consignments of several shippers;
- Limited handling capacity for many consignments, and in particular large volumes. This may lead to backlog handling which may accrue storage charges;
- Lack an integrated management system; and
- Inadequate handling equipment.

Key recommendations

- Recommend that Mozambique Customs authorities provide export terminal market access and open registration for other market participants by eliminating NCL's monopoly position. This will create competition that will ensure optimal service level and competitive prices.
- Recommend the Mozambique Customs establish key performance indicators and relevant statistical requirements with NCL to measure the operation efficiency of the NCL export terminal and other terminal that may be created.

5.0 COMMODITY TRADING LOGISTICS COSTS

5.1 Introduction

This chapter briefly reviews the logistics costs associated with trading of sample commodities chosen for this study, these being fertilizers and pigeon peas (dhal). In doing so, it brings into consideration for delivered duty unpaid (DDU) charges from ex-vessel to free on terminal at main destinations for import fertilizer; and from free on truck at origin to free on board for export pigeon peas. For import bulk and break bulk cargoes, costs presented exclude Ad Valorem (wharfage), which is assessed on basis of FOB value of respective commodity.

The analysis concluded that land transport costs whether by rail or road account for at least 51% of the total cost even when considering the most expensive and uncommon port handling option and the shortest sample destination or origin of cargo. The share of land transport can reach as high as 93% of the total logistics costs when cheapest port handling alternative and farthest destination (import cargo) are considered, and as high as 70% (export cargo only) when the farthest origin of cargo is taken as example. Sections below gives a summary of the commodity logistic costs studied. Detailed information on logistic costs analysis is given in Annex 4 of the report.

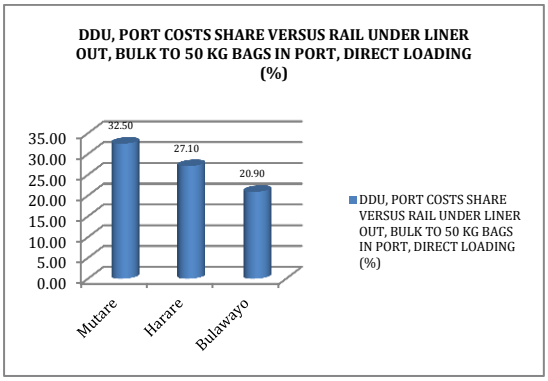
5.2 Import Cargo (Fertilizers) Direct Costs

This section will concentrate on the Port of Beira, given that the Port of Nacala handles very marginal amount of fertilizers. Also, the analysis focus on transit cargo, as very small amount of this commodity is destined for local markets. The exercise is based on liner out and free out terms for cargo in several modes of packaging and delivery. Under liner out, stevedoring and related charges are on account of the shipping line, whereas on free out basis stevedoring related fees are charged along with shore handling to consignee. Figures 34 to Figure 35 below depict the share of port charges in relation to railway haulage costs for handling bulk fertilizer to be bagged and railed out to final destination.

Under these Figures, the cargo is loaded directly onto rail cars after bagging (Figure 34); bagged and stored in port warehouse for later loading onto wagons (Figure 35); bagged in port, shunted and stored in agent's warehouse outside the port premises (Figure 36) or discharged in bulk onto tipper trucks, shunted to outside warehouse where it is bagged and stored prior to loading to final destination (Figure 37).

It should be pointed out that the port costs include not only the charges invoiced by the port operator as per the published tariff book, but also fees assessed by other institutions that play a role in cargo handling related services in ports such as scanners operator, tally companies, freight forwarding agents, security entities, shipping lines, road shunting operators, etc.

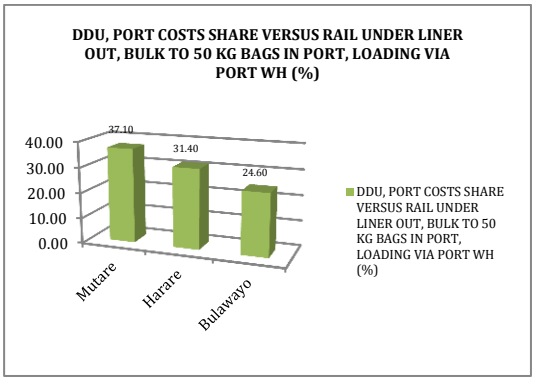
Figure 34



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

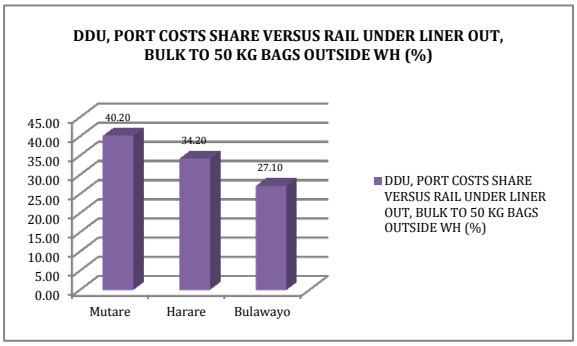
WH = Warehouse

Figure 35



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

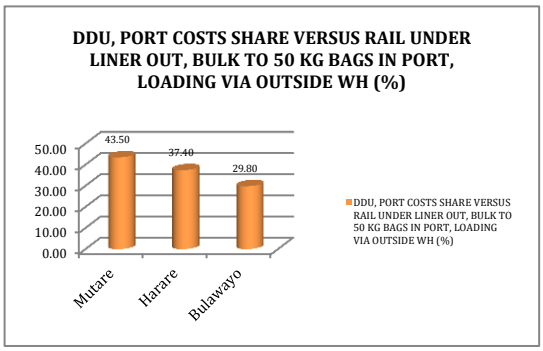
Figure 36



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

WH = Warehouse

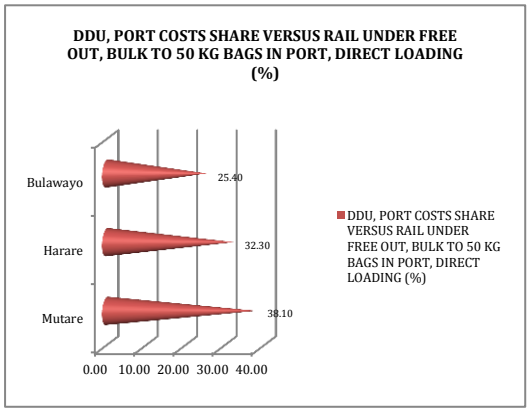
Figure 37



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

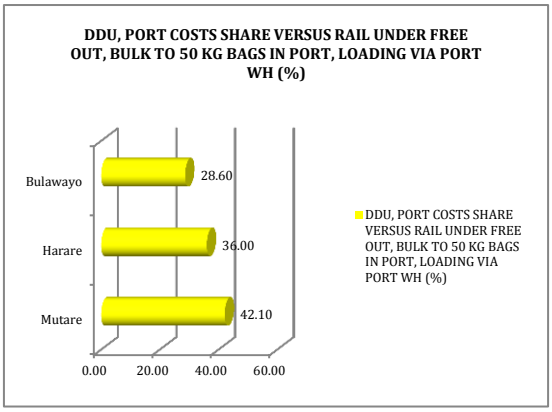
Notwithstanding various interventions and associated costs from different entities, it is interesting to note that port clearance related costs account for a maximum of 40.2% only under liner out terms of the most expensive handling option and considering the shortest destination by rail. A similar conclusion can be drawn if analysing in Figure 38 to Figure 39 below, which consider handling under free out terms.

Figure 38



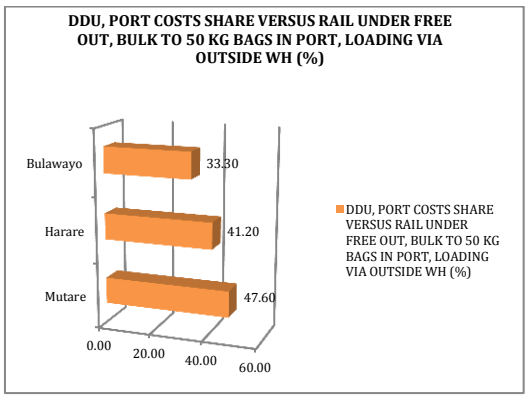
Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 39



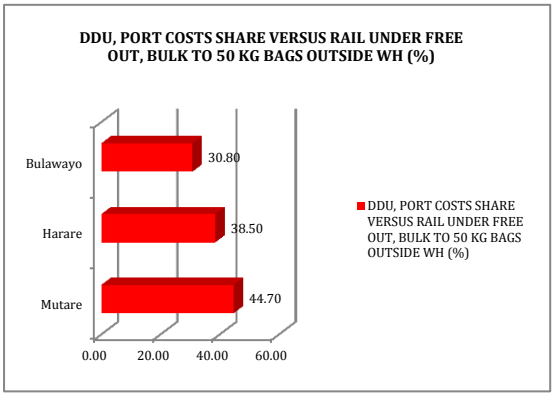
Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 40



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

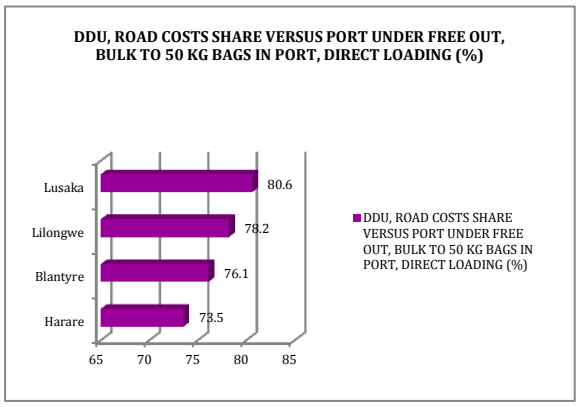
Figure 41



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

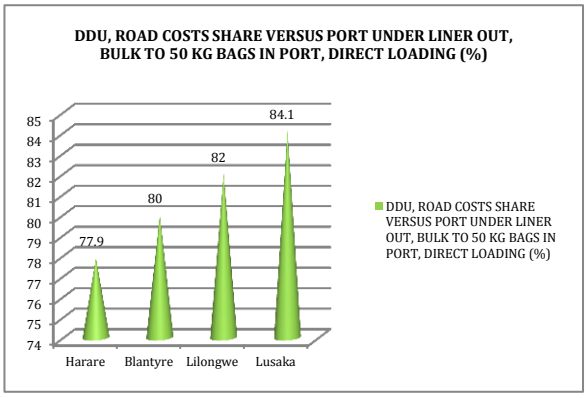
Using the most expensive handling option under free out terms, the highest port costs account for 47.60% to the shortest rail delivery destination (Mutare). The port costs then decrease as the delivery distance increases to Harare (41.20%) and Bulawayo (33.30%), as illustrated in Figure 40. The land transport costs are even much higher for road delivery to farthest distances such as Lilongwe and Lusaka. Consequently, road transport share of total logistcs costs amount up to 80.6% under free out and up to 84.1% under liner out for Lusaka, as can be seen in Figure 42 and Figure 43 below.

Figure 42



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 43

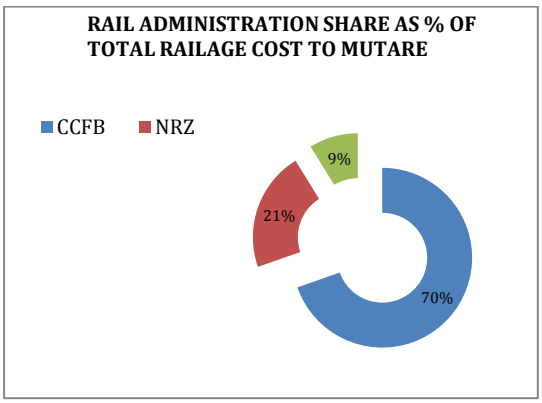


Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

It should be noted that road haulage companies incorporate in their freight rates border crosssing fees, immigration charges, third party insurance costs, as well as road toll fees.

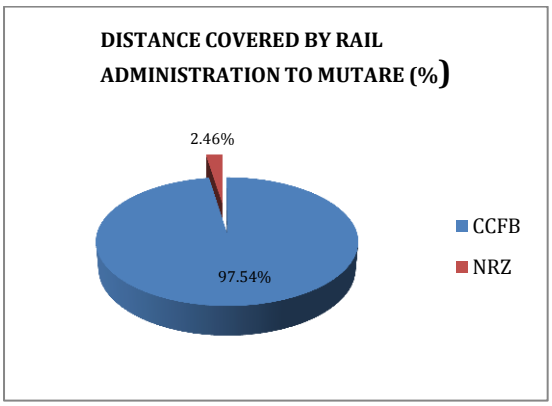
With regards to railage costs, it is worthwhile to review the charges by each rail administration to relevant destinations, as this compares distance travelled to fees assessed.

Figure 44



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 45

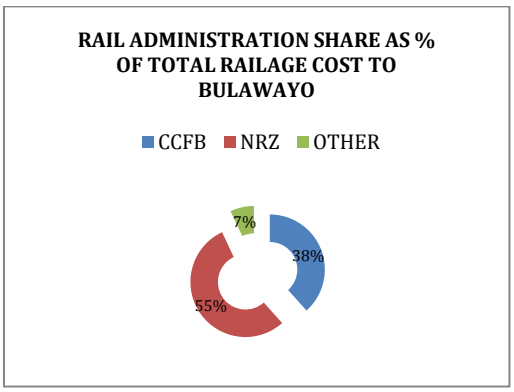


Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figures 44 and Figure 45 above depict the share by Companhia de Caminhos de Ferro da Beira (CCFB) and National Railways of Zimbabwe (NRZ) for moving fertilizers from Beira to Mutare. The charts depects punitive rates for customers who intend to move goods by rail on a shorter distance such as between Machipanda and Mutare. It is striking to note that while NRZ pulls the goods for less than 2.5% of the total distance, it yet invoices 21% of the total freight.

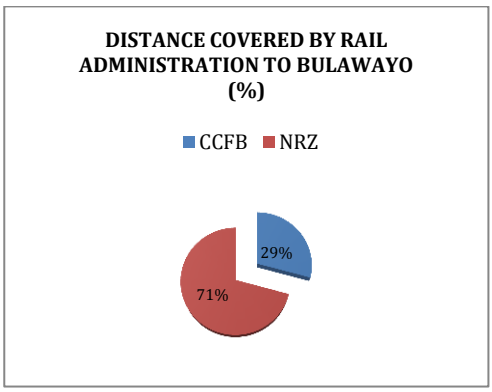
Further look at Figure 47 and Figure 48 below high cost pricing for CCFB. While it can be argued that operating costs vary from one rail administration to another, specially considering the pattern of railways such as gradient, sharpness of curves, fuel costs and other factors, it is still interesting to note that CCFB would invoice 38% of the total freight amount for rail hauling fertilizers from Beira to Bulawayo, while it only covers 29% of the total distance transported.

Figure 47



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 48



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Land transport takes the largest share of the entire logistics costs on imports as confirmed above. This pattern is also verified on exports as given below.

5.3 Export Cargo (Pigeon Peas) Direct Costs

This section pays attention to export of pigeon peas (dhal) from both Mozambique and neighbouring countries, notably Malawi. However, land transport freight costs from Malawi couldn't be obtained and therefore the anlaysis are limited to port related costs. Several handling options are explored, including cargo stuffed at shipper's warehouse (WH), at port warehouse, at agents warehouse, as well as containerized at origin. As for Mozambique, road transport costs from sample origin areas are provided separately under Table 66 below.

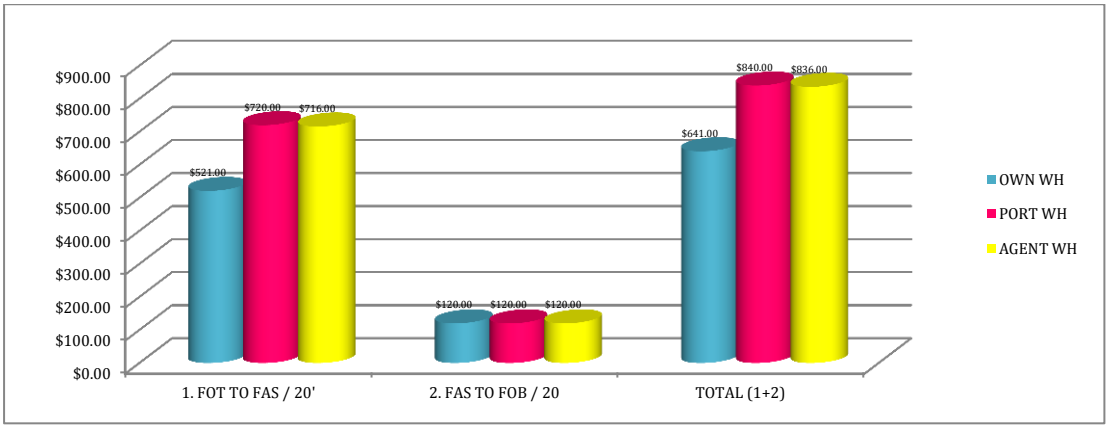
As the rates refer to consolidation points, total road freight costs are by and large more than what is given in Table 66 below. As for port related costs, there is an additional charge for customs clearance in regards to local cargo that couldn't be included, as it is assessed on basis of FOB value and records a great variance from one broker to another. Figure 49 to Figure 50 below summarize pigeon peas handling costs at the Port of Beira.

Table 66: Road Freight Rates from Sample Consolidation Points to the Ports of Beira and Nacala

Consolidation Areas	Beira Port	Nacala Port
Sena	$42.86	N / A
Murraça	$41.07	N / A
Caia	$40.82	N / A
Morrumbala	$42.86	N / A
Mocuba	$51.02	$53.57
Milange	$61.22	$80.35
Alto Molócue	N / A	$53.57
Gurue	N / A	$62.50
Cuamba	N / A	$57.14
Mutuali	N / A	$50.00
Malema	N / A	$44.64
Nampula	N / A	$28.57

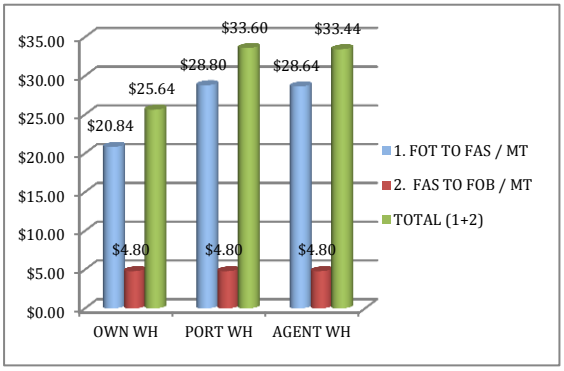
Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 49: Port Costs per Container for Local Cargo at Beira

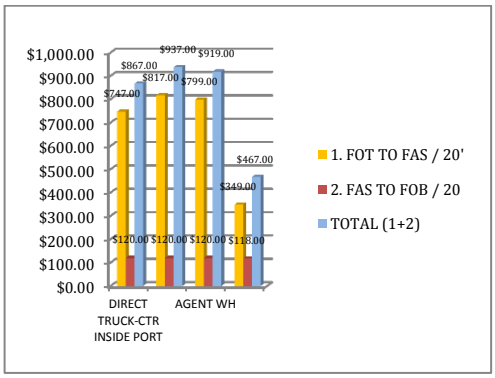


Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 50 and Figure 51: Port Costs per MT for Local Cargo at Beira Port Costs per Container for Transit Cargo at Beira

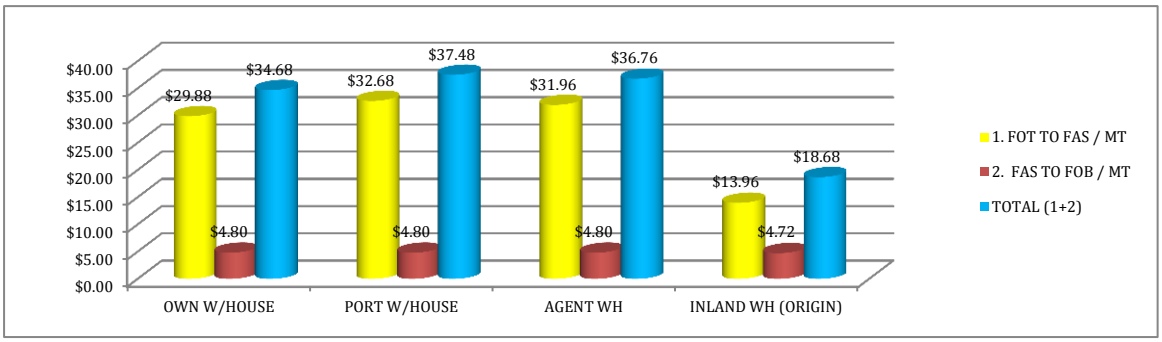


Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 52: Port Costs per MT for Transit Cargo at Beira

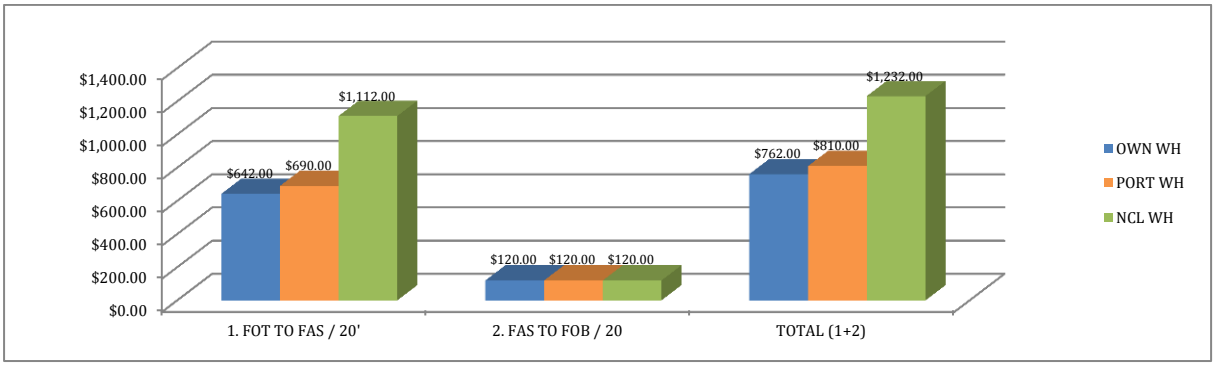


Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Considering cargo stuffed at shipper's warehouse, which is the cheapest option, road freight cost accounts for over 61% when cargo originates from the nearest consolidation point (Caia). If cargo originates from the farthest consolidation place (Milange), road freight cost amount to more than 70% of the total logistics costs excluding customs brokerage fee. Even when the most expensive handling alternative is considered (via agent's warehouse) against the cheapest collecting point (Caia), road freight cost still accounts for over 54% of the total logistics costs excluding customs broker fee.

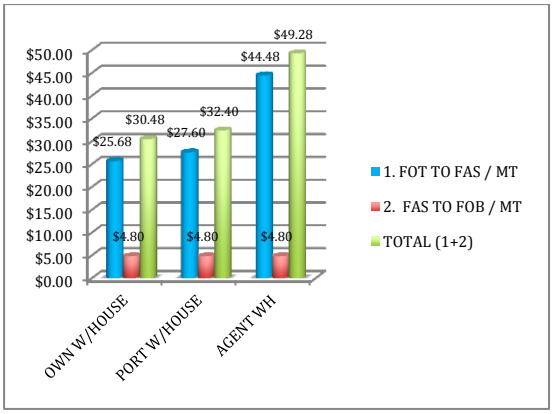
However, this pattern of road freight contributing the largest portion of the total logistics costs is somewhat distorted for Nacala when handling goods at agents warehouse as well as at the Special Export Terminal (NCL). In addition to costs generated as a result of double handling, fees assessed by NCL are excessively high not only when benchmarked with similar charges at the Port of Nacala, but also with the Port of Beira and container freight stations around Beira. Figure 53 to Figure 55 below summarize dhal handling charges at the Port of Nacala.

Figure 53: Port Costs Per Container for Local Cargo at Nacala



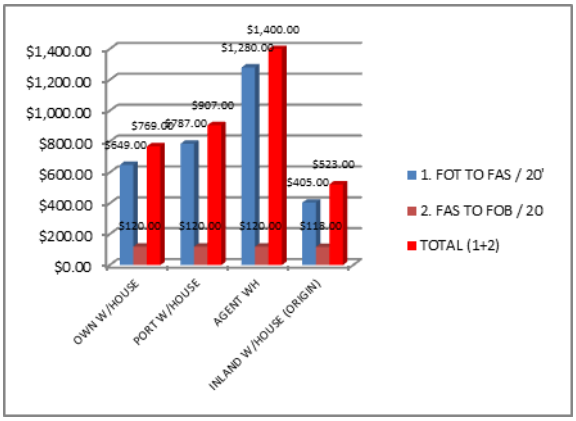
Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 54: Port Costs Per MT for Local Cargo at Nacala



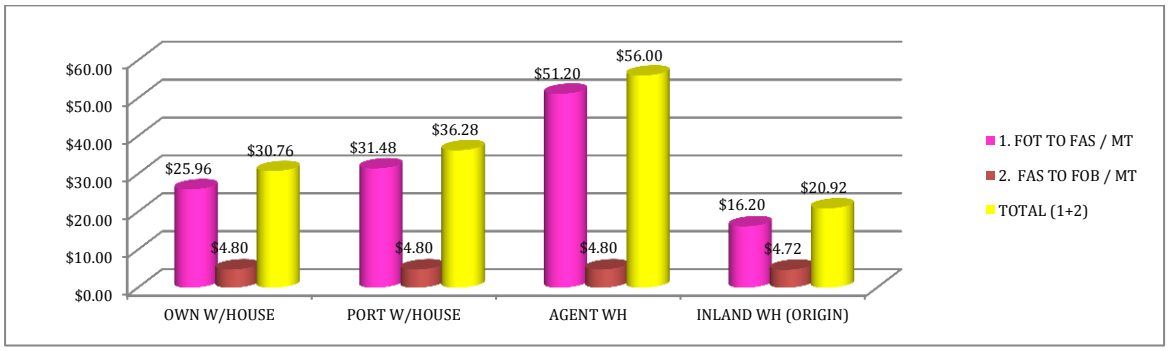
Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 55: Port Costs Per Container for Transit Cargo at Nacala



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

Figure 56: Port Costs per MT for Transit Cargo at Nacala



Source: Freight forwarding agents, rail administrations, road haulage companies, shippers and CONTRATUZ, Lda data basis and analysis

As shown in Table 66 above, if we consider the nearest consolidation point (Nampula) and handling of cargo at NCL, road freight accounts less than 37% of the total logistics costs, while a remarkable share of more than 63% of the total costs is attributed to port handling. By contrast, if we consider stuffing of dhal at shipper's and port warehouses, road freight from same consolidation point accounts for nearly 53% and 51% of the total logistics costs respectively, while the remainder is the port related handling charges. Even when the second nearest consolidation point is considered (Malema), road freight accounts for less than 48% of the total logistics costs involved in fobbing pigeon peas. When benchmarked with similar container freight stations in Beira, double handling and shunting costs attributed to handling cargo at NCL plus charges assessed at this facility outpace those of Beira by a striking figure of more than 47%. Also, assuming other charges such as port operators almost equal at both ports, handling of a 20 foot container of local dhal via NCL is US$396.00 more expensive than via a container freight station in Beira.

In addition to visible costs discussed above, there are other invisible costs along the corridors such as red tape at various institutions, as well as safety issues. This is discussed in the following section.

5.4 Invisible Costs along the Corridors

While proof of occurrences of red tape couldn't be obtained, reports by corridor users of such practices were recorded during the field visits. These include tips to equipment drivers at ports for quick loading, to customs officers for quick processing of customs declaration and avoidance of physical examination of cargo, to traffic police officers along the roads, as well as to other private and government staff direct and indirectly involved in the logistics chain.

Likewise, safety was mentioned to be another concern, although to a minor extent. On the rail traffic, sensitive goods such as rice, fertilizers and vegetable oil in break bulk must often travel with security guards on board of rail cars, to prevent theft. On the road haulage, driving at night is usually not recommended through areas where trucks must move at a slow speed due to poor road condition, as pilferages do occur. Vehicles carrying non-containerized and sensitive goods including fuel must also take precaution near the main CFM gate at the Port of Beira to avoid pilferage.

Concluding Remarks

Land transport accounts for the largest share of the total logistics cost. This is the case of imports (from free out to DDU); and for exports (from ex-works to FOB). This conclusion reinforces earlier findings of a relatively high land transport costs (per ton-km and per TEU-km) along Beira and Nacala Corridors presented in Chapter 4, notwithstanding their overall absolute advantage afforded by their vicinity to the hinterlands. The high land transport costs can be attributed not only to rail and road truck conditions, but also to factors such as fuel and other transport running inputs, from which operators

may need to make a sufficient cover. Another key element is the lack of a common approach by land transport users, which hinders them from leveraging the rates offered by transporters downwards.

The trend of land transport taking the largest share of the total logistics cost has remarkably been reduced at Nacala corridor due high costs associated with the introduction of NCL operations. As a result of high costs entailed in using this facility, the share of road transport on total logistics costs record as low as 37%. The high costs results from excessive fees charged at NCL and additional costs generated as a result of mandatory use of this terminal and increased logistics costs from increased movements and handling of goods (as discussed in Chapter 4).

High logistics costs usually result in high prices of imported goods. If imported products play a significant role in local production, then domestic products will become very expensive. Similarly, local products made for exports will be uncompetitive in international markets. The spill-over effects of high logistics costs and constrained international market will likely result in suppression of the local production sector, including agriculture. Consequently, peasant farmers and local economy may end up with little income to dispense for health, education, clothing and other general living expenses.

6.0 KEY FINDINGS AND RECOMMENDATIONS FOR IMPROVEMENT OF CORRIDOR EFFICIENCY

6.1 Key Findings

The purpose and objectives of this assessment was to assess the productivity and efficiency of Beira and Nacala Corridor logistics.

Ports

This section below presents recommendations arising from this port assessment, its findings and conclusions described above. The recommendations are derived specifically from our analysis of the productivity and efficiency of Beira and Nacala Ports.

The Assessment team conducted on-site interviews with the key public official, port uses, and private stakeholders and port operators. The interviews focused on five critical aspects of the port's operations, including: 1) the gate; 2) terminal; 3) quay; 4) equipment, and 5) labor. Supplementing these interviews were site inspections of the gate, scanning facilities, terminals, quays and equipment. We evaluated performance indicators that measured the port terminal operating system regarding delivery, storage, and transfer, loading and discharging cargo. In effect, the analysis focused from the gate on the landside to quay on the waterside. Overarching the operations analysis was a process analysis of procedures of how containers flow through the terminal. The process evaluated the time from when a container arrives at the gate to the time it is loaded onto a vessel and from being discharged from a vessel to the time the container exits the port's gate. Additionally, the assessment examined: the legal and regulatory structure; evaluated the capacity of each port; analyzed the terminal handling charges; and reviewed the current and planned development of each port. Presented below are key finding arising from these analyses.

As strategic assets of Government of Mozambique, the Nacala and Beira Ports present enormous opportunities to contribute to Mozambique's export earnings capacity, increased international trade and GDP growth. However, despite the Ports of Beira and Nacala's strengths and opportunities, each port faces enormous challenges now and in the future. Such challenges require comprehensive actions to cope with the increasing demand for port facilities and services, efficient port operations and higher productivity. Rapid increases in general cargo, and bulk cargo traffic, particularly coal and other mineral exports, and indeed container and POL traffic will amplify these challenges and make it imperative to improve port productivity and efficiency.

Comparative Port Assessment

There is a general perception among industry experts and others in Mozambique that Beira Port is a more efficient port than Nacala Port. Our analysis of the performance of both ports finds that Beira Port performs only

marginally better than Nacala Port and only in a few areas. This finding resulted despite the port's advantages in equipment, technology and management resources. Beira Port has an advantage in equipment availability, berth occupancy rate, terminal area, and in TEU and general cargo throughput. However, this has not translated into a superior operational performance compared to Nacala Port. And in fact, the KPIs for both ports are comparable in key areas of efficiency such as dwell time and truck cycle time.

Comparison Dwell time performance

Port Efficiency and Productivity

In general, Beira and Nacala Ports have a significant geographical and overall transport cost advantage over the competing ports in Southern Africa. Nevertheless, Beira and Nacala Ports do not offer favorable productivity and efficiency advantages compared to other ports in Eastern and Southern Africa. And indeed, Beira and Nacala are less favorable when compared against a range of international benchmarks. When benchmarked against several KPIs affecting port operations, including delivery, storage, transfer; and loading and discharging cargo, as was done in this assessment, both ports exhibit remarkable inefficiencies and low productivity. This is especially troubling in light of the fact that private commercial operators manage both Beira and Nacala Ports under long-term concession agreements. However, a special note needs to be made regarding Beira Port. Being a tidal Port with entrance channel considerably silted for the period under analysis, KPIs were somewhat affected by such factors as small and old fashion vessels calling this port, frequent short shipments in light of drought restrictions by the time of sailing, as well as de-prioritization of vessels whose sailing time was bound by right tide window opportunity some days ahead. The findings regarding the core evaluation of the performance of Beira and Nacala Ports analysis are the following:

- **Crane Productivity** - The international benchmark for crane productivity is 25 to 30 moves per crane hour for Panamax gantry cranes. The findings of the benchmarking analysis indicate that Durban Container Terminal (DCT) and the Port of Cape Town in 2010 did 22 moves per crane hour. Beira and Nacala Ports are 2.6 to 2.9 times less efficient in crane productivity than any of the four South African ports benchmarked against. However, it should be pointed out that the type of crane deployed by the port operator is a major factor affecting crane productivity. Industry benchmarks of crane production for different types of cranes are: (i) a Post Panamax gantry crane is 35 to 45 lifts per hour; (ii) a Panamax gantry crane is 20 to 30 lifts per hour; (iii) a port mobile crane is 18 to 25 lifts per hour; and (iv) ship's gear is 8 to 15 lifts per hour.
- **Dwell Time -** The dwell time performance at Durban Container Terminal was observed at slightly under 4 days (3.93 days). These results are comparable to international standards of 3 to 4 days. By comparison, dwell time performance by both Beira and Nacala Ports were 18.3 days and 26 days respectively in 2011. Our benchmark findings reveal that Durban

Container Terminal was almost 8 times more efficient than Nacala Port and about 4.5 times more efficient than Beira Port. However, one needs to take into consideration that both Beira and Nacala marine terminals are used as stacking areas by shippers, shipping lines as well as customs authorities for their confiscated cargo.

- **Truck Cycle Time -** The benchmark results for Durban Pier 1 and the Port of Elizabeth indicate performance for average truck cycle times of 15 and 18 minutes, respectively. These are remarkable results because the international standard, which all ports try to achieve, is under one hour. By comparison, the average truck cycle time for Beira and Nacala Ports in 2011were respectively 4.1 and in excess of 6 hours.

6.2 Key Performance Indicators

Although CDN has a robust set of performance indicators that cover all aspects of port operations, no evidence was found to show how such indicators were being used in managing port operations. Typically, KPIs are used to set efficiency and production targets but no such targets could be identified in the case of Nacala Port. Conversely, Beira Port manages against a limited number of KPIs. Cornelder has specific targets for each productivity and efficiency measure.

Another revealing finding regarding the port's KPIs is that despite the fact that both ports are operated under concession agreements (even though CFM functions both as the regulator and an equity owner in these port concessions), neither Beira nor Nacala Ports use a common set of KPIs to gauge the port's performance and set targets. This is an issue the proposed regulator will undoubtedly have to address once the regulatory structure has been fully established.

6.3 Terminal Operations System

The findings that relate to the terminal operating system include the following:

- **Gate -** The documentation process requirement at the ports' gate is highly inefficient. It necessitates paper documents to accompany every driver and requires the driver to leave their vehicle to have export documents inspected and stamped at the terminal gate by customs, security, A-Check, etc. This process contributes nothing to modern day port operations. In fact, this antiquated system of container delivery operations ads to truck–cycle time, creates port/gate congestion, and other delays such as prepositioning to a stack for loading. Truck cycle time is 4.1 hours at Beira Port and in excess of 6 hours at Nacala Port, compared to South Africa ports where cycle time is between from 15 minutes to a half an hour, well below the one-hour international benchmark. Both Beira and Nacala Ports have cumbersome and antiquated processes for delivering and picking-up containers and general cargo. We believe their process contributes to each port's high dwell time. Moreover, we believe both ports

could realize significant productivity benefits with the introduction of a Single Electronic Window and an advance vehicle booking system.

- **Terminal** - The second and one of the most challenging aspects of Beira and Nacala's terminal operations is dwell time. Dwell times for both ports are exceedingly high (e.g., 18.3 days for Beira Port and 26. days for Nacala Ports). This is at a time when the dwell time at Durban Container Terminal is under 4 days and well below the international benchmark of less than seven days. Of the two ports that are the subject of this study, only Cornelder of Beira Port has embarked on a strategy to address its high dwell times. As of 1 April Cornelder reduced the number of free days from 7 to 5 days for local and transshipment import full containers, and from 14 to 10 days for import full transit containers. Additionally, Cornelder has also increased its container storage rates. Both Beira and Nacala Port can benefit from the experience of Durban Container Terminal, which substantially reduced its dwell times from the high 20 plus days to its current level.
- **Quay** - A key finding regarding the Nacala Port's quay operations is the practice of conducting only loading or discharging of cargo once a vessel arrives at the port. Because of port's lack of equipment, arrival of a vessel means other operations such as releasing containers from the container terminal or receiving container are suspended. Such an operations procedure lowers the port's productivity by contributing to delays in the terminal and at the gate, and is likely to be one of the main contributing factors to excess truck cycle times.
- **Port Handling Equipment -** Two findings have emerged in this study regarding port-handling equipment. One is the equipment availability rate and the second is the equipment productivity. Both issues affect the Port of Nacala. The persistent lack of adequate equipment, especially cranes, tractors and trailers, etc. to perform routine port handling operations lowers the port's productivity and efficiency. The situation has had a direct impact on operations because it forces CDN to suspend terminal operations while vessels are being loaded or discharging cargo at the quay. And, of the equipment that is in Nacala Port's equipment inventory, less than 35 percent is reliable or are available on any given day. The lack of equipment appears to be a major contributing factor to high dwell times and low productivity.

  The second issue regarding port equipment relates to equipment productivity or more precisely crane productivity. Although Beira Port appears to have sufficient equipment for its operations, in 2011 its crane rate was twice better (8.9 moves per hour versus 4.0 moves per hour) than that of Nacala Port. These results indicate that both ports underperform compared to their Eastern and Southern African peers, whose crane rates are 2 to 3 times more productive.
- **Port Labor -** The labor force at Beira and Nacala Port consist of direct staff that include administrative, operations and management staff. Stevedoring operations are outsourced to private companies. The in 2011 Beira Port had more than twice as many employees as Nacala Port (502

to 223 employees). On a comparative basis Beira Port does not performs better than Nacala Port in term of container throughput per employee. Despite the use of contracted stevedoring services, labor productivity at both Nacala and Beira Ports were found to be below international standards when evaluated against either of the performance measures such as container throughput per employee; tons per employee or net and gross ton per gang. In 2011, productivity yields for container throughput at Nacala Port was 400 per employee compared to versus 319 TEUs per employee at Beira Port. The international standard is 1,000 TEUs per employee. At Beira Port, labor productivity as measured in tons per employee 8,106 metric tons in 2011 which is also below the international standard.

6.4 Port Capacity

Our findings indicate that both Beria and Nacala Ports are experiencing significant capacity problems at their container terminals. In 2011 Beira Port was at 91.4 percent of its container terminal capacity of 175,000 TEUs. By 2015, the projected traffic demand for container traffic at Beira Port is expected to reach 280,000 TEUs. To rebalance its terminal capacity utilization rate to below 80 percent and meet the projected traffic demand, Beira Port plans to expand its container terminal capacity to 400,000 TEUs by 2015. This is year over year average of 75,000 TEUs by per year. The result of the expanding container terminal to 400,000 to 450,000 TEUs yields a capacity utilization rate of between 62 to 70 percent.

Nacala Port has also exceeded its container terminal capacity of 75,000 TEUs. In 2011 Nacala Port handled 89,719 TEUs, which is almost 20 percent (19.6 percent) above its terminal capacity. By the following year, the Nacala Port exceeded its terminal utilization rate by 21 percent above the benchmark terminal utilization rate of 80 percent. JICA's forecast for container traffic demand at Nacala Port assumes a 12.8 percent CAGR based on the past 6 years We expect continued growth in demand for containers services at the Nacala Port at about this same rate as in previous years. Given this, the Nacala Port will need to increase its terminal capacity by an average of 31,790 TEUs per year over the next four years to have a capacity of 275,000. Were Nacala Port to reach 275,000 TEUs, this will result in a rebalancing of its capacity utilization rate to 65 percent by 2014 and down to 53 percent by 2015.

6.5 Legal and Regulatory Issues and Dwell Time

A review of the legal and regulatory structure found no evidence that the Mozambican laws or maritime regulations adversely impact on container or vessel dwell times. Both Beira and Nacala Ports are operated under concession agreements with the Government of Mozambique, which are set forth in a decree granting the concessionaire full authority to operate the ports. The ability of the port operators to set limits on dwell times or impose rate increase is entirely within his purview under the terms of the concession

agreements. However, a promising development is that the Ministry of Transport and Communication has decided to establish an independent regulatory body to regulate the ports and railway. Although the timing, scope and authority of the regulator has yet to be determined, it is possible that the regulator could influence the concessionaire's port operations regarding dwell time by imposing dwell times as one of several performance standards. But here again, this is likely to require re-negotiations of the port concession agreement.

6.6 Port Handling Charges and Other Services

Based on published tariffs for terminal handling charges and other services at Beira and Nacala Ports, our findings indicate some variances in prices for certain port services. For instance, certain services, such as stevedoring and handling of a 40-foot container, the price variance is in the range of 8 percent. Beira Port's handling charges tends to be slightly higher than those of Nacala Port, but not by a wide margin. By contrast, the combined services (stevedoring and shore handling) for a 40-foot reefer container at Nacala Port was 1.0 percent lower than at Beira Port so by comparison the prices gaps are not large between the ports. The exception is the price gap for 20-footer import and export containers, which at Beira Port is 29 percent cheaper than at Nacala Port. The port handling charges for 40-foot export import and export containers at both ports are roughly the same price.

Comparing the terminal handling charges of the Mozambican ports with those of South Africa we find that South Africa's pricing strategy for terminal handling charges favors export containers. The terminal handling charges for 20-foot and 40-foot export containers are half the price of an import container (respectively US$ 160 versus US$ 323 and US$ 320 versus 645) from South Africa's ports. Moreover, terminal handling charges for export containers at South African Ports are more competitive than at Beira or Nacala Ports. The average terminal handling charges for a TEU and a FEU at Beira port are respectively 19 percent and 57 percent more expensive than comparable size containers at South African ports. For a 20-foot export container the average handling charge at Nacala Port is about 73 percent more expensive and for a 40-foot export container it is 55 percent more expensive than at South African Ports. The average container handling charges for a 20-foot export container is about 31 percent cheaper at Beira Port than at Nacala Port.

6.7 Current and Planned Infrastructure Development

Currents efforts underway at the Port of Beira to development the port's infrastructure involves, *inter alia,* expanding the container terminal, and building a new coal terminal. CDN's current and future plans for the development of the Nacala Port seem less certain than the plans being implemented at Beira Port. The exception, of course, is the new coal terminal being built by Vale Mozambique for coal exports.

6.8 Donor and Government Interventions

No direct on-going donor or government support was found to exist in either Beira or Nacala Ports, with the exception of interventions being undertaken by JICA and Department for International Development (DFID). JICA has also prepared long-range container and general cargo forecasts for 2020 and 2030 along with an urgent rehabilitation program of infrastructure and superstructure improvements for Nacala Port. This programmatic assistance is being carried out under cooperation agreement between JICA and the Ministry of Transport and Communications (MTC). However, as of this writing the rehabilitation program has not yet been agreed to by MTC.

JICA is also conducting an economic development strategy study of the Nacala Corridor under an agreement with the Ministry of Planning and Development (MPD). The focus of JICA's effort is on developing a strategy to guide the development and investment within the corridor. The outputs of the study entail investments in the Nacala Port. Additionally, DFID is providing technical assistance to MTC to establish a regulator for the ports and railways. Thus, our finding is that there is no direct donor or international assistance being provided to the Ports of Beira and Nacala. However, there does appear to be scope to leverage both JICA and DFID's efforts in the area of logistics and assistance to support the establishment of the regulator, given USAID ports, railway and corridor experience in Mozambique.

Shipping Developments

- Both Beira and Nacala are reposition themselves as regional ports and attracting direct calls as opposed to their previous positions as feeder ports. For Beira port, this has largely been enabled by dredging of the channel which was completed in July 2011 to re-establish the port seaway to its original depth of 8.5m below chart datum and attract fully loaded ships of 60,000 tons to berth and sail from the port. Both ports are receiving direct calls that connect to East Africa and East Asia.
- There are a multiple of shipping lines local charges. This includes the Terminal handling Charges (THCs) which have very high margins over the stevedoring charges, which they are supposed to recover. This has an overall effect of increasing costs of goods handled in the corridors, especially for exports that have to compete in the international markets.

Customs

- Although the customs regulations may seem to be straightforward, its interpretation is not always common among all Customs officers and agents involved in clearing of goods. The situation is made difficult when new legislations and regulations are introduced without fully repealing legislation already enacted. This leads to confusion and differences in interpretation as users have to refer to two legislations for the same operation and activities.

- No pre-clearance allowed, in view of sequential vessel entry number requirement at port for customs clearance. Full pre-clearance of goods has not been authorized. The law provide issue of “contramarc”, which is the sequential entry number of means of transport at a given customs border in Mozambique. Every vessel calling at Mozambican ports is assigned the respective order number at entry point while proceeding to berth, without which customs clearance cannot be accomplished.
- Mozambique is yet to implement some critical instruments on regional facilitation on trade and transport, which includes Regional Transit Bond Guarantee and establishment of customs to business forum.
- The charging for SEWS on local exports and imports is by value of declaration. Charging is not related to the amount of service but FOB value. The system is discriminatory to shippers with high value declarations who have to pay for high user charges.
- Scanning charges are made on full load consignment and not on the actual cargo scanned. This imposes a lot on shippers with big consignments, and pushes the prices of commodities high as shippers seek to recover additional costs from final buyers of their products.
- No criteria given to shippers for selection of goods for physical verification by customs. This, irrespective of scanning which is carried in all goods.
- Inefficient communication channels between customs authorities and shippers at both Ports of Beira and Nacala. There is no forum to discuss relevant customs matters such as new procedures and systems prior to implementation, to gather ground inputs and ensure ownership of the new processes from shippers and their agents.
- Site for scanning facilities at the Beira port cause a lot of traffic jams impending, which creates congestion in the port. With the only gate in and out of the port, and three rail / road crossing levels in the port, this cause traffic jam and port congestion. With anticipated increase in the coal export and with more trains in and out the stockpiling yard, the situation is likely to worsen.
- There are no current accounts for payment of scanning charges. With shippers or their agents having to get back to their offices to issue bank checks and then return for final payment at Kudumba scanning counter, this procedure increases the lead time for customs clearance.
  SEWS is internet based. However, both Beira and Nacala experience limited internet connectivity. In case of internet failure, customs clearance operations will get to standstill. Likewise, in case of power outages, clearing declarations cannot be filed. With no reliable backups for both utilities, risk of congestion is serious if failures occur.

Transport Infrastructure

- The regions served by the corridors are endowed with a lot of potential for production and consumption, which are expanding faster than the

capacities and developments of roads, rail, ports and pipeline infrastructures and systems. The expansion of coal mines at Moatze in Tete in Mozambque, alone is projected to reach annual production of 20 million tons that will be handled through Beira and Nacala railway systems and ports by 2015.

- Roads have bottlenecks with links needing urgent attention for rehabilitations and maintenance. These sections include Beira-Inchope (135km), Mocuba-Milange (192km), and Nampula-Cuamba-Mandimba-Lichinga (748km). Their poor condition impact on vehicle operation costs and transit time. Both factors have effect of high transportation costs and constraining trade along the corridors.
- Overloading on roads. The roads though have weighbridges, they are either not in full operation have few weighbridges over long distances. The weighbridge at Dondo which is at the beginning of the corridor is reported not in operation though planned for maintenance. Nacala corridor has only two weighbridges at Nacala and Nampula. There are no weighbridges on a long distance of 748km from Nampula to Mandimba and Lichinga. The absence of weight restrictions on the route leads to the truck operators to overload to increase their productivity and offer lower prices to customers. This in the long run is not safe and drives up maintenance costs.
- The railway services on Beira corridor do not reflect the benefit of economies of scale they have for the bulk haulage and long distances. The corridor only handles about 3% for transit traffic. Rail also takes about 10% of cargo moved from port to national locations. The poor performance of railways is associated to lack of wagons and management underperformance.

Transit Times Analyses

- The study has established that ports accounts for the largest share of time the cargo is moved in the corridors, which is caused by high time cargo is inventoried in port storage areas. High dwell time caused by high storage time is a major source of inefficiency as it takes a high 17 to 20 days to deliver cargo on transit to destinations in Beira and Nacala corridors. Even deliveries to Mozambique, for instance, to Machipanda and Tete take an average high transit time of 15.5 and 16 days respectively.
- The high and ranging dwell times at Beira and Nacala ports impacts heavily on corridor efficiency making the ports the most unreliable part of the transport logistics chain.
- The poor condition of road sections at Beira-Inchope on Beira corridor, and Mocuba-Milange on Nacala corridor impacts heavily on the driving time for cargo destined to locations in Mozambique, Zimbabwe, Malawi, Zambia and DR Congo. These links require urgent attention for rehabilitation and maintenance. For Beira-Incope road, only funds for maintenance are available.

- The border crossings have long clearing times of an average one day for all borders observed. This is considered to be very high noting that all logistic formalities have been cleared with the uplift of cargo at the ports. Borders with Zimbabwe and Zambia require all clearing formalities at borders, which impends on transport facilitation.

Cost Chain analysis on Roads and Borders

- Poor conditions of roads have contributed significantly to high costs of transportation. Roads with poor sections have high costs per TEU-km and ton-km for goods transported. The most expensive route sections on Beira corridor are Beira-Machipanda with cost of US$5.96 per TEU-km, and Beira-Harare with US$4.11 per TEU-km. Both sections have common factor of goods passing through Beira-Inchope, which is a very poor road section.
- Road transportation costs are very high on Nacala corridor than Beira corridor due to poorer road conditions.
- Roads to Malawi through Beira corridor have relatively lower transportation costs compared to roads with routes to Zimbabwe, Zambia and DR Congo. This is because travels to Malawi have shorter transit time despite longer distances.
- There are multiple costs of border charges which includes road toll fees, insurance, carbon tax, vehicle permit and port health permit. All countries require payment for insurance with ranging costs of US$50 at Malawi border to US$95 at Zambia border. Truck destined to Lusaka via Forbes and Chirundu borders have to pay for two insurances. Carbon tax is levied by all countries in the corridors. Entry permit is required for Malawi and Zimbabwe at US$30 and US$25, respectively. All countries except Malawi issue port health requirement of US$25. Road toll charges are paid according to distance and charged including the backhaul. Road toll of US$180 is charged at Forbes for destinations to Harare and US$66 at Mwanza for destinations to Blantyre. There are other border costs associated with immigration, customs and other agencies and actors at the borders.
- Though countries sharing the borders are members of SADC, they have not been applying regional instruments of facilitation at the borders.
- Compared with the region, Beira and Nacala corridor routes are more expensive than corridors served by Mombasa, Dar es Salaam and Maputo ports in relative terms, although the final decision on which route to use may be made on the basis of the total land transport cost, for which Beira and Nacala have a considerable advantage over the rival ports. Moving 20’ foot import container (22 tons) from Beira to Harare and Lusaka costs US$4.11 per TEU-km and US$3.94 per TEU-km respectively, compared to a half cost for US$2.04 from Maputo to Johannesburg, and the lesser costs of US$2.67 per TEU-km from Dar es Salaam to both Kigali and Bujumbura.

- There are two pricing for cargo handled by railway system from Beira to Harare. The two pricings may not be cost efficient on moving cargo.
- Nacala railway system has lower costs of moving goods than Beira railway system. The railways system accounts for 90% of transits handled at the port, offering the economies of scale.
- In overall, the rail systems have lower costs of transportation than road. They give them advantage for economies of scale. Beira railways system due to its underperformance does not enjoy the economies of scale as it only hands 3% of transit traffic and 10% of the national traffic handled at Beira.

Special Export Terminal

- Customs has issued a service order requiring operations related to exports through Nacala Port to be carried out at a special export terminal for customs control. The terminal that is located 9km from the port is being owned and operated by NCL, a private operator.
- One of the major concerns is that the export terminal could result in higher tariffs to exporters. Analyses undertaken already indicates that the NCL handling charges are US$87 and US$156 higher than Nacala Port's handling charges for 20' foot and 40' foot containers, respectively. This is 44% more expensive in handling charges at NCL in both categories of containers.
- There are additional logistic movements and handling costs that have resulted from the requirement to clear export cargo through terminal, instead of one round cross haul movement from the shipping line yard to its own warehouse for cargo stuffing, and then to the port.
- Other concerns arise from risk of cargo contamination when mixing break-bulk consignments of several shippers and limited handling capacity for many consignments, and in particular large volumes that may lead to backlog handling which may accrue storage charges.

6.9 Key Recommendations

Government of Mozambique through JICA is undertaking both the preparation of the Nacala Corridor Economic Development Strategies, and upgrade of the Master Plan for the expansion of the Nacala port. A finalization of these studies will provide with some of the future strategies and actions required to address the capacity upgrade ad operational efficiency of the Nacala corridor. A Similar undertaking by Government of Mozambique that addresses the entire corridor approach is required for Beira corridor. Other recommendations in specific areas are given below.

Ports

In summary, both ports were deficient with respect to productivity and efficiency in most or all areas of port operations. As privately operated commercial enterprises, the scope for development assistance interventions to address Beira and Nacala Port's lack of productivity and their inefficiencies is, and as it should be, very limited. Moreover, both ports operate within the framework of concession agreements and, as such, the presumed risks for Government of Mozambique and the concessionaires are appropriately calculated and adequately allocated between the parties. Nonetheless, as the recommendations below indicate there are some promising opportunities, if implemented. The recommendations below are unlikely to impact directly on the productivity and efficiency parameters of the ports, but rather on the enabling environment, stakeholder's engagement, and port regulatory and institutional reforms.

Considering the forgone analysis and the findings presented therein, and in our best professional judgment we put forth the following recommendations on ports.

USAID undertake Ports Efficiency Improvement Program (PEIP) on ports area that entails:

- Supporting and establish initiatives to reduce dwell time through shippers' behavioral changes, legal and regulatory review on ports as storage areas and improve ports operational efficiency.
- Supporting establishment of a Port User Group as a forum for users of Beira and Nacala Ports to inform on operational and policy decisions by Government of Mozambique and the concessionaries, and facilitate discussion of user challenges between port authorities and operators, and the users, and implementation of the decisions.
- Supporting establishment of KPIs for the CFM and Government Ministry of Transport, for management and evaluation of ports performance, and their publication.
- Supporting the creation of a PPP subscription-based advanced container information management and tracking system for port users of the Nacala and Beira Corridors.
- USAID support the Ministry of Transport to establish a regulatory body for ports and railways by providing programmatic support
- Recommend that CDN undertake urgent steps to acquire additional port handling equipment to improve its operational efficiency and productive capacity.
- CFM create two gates for port entry and exit to alleviate traffic jam and hence congestion, inside the ports.

Shipping Developments

1. USAID undertake Ports Efficiency Improvement Program (PEIP) on shipping area that entails:
    - Support to establish the corridor shipping councils that will comprise all stakeholders, including ports and shipping lines that will consider optimal solutions for various costs and operation efficiency. The councils will look at many other matters geared to increase trade and make the corridors competitive.
    - Support to establish a market oriented regulatory authority that will guide on optimal charges.
2. Beira and Nacala ports undertake to collect the stevedoring charges. This will have immediate effect of reducing any cost mark-up and lowering the terminal handling charges. The result has a multiplier effect of lowering the costs of both imports and exports and increasing the volume of trade. The approach is a win-win situation where the shippers' goods become competitive, and there is an increase in trade, while the ports and shipping lines receive more exports and imports cargo to handle and transport. The option is a shorter root to the answer.

Customs

1. USAID undertake Ports Efficiency Improvement Program (PEIP) on customs area that entails:
    - Support review of regulation to allow for cargo pre-clearance by repealing requirement to provide a sequential entry number of vessel (contramarca) for import cargo.
    - Support to establish customs forum that brings together all stakeholders involved in undertaking customs formalities. Such should be established as a permanent committee that meets regularly to discuss issues involving customs facilitation.
    - Support prepare a Standard Operating Procedures Manual for all customs clearance regimes that should be produced, updated as required and made available to all customs officers, transit agents and brokers at the clearing points.
2. Recommend MRA to review and provide and make available regulation for random scanning of goods (instead of full shipments).
3. Recommend MRA to eliminate scanning charges of goods, which are considered as operation costs of customs. The will have substantial effect on reducing the handling costs of goods.
4. Recommend MRA to eliminate SEWS charges, which are considered as operation costs of customs. The effect will be to reduce handling costs of goods.
5. Recommend MRA to establish and publicize a toll free line for reporting incorrect practices.

6. Recommend MRA to establish with its concessionaire for scanning services a current accounts scheme, especially for operators handling regularly large cargo volumes through Beira and Nacala.

Border post

Border posts measures by Government include:

1. USAID undertake Ports Efficiency Improvement Program (PEIP) on border post area that entails:
    - Support to establish one-border posts on Beira and Nacala corridors to reduce clearing time by minimizing duplication of processes; and
    - Support an assessment of border posts operation efficiency.
2. Government of Mozambique to work with corridor countries and implement the SADC trade and transport facilitation instruments on documentation and processing for cargo, vehicles and persons crossing the borders.
3. Government of Mozambique to invest on information facilities at the borders

Roads

1. ANE and Government of Mozambique undertake urgent attention to rehabilitate links that have been identified as poor on Beira and Nacala corridors. On funds sourcing, the Government may undertake to concession links for quick approach to funding. Some roads have already been concessioned to private investors and ANE can tender more concessions where funds are not immediately available to links already identified.
2. ANE undertake a pragmatic approach and provide adequate weighbridges for overload control. The management of the weighbridges can also be concessioned for operational efficiency.
3. The Government and ANE undertake vigorous approach and ensure Beira and Nacala corridor roads are considered as regional routes and included for development in the regional programs by organizations and institutions such SADC, AfDB and other development partners. ANE should then follow and ensure they receive funding.

Railways

1. CFM undertakes to improve the management and operation of the Beira railway system by buying more wagons, locomotives and upgrading of rail tracks. CFM can consider a strategic partner for investment and management.
2. Upgrading of Nacala railway system by investing on wagons, rolling stock and rail tracks.

3. CFM to conclude rail haulage agreement with Zimbabwe railways for through cost efficient tariff
4. CFM and railway operators establish KPIs on railway systems

Special Export Terminal

1. Recommend that Mozambique Customs authorities provide export terminal market access and open registration for other market participants and eliminate NCL's monopoly position. This will create competition that will ensure optimal service level and competitive prices.
2. USAID working with the Mozambique Customs support establish key performance indicators and relevant statistical requirements with NCL to measure the operation efficiency of the NCL export terminal and other terminal that may be created.

6.10 Implementation Matrix

A framework of implementation matrix with project activities, description, responsibilities, and expected output is shown in Table 67 below. The activities can be implemented by various entities that include the relevant government ministries and agencies, USAID and other development partners, and private sector.

Implementation Matrix

Table 67: Implementation Matrix - Beira And Nacala Corridors Logistic Review

Activity (project name)	Description of activities	Responsibility and partners involved	Expected output/ target	Time-frame	Remarks/ assumption
Ports Efficiency Improvement Program (PEIP) on ports area that entails:					
Reduction of port dwell time initiatives	Shippers' behavioral change initiatives; legal and regulatory review on ports as storage areas; increase port equipment; improve ports operational efficiency.	Beira port (Cornelder), Nacala port (CDN), CFM, port users, business associations, USAID, development partners	Reduction of container dwell time to an average 10-15 days.	2012-2013	Effective stakeholders participation, availability of port of KPIs
Establishment of Port User Group / Forum	Establishment of Port User Groups/ forums for Beira and Nacala ports	Beira port (Cornelder), Nacala port (CDN), CFM, port users, business associations, USAID, development partners	Port users informed on operational and policy decisions by operators and government agencies; consideration of users' challenges; implementation of decisions.	2012-2013	Effective stakeholders participation
Establish Beira and Nacala ports KPIs	Establishment of KPIs for the CFM and Government Ministry of Transport, for management and evaluation of ports performance, and their publication.	Beira port (Cornelder), Nacala port (CDN), CFM, port users, business associations, USAID, development partners	Framework of port KPIs	2012-2013	Effective stakeholders participation and relevant statistics availability
Integrated port management system	Introduce a port management system linked to an advanced container information management	Beira port (Cornelder), Nacala port (CDN), CFM,	Integrated port management system and	2012	Availability of funds and port operator

	and tracking system	development partners	tracking system.		commitment
Acquire additional port handling equipment	For Nacala, acquisition of more and new equipment, which include reach stackers, tug masters, trucks, tractors, forklifts, cranes etc.	Beira port (Cornelder), Nacala port (CDN), CFM, development partners	Improved ports operational efficiency and productive capacity	2012	Availability of funds and port operator commitment
Create port entry and exit gates	Create two gates for port entry and exit	Beira port (Cornelder), Nacala port (CDN), CFM	Improves traffic flow inside port; eliminated traffic jams and congestions inside port	2012	Ports operators and CFM commitment
Shipping Developments					
Establishment of Shipping Councils	Establish Beira and Nacala ports shipping councils.	Port operators, shipping lines, MOT, CFM, shippers (exporters & importers); clearing & forwarding agents, USAID, other development partners	Lower/optimal local charges; port operators collect THC/ stevedore charges; increased efficiency on ships operations; increase trade	2012-2013	Effective stakeholders participation
Establishment of maritime regulatory authority	Establish a market oriented regulatory authority	MOT, CFM	Optimal maritime charges	2012	MOT institutional establishment and legislation review
MRA					
Review of customs	Review of customs regulations to allow cargo pre-clearance of goods; eliminate scanning	MRA (customs), Ministry	Cargo pre-clearance (repeal	2012	Full legislation

regulations	charges of goods; eliminate SEWS charges; regulation on clarity on random scanning; fully harmonization and repeal of regulations; published and increased regulations availability	of Finance	of 'contramarca'); removal of scan charges ; removal of SEWS charges; clarity for random scanning; fully harmonized and repealed regulations; published and increased regulations availability; current accounts scheme for scanning services		review
Establishment of customs forum	Establish customs forum that brings together all stakeholders involved in undertaking customs formalities.	Customs, Ministry of Finance, stakeholders, USAID, other development partners	Permanent committee that meets regularly to discuss issues involving customs facilitation.	2012-2013	Effective stakeholders participation
Prepare Standard Operating Procedures Manual	Prepare a Standard Operating Procedures Manual for all customs clearance regimes	Customs, Ministry of Finance, stakeholders, USAID, other development partners	Standard Operating Procedures Manual produced, updated, and made available to all customs officers, transit agents and	2012-2013	Stakeholders participation, dissemination/ availability and sensitization

			brokers at the clearing points		
Special Export Terminals	Provide market access and open registration for special export terminals	Customs, Ministry of Finance,	Elimination of monopoly on special export terminal services; optimal service level and competitive prices	2012	Legislation review for open market registration of special export terminals
Establish and publicize toll free line	Establish and publicize a toll free line for reporting incorrect practices.	MRA	Toll free line; cases of malpractice reporting		Publicize and Stakeholders participation
Border Points					
Establish one-border posts	Support establish one-border posts on Beira and Nacala corridors to reduce clearing time by minimizing duplication of processes	Customs, Ministry of Finance, USAID, other development partners	One-border posts on Beira and Nacala; reduced border clearing time	2013	Funds availability and legislation provision
Implement the SADC trade and transport facilitation instruments	Harmonization of SADC trade and facilitation instruments on documentation and processing for cargo, vehicles and persons crossing the borders	MRA	Harmonized documents and cargo clearing procedures for cargo, vehicles and persons crossing the borders	2012	Domestication and integration of SADC trade and transport facilitation requirements into national legislations
Increased border points facilities and services	Invest on information and other facilities at the borders	Customs, Ministry of Finance, development partners	Border posts online customs integrated services;	2012	Funds availability

			adequate business and administration office structures; adequate parking and inspection areas; adequate security		
Roads					
Rehabilitation of poor road links	Identify and rehabilitation poor road sections along Beira and Nacala corridors	ANE, MOT, development partners	Rehabilitation of Beira-Inchope (135km), Mocuba-Milange (192km), and Nampula-Cuamba-Mandimba-Lichinga (748km)	2012	Adequate funding available
Weighbridges for overload control	Repair and install adequate weighbridges for overload control	ANE, MOT, development partners	Adequate and operational weighbridges installed on Beira and Nacala corridors	2012	Adequate funding available
Railways					
Improvement management and operation of railway systems	Acquire additional wagons, locomotives and upgrading of rail tracks	CFM, CDN, Vale, development partners, strategic investors	Increased availability of wagons and locomotives; Improved	2012	Strategic investor and adequate funding available

			turnaround times; improved track capacity; reduction of operation costs; reduction of tariffs		
Establish key performance indicators (KPIs) for railway transport system	Support establishment of key performance indicators (KPIs) for the CFM and Government Ministry of Transport, for management of railway systems and their publication.	CFM, CDN, Vale, business associations, USAID, other development partners	Railway system key performance indicators (KPIs) tools	2012-2013	Railways operators and CFM maintains adequate statistical data available

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Work Plan Activity: 1.2.2 D. USAID Southern Africa Trade Hub

ANNEX 1: LIST OF CONTACTS

Field Contact List for Logistic Assessment of Beira and Nacala Corridor

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ANNEX 2: STATEMENT OF WORK

Logistics Review of the Beira and Nacala Corridors

March 5, 2012

I. BACKGROUND

A. AgriFUTURO

The purpose of the USAID AgriFUTURO Program is to increase Mozambique's private-sector competitiveness by strengthening targeted, agricultural value chains. The Project focuses on value chain development as a means of creating incentives to improve the Enabling Environment, expand and strengthen business development services, build linkages between agribusinesses and financial services providers, and increase and strengthen public/private partnerships. The USAID AgriFUTURO Program will leverage innovations and improvements in specific value chains to improve the competitiveness of Mozambican agribusiness in general and, specifically, to bring about change in the overall business environment.

The USAID AgriFUTURO Program supports the USAID Mozambique Mission's strategic objective of "Broad-based, rapid economic growth sustained through expanded capacities and opportunities" and is part of the Mission's Rural Income Program.

The project is implemented by Abt Associates focusing assistance on a target group of high-potential, agricultural value chains.

The project is comprised of four components:

1. Improve the Enabling Environment for Agribusinesses;
2. Expand and Strengthen Agribusiness Development Services;
3. Build Linkages to Financing Services for Agribusiness Development; and,
4. Increase and Strengthen Public-Private Partnerships

B. Southern Africa Trade Hub (SATH)

The overall goal of the SATH is to increase international competitiveness, intra-regional trade, and food security in the Southern African Development Community (SADC) region. SATH will deliver targeted technical assistance to government, the private sector, and civil society organizations in support of advancing regional integration and increasing the trade capacity of selected value chains within Southern Africa. As a regional program working across the 15 member states of SADC the project will address regional issues[8]. These include:

- Strengthening the technical and management capacities of the SADC Secretariat and other regional bodies that promote trade and address food security;

[8] As a regional project, SATH will focus on interventions that have either a cross-border or regional impact. SATH does not envisage working with individual firms or farms as these tasks are more suited to a bilateral project, however, we will work with producer associations, groups of firms/exporters to reduce trade costs.

- The provision of technical assistance aimed at reducing trade costs through harmonizing policy, enhancing regulatory efficiency, and improving delivery in both the public and private service sectors (e.g., energy, finance, investment, Information and Communication Technology (ICT)) ;
- Continuing to support trade corridors to expand trade opportunities; and
- Development of regional information sharing and monitoring networks for market information and the sharing of 'best practices' which is an effective incentive for encouraging regulatory and policy reform.

SATH will provide technical assistance and training on a demand-driven basis in support of the regional trade agenda while working to promote increased private sector competitiveness along four value chains within the region. Country level policy level harmonization and regulatory reform will reduce trade costs and spur increased intra-regional trade and also exports under the African Growth and Opportunities Act (AGOA) and trade with the rest of the world. SATH has two key objectives and eight Intermediate Result (IR) areas:

Objective 1: Advancement of the Regional Integration Agenda

IR 1.1: Enhanced Trade Liberalization; IR 1.2: Improved Trade Facilitation in Transit, Customs, and Other Areas; IR 1.3: Alignment of Regional Agricultural and Other Standards with International Standards; IR 1.4: Strengthened Regional Capacity for Energy Sector Planning and Cooperation.

Objective 2: Increased Trade Capacity of Regional Value Chains

IR 2.1: New Trade Linkages Established and Greater Competitiveness in Staple Foods and Other Strategic Value Chains; IR 2.2: Enhanced Private Sector Capacity to Comply with Regional and International Market Standards, Including Agricultural Standards; IR 2.3: Increased Use and Availability of Financial Products and Services for Trade and Investment; IR 2.4: Increased Use and Availability of Trade-Related ICT Products.

This Assessment Activity also helps keep off-the SATH Ports Efficiency Improvement Program for the Ports of Beira and Nacala. Findings of the Regional Trade Facilitation Needs Assessment undertaken in the first year have revealed that over 65% of the time goods take to go through SADC transport corridors is spent at the port indicating the need to improve port efficiency and reduce delays in order to reduce transport costs and transit times through these corridors. Durban takes an average of just over 6 days to clear, albeit at a higher cost while Beira and Nacala ports stand out as being slow to clear and expensive. Through the Ports Efficiency Improvement Program, in coordination with the SATH Value Chain team, the Trade Facilitation team will unpack the causes of the poor performance of the Nacala and Beira ports with the view of sharing some of the best practices from the Durban port in order to reduce the delays at these ports. In this respect, SATH will establish and work with other donors already involved in improving the operations at these ports which are located in the "Feed the Future" country Mozambique and are critical for increasing food security in the SADC region. Reduction in port dwell time and other port related charges through legal and regulatory reforms as was done in Durban will reduce the cost of doing business through the SADC transport corridors.

II PURPOSE AND OBJECTIVES OF THE ASSIGNMENT

Through this SOW, AgriFUTURO and SATH propose to employ the services of a Team of analysts to assess the efficiency of Beira Corridor Logistics, culminating in the operations at the Port of Beira itself, and to revisit previous studies already conducted by AgriFUTURO pertaining to the Port of Nacala. With reference to the latter, a quick revisit

of the Nacala study conducted in 2010 to reassess the study's findings and recommendations, and a quick update of the "critical path" review of Nacala recently conducted using Matanuska bananas as a case study are considered. In parallel with this effort, a detailed assessment of the critical path for exports and imports through the Beira Corridor will be conducted (see below). Studies conducted by the Beira Agricultural Corridor Group (BAGC) and TradeMark Southern Africa (TMSA) will be reviewed. These components will form parts of an overall analysis to be conducted by the external consulting team, contracted by SATH and AgriFUTURO, to provide a macro overview of the logistics of both the Nacala and Beira Corridors, and of the impact that current inefficiencies and resulting high costs have on agribusiness in Mozambique and its immediate neighbors. For SATH, this analysis should identify interventions necessary to improve the efficiency of these ports that SATH could undertake.

Beira and, increasingly Nacala, are a key component to regional agricultural competitiveness. This affects both product moving in (such as fertilizer, wheat, and soy cake) and out (maize, cotton, peas, sugar and various fruits).The ports are points of entry for the fertilizer requirements of the region. They are also the key to deep water exports of agricultural commodities from the region. An assessment of the current operating environment and future infrastructural requirements is essential in order to position the ports for the expanding commodity exports from Mozambique and the region. Maize surpluses in Malawi, Mozambique and Zambia will continue to grow under their respective input subsidy programs. Exports of legumes from the region have increased substantially and will continue to grow. Currently much of the regional commodity exports are routed through Durban, already a congested port. Fertilizer imports are routed via South Africa adding substantially to their cost. The study will determine why these anomalies exist and what needs to be done in order to enhance the performance and utilization of the ports. Part of the macro overview will be to share best practices from the port of Durban, in order to reduce delays and enhance efficiencies at the targeted ports through regulatory reforms similar to those undertaken in Durban.

Support for this assessment has been obtained from Mozambican institutions including IPEX (Institute for the Promotion of Export), ACIS (Associação Commercial e Industrial de Sofala), BAGC (Beira Agricultural Growth Corridor) and FrutiCentro, all of whom have an interest in improving the operations of Beira. On a regional basis support has been obtained from the private sector (fertilizer and commodity traders) and USAID missions in Malawi and Zambia.

AgriFUTURO/SATH believe that improving port and regional logistic efficiency will enhance regional competiveness both in terms of reducing input prices as well as reducing export costs. This in turn should improve regional margins and enhance food security.

III. SCOPE OF WORK -SPECIFIC TASKS AND RESPONSIBILITIES

SATH will place emphasis on a macro level overview of the various logistics components and their impact on agribusiness competitiveness in Zambia and Malawi. AgriFUTURO will complete a micro level review of the impact of current inefficiencies in the logistics system that culminates in the port of Beira to along the lines of a similar review already conducted for the port of Nacala.

The assessment will look at the efficacy and costs of using Beira and Nacala ports and the impact they have on Mozambican and regional agricultural competitiveness.

What must be determined empirically is:

1) The cost chain of moving product from farm source, through processing (if appropriate and if not then in bulk) to FOB ship including any road tax, customs and port handling charges.
2) The cost chain of bringing product in (fertilizer or other major inputs).
3) Current port capacity and efficiency (number and size of gantries, container movements, relevant bulk handling equipment, storage, frequency of sailings etc.).
4) Establish the modal split by road and railway of goods entering and exiting the port, including the port's capacity and efficiency in clearing inland cargo for export and import.

What is needed to establish this is:

1) Cost chain analyses to determine where the major costs in movements occur. For example, is there a disproportionate cost in port service fees, transportation and handling both to and within the ports, storage, ship agency and other processing fees, demurrage costs, customs fees, freight/trucking costs, availability of empty containers, dry port costs etc.? The findings could then be utilized focus effort on those areas where the greatest impact could be had either through modifications of procedures, through investment in equipment or fixed infrastructure, policy changes, provision of information, etc.
2) Forward planning for both Beira and Nacala to optimize investments recently made or now contemplated. For example, extensive investment has recently been made in the port of Beira to improve coal handling capacity, but what other infrastructure needs are there to handle other commodities? And how does one ensure that the port does not become locked into coal to the detriment of other commodities? Similarly, major capital investment is contemplated for the Port of Nacala in the intermediate term future, but (a) is it sufficiently broad based to cover a wide range of potential products or is it, as in the case of recent, major investments in the port of Beira, highly specialized; and (b) while awaiting the improved infrastructure what improvements can be made operationally with existing assets to enhance the port's efficacy?

The analyses will include a detailed case study on fertilizer imports into Mozambique and the region and exports of dhal/pigeon peas from Malawi and Mozambique. The study will track the commodities from the point of initiation to end destination (warehouse in Zambia and Malawi or on board a ship for exports) detailing each step along the way (the components of a critical path review), with timeline and cost summaries accompanying the description of the steps in the process. The analysis of each step should show a) what is claimed by the service providers, b) what is actually taking place, and c) highlight the opportunities for improvement.

IV: DELIVERABLES

1. **Inception Report:** There will be a Project inception meeting for all team members. It is proposed that this meeting be held in Beira in early March 2012. At the meeting an inception report from the Team Leader highlighting the methodology to be used for the critical path analysis and the commodities to be tracked will be provided. The inception report will also advance the essential steps to be considered in the critical path analysis and all previous studies and reports that are to be reviewed.
2. **Draft Final Report** to be submitted to both SATH and AgriFUTURO by 1st Week of June, on the findings and recommendations and forward planning.

3. **Workshop:** Key findings of the assessment will be presented by the team at a workshop in Beira.
4. **Final Report**: Incorporate comments from the workshop to produce final assessment report. Final Report to be co-authored by both the SATH Regional Logistics Specialist (RLS) /Transport Economist (TE)and the Port Specialist with support to both provided by the Commodity Trade Specialist and the Customs Specialist on their findings and recommendations. (The data collectors will work under the direction of the RLS/TE and/or the port specialist, as appropriate).

V: CONSULTANCY TEAM AND SKILL SETS REQUIRED

The individuals/skill sets required by the Team tasked to conduct this study will include:

1. A **RLS/Transport Economist will be the Team Leader** to review the efficiency and associated costs associated with movement of goods into and from the port; to project these costs to a macro level in the various markets served, and to arrive at recommendations for practical improvement.
2. A bilingual (English/Portuguese) P**ort Specialist** (to assess or reassess the efficiency with which cargo is moved in and out through the ports, whether in break-bulk or loaded into containers, the various discharge and loading steps and related costs, handling efficiencies at all stages of the loading and discharge process, and to conduct an assessment of actual or currently planned infrastructure to cope with expected demand for services, and last but not least the fee structures of the ports and related service entities). Recommendations for improvement would be part of this individual's task description.
3. A bilingual (English/Portuguese) C**ustoms Specialist** to review the cargo clearance procedures and assess its suitability within the context of the region.
4. A bilingual (Portuguese/English) **Commodity Trade Specialist** (to work with both of the above in determining the real market costs associated with market prices for both imports and exports and the real impact current inefficiencies and high costs are having on national and regional trade).
5. As needed, up to two, bilingual (Portuguese/English, with only basic proficiency in the latter being required) **Data Collectors** to actually observe time and cost factors empirically in the proposed case study working under the supervision of the transport economist/RLS and/or the port specialist as appropriate and needed.

VI: PROJECT LEADERSHIP

The proposed team would work under the supervision of the **SATH Senior Transport and Trade Facilitation Advisor**, who will coordinate closely with the **AgriFUTURO, Director for the Enabling Environment**. The final report is to be delivered to both AgriFUTURO and SATH against timelines set at the project inception meeting.

VII: LEVEL OF EFFORT

The period of performance will be from February to end of June 2012 with total LOE allocated as follows:

- 45 working days for the Transport Economist/RLS (Team leader);
- 30 working days for the Ports Specialist;

- 20 working days for the Customs Specialist;
- 20 days for the Commodity Trade Specialist, and
- 20 days each for the data collectors (National).

Total Project man days: 145

ANNEX 3: A BEIRA PORT TRAFFIC DATA

Containers handled in TEU'S, 2006-2011

	2006	2007	2008	2009	2010	2011
TOTAL TRAFFIC	**54,268**	**71,167**	**85,716**	**92,236**	**105,707**	**160,222**
CABOTAGE	**2,059**	**4,965**	**3,140**	**1,207**	**126**	**-**
LOAD	**1,926**	**3,187**	**1,860**	**851**	**126**	**-**
Sugar	556	1,236	488	236	-	-
Fertilizer	-	-	161	18	-	-
Chemical products	-	-	-	32	-	-
Various	48	243	204	22	1	-
Empty	1,322	1,708	1,007	543	125	-
UNLOAD	**133**	**1,778**	**1,280**	**356**	**-**	**-**
Sugar	-	1,136	598	356	-	-
Various	132	74	226	-	-	-
Empty	1	568	456	-	-	-
MOZ. INTERNATIONAL	**27,076**	**33,346**	**44,181**	**50,493**	**51,169**	**85,884**
EXPORT	**12,748**	**12,798**	**24,690**	**26,097**	**26,655**	**51,601**
Prawns	405	477	343	345	380	112
Tobacco	3,454	3,099	3,562	4,114	3,701	1,394
Cotton	656	947	952	612	415	30
Sugar	421	127	215	126	-	-
Timber Loggs	726	1,348	1,363	207	346	722
Sawn Timber	418	767	2,267	3,959	7,752	6,006
Scrap	666	701	642	283	256	186
Nuts	-	-	98	10	5	-
Sesam	216	431	480	1,234	323	-
Soya Beans	-	-	1	10	255	15
Beans	-	-	8	564	158	514
Chemical products	-	-	-	103	-	-
Granite	80	1	-	-	33	13
Cashew Nuts	-	-	-	-	302	120
Various	793	376	792	321	318	156
Empty	4,913	4,524	13,967	14,209	12,411	11,666
IMPORT	**14,328**	**20,548**	**19,491**	**24,396**	**24,514**	**34,283**
Various	9,038	15,563	17,446	17,019	17,981	12,719
Empty	5,290	4,985	2,045	7,377	6,533	3,624

TRANSIT	**25,133**	**32,856**	**38,395**	**40,536**	**54,412**	**74,338**
ZIMBABWE	**6,587**	**6,980**	**5,651**	**8,960**	**18,936**	**25,472**
EXPORT	**4,316**	**4,130**	**2,526**	**3,618**	**8,361**	**9,486**
Cotton	203	111	76	16	69	332
Tea	263	24	-	107	212	168
Coffee	26	6	14	1	-	3
Tobacco	1,990	1,115	485	924	516	269
Graphite	220	328	161	156	157	103
Asbestos	-	-	-	-	-	-
Extracts	197	174	151	136	154	98
Vermiculite	505	642	549	540	864	441
Steel	9	-	-	-	-	-
Chrome	-	-	-	-	4,232	1,436
Copper	264	337	-	79	72	1
Nickel	7	7	2	32	76	31
Sawn Timber	30	108	57	79	-	277
Sugar	18	46	90		-	-
Granite	380	475	386	118	190	130
Cobalt	-	3	-	1	30	-
Petalite	-	263	292	176	-	10
Ferro-Chrome	3	66	144	1,220	1,601	2,507
Various	201	425	119	33	181	92
Empty	-	-	-		7	-
IMPORT	**2,271**	**2,850**	**3,125**	**5,342**	**10,575**	**15,986**
Various	2,271	2,850	3,124	5,337	10,378	6,843
Empty	-	-	1	5	197	10
MALAWI	**15,076**	**22,201**	**25,463**	**25,950**	**26,863**	**35,192**
EXPORT	**7,992**	**14,511**	**10,345**	**12,644**	**13,294**	**11,831**
Sugar	391	923	281	191	78	60
Coffee	1	8	8	9	4	8
Tobacco	6,042	10,562	7,721	8,210	9,076	3,681
Cotton	44	120	101	757	1,284	114
Tea	1,044	1,432	1,321	1,206	1,316	210
Chilly	5	31	31	54	39	11
Nuts	24	35	41	16	6	-
Toordhall	190	1,155	208	1,763	1,254	156
Sesame	-	-	-	22	-	-

Sawn Timber	-	-	115	3	50	182
Animal Skins	-	-	19	29	23	34
Household goods	-	-	-	50	43	36
Stones	-	-	-	-	3	9
Various	187	240	294	334	118	272
Empty	64	5	205	-	-	20
IMPORT	**7,084**	**7,690**	**15,118**	**13,306**	**13,569**	**23,361**
Various	6,631	7,596	15,118	13,306	13,568	7,957
Empty	453	94	-	-	1	65
ZAMBIA	**3,099**	**3,444**	**7,170**	**5,529**	**8,523**	**13,665**
EXPORT	**676**	**822**	**753**	**1,167**	**2,410**	**3,763**
Copper	-	-	2	313	636	423
Tobacco	121	28	66	12	120	4
Cotton	352	300	318	400	170	2
Sugar	203	494	332	36	24	-
Sawn Timber	-	-	35	160	434	227
Manganese Ore	-	-	-	-	859	438
Ferro-Chrome	-	-	-	-	15	-
Cobalt	-	-	-	-	76	14
Various	-	-	-	246	76	8
IMPORT	**2,423**	**2,622**	**6,417**	**4,362**	**6,113**	**9,902**
Various	2,419	2,622	6,417	4,362	6,112	3,624
Empty	4	-	-	-	1	7
BOTSWANA	**21**	**-**	**-**	**-**	**-**	**-**
EXPORT	**21**	**-**	**-**	**-**	**-**	**-**
Various	21	-	-	-	-	2
IMPORT	**-**	**-**	**-**	**-**	**-**	**-**
Various			-	-	-	-
D.R. CONGO	**350**	**231**	**111**	**97**	**90**	**9**
EXPORT	**113**	**33**	**-**	**-**	**25**	**-**
Copper	113	33	-	-	23	-
Various	-	-	-	-	2	-
IMPORT	**237**	**198**	**111**	**97**	**65**	**9**
Various	237	198	111	97	65	-

Source: Cornelder, 2012

ANNEX 4: BEIRA PORT TRAFFIC DATA

General Cargo Handled in Metric Tons, 2006-2011

	2006	2007	2008	2009	2010	2011
TOTAL TRAFFIC	**1,240,183**	**1,102,963**	**946,754**	**981,057**	**1,291,961**	**1,921,460**
CABOTAGE	**5,563**	**10,570**	**4,953**	**3,431**	**2,264**	**279**
LOAD	**3,834**	**3,776**	**1,688**	**939**	**-**	**-**
Foodstuffs	-	-	-	23	-	-
Sugar	-	-	-	-	-	-
Coal	600	1,236	574	-	-	-
Fertilizer	1,200	2,524	1,114	-	-	-
Other Products	2,034	16	-	916	-	-
UNLOAD	**1,729**	**6,794**	**3,265**	**2,492**	**2,264**	**279**
Fish	516	1,681	2,635	2,492	2,264	279
Sugar	-	-	-	-	-	-
Clinker	-	1,271	-	-	-	-
Coal	1,213	3,842	-	-	-	-
Vehicles	-	-	-	-	-	-
Other Products	-	-	630	-	-	-
MOZ. INTERNATIONAL	**441,823**	**465,195**	**389,389**	**385,274**	**474,630**	**832,133**
EXPORT	**113,054**	**71,597**	**57,634**	**4,571**	**10,996**	**255,827**
Cotton	-	-	287	-	-	-
Sugar	36,008	17,351	-	-	-	-
Sawn Timber	-	-	20,040	-	-	-
Timber Loggs	38,969	20,682	19,219	-	-	-
Scrap	38,077	12,932	17,386	4,101	10,996	9,198
Granite	-	16,780	-	-	-	-
Coal	-	-	-	-	-	-
Other Products	-	3,852	702	470	-	168
IMPORT	**328,769**	**393,598**	**331,755**	**380,703**	**463,634**	**576,306**
Rice	85,179	40,397	24,174	51,595	20,509	19,564
Wheat	74,076	78,055	82,884	78,753	134,917	85,438
Maize	4,400	-	-	-	-	32,294
Cement	-	-	-	64,188	36,292	70,102
Clinker	111,325	148,358	183,239	126,560	227,118	22,517
Fertilizer	23,646	72,959	6,000	22,716	8,485	4,231
Fish	-	-	5,258	6,764	10,758	2,064

Vehicles	96	1,044	-	-	-	39,966
Other Products	30,047	52,785	30,200	30,127	25,555	-
TRANSIT	**792,797**	**627,198**	**552,412**	**592,352**	**815,067**	**1,089,048**
ZIMBABWE	**472,739**	**356,313**	**207,508**	**195,965**	**343,685**	**328,879**
EXPORT	**194,632**	**184,385**	**122,494**	**127,410**	**112,703**	**135,562**
Asbests	-	3,647	-	-	-	-
Wheat	-	-	-	-	-	-
Maize	-	-	-	-	-	-
Granite	176,194	170,437	122,494	127,410	98,675	62,003
Steel	10,059	2,749	-	-	-	-
Corundium Ore	88	4,847	-	-	-	-
Chrome Ore	-	-	-	-	5,520	17,260
Ferro Chrome	-	-	-	-	8,508	-
Vermiculite	3,771	2,705	-	-	-	-
Sawn Timber	-	-	-	-	-	-
Other Products	4,520	-	-	-	-	-
IMPORT	**278,107**	**171,928**	**85,014**	**68,555**	**230,982**	**193,317**
Fertilizer	41,696	103,487	33,977	34,857	124,582	2,000
Rice	810	4,898	-	8,817	24,207	-
Wheat	52,764	62,043	42,833	15,571	56,097	40,008
Maize	165,494	-	-	2,736	23,882	-
Corn Soya	2,222	-	-	36	-	13,093
Sugar	-	-	993	-	-	-
Vehicles	-	-	1,887	883	822	-
Tallow	-	-	-	-	-	6,568
Acid Fat	-	-	-	-	-	-
Palm Oil	-	-	-	-	-	-
Other Products	15,121	1,500	5,324	5,655	1,392	403
MALAWI	**237,805**	**198,841**	**262,751**	**286,714**	**361,845**	**457,107**
EXPORT	**21,774**	**13,037**	**11,293**	**21,538**	**997**	**168,525**
Sugar	21,774	13,037	11,293	21,538	997	16,183
Mineral Sand	-	-	-	-	-	8,561
Other Products	-	-	-	-	-	495
IMPORT	**216,031**	**185,804**	**251,458**	**265,176**	**360,848**	**288,582**
Fertilizer	52,977	113,390	118,930	134,788	246,177	64,735
Wheat	111,636	68,641	83,867	104,161	109,167	-
Maize	24,064	-	2,668	20,578	-	2,900

Corn Soya	10,125	3,773	1,183	4,544	4,435	23,945
Clinker	-	-	44,810	-	-	-
Tallow	-	-	-	-	-	-
Acid Fat	-	-	-	-	-	-
Palm Oil	-	-	-	-	-	-
Other Products	17,229	-	-	1,105	1,069	5,916
ZAMBIA	**81,503**	**72,044**	**82,153**	**108,665**	**108,516**	**303,062**
EXPORT	**22,321**	**26,517**	**55,590**	**29,547**	**6,898**	**116,954**
Copper	-	-	-	-	-	-
Sugar	22,321	26,517	55,590	29,547	6,898	37,745
Maize	-	-	-	-	-	2,950
Manganese Ore	-	-	-	-	-	-
Other Products	-	-	-	-	-	-
IMPORT	**59,182**	**45,527**	**26,563**	**79,118**	**101,618**	**186,108**
Wheat	1,937	11,350	-	-	-	-
Fertilizer	29,525	27,678	25,963	78,610	101,618	123,910
Corn Soya	13,499	500	-	-	-	-
Rice	-	-	-	500	-	-
Other Products	14,221	5,999	600	8	-	4,065
BOTSWANA	**-**	**-**	**-**	**-**	**-**	**-**
EXPORT	**-**	**-**	**-**	**-**	**-**	**-**
Other Products	-	-	-	-	-	-
IMPORT	**-**	**-**	**-**	**-**	**-**	**-**
Other Products	-	-	-	-	-	-
D.R. CONGO	**750**	**-**	**-**	**1,008**	**1,021**	**-**
EXPORT	**-**	**-**	**-**	**-**	**-**	**-**
Scrap	-	-	-	-	-	-
Other Products	-	-	-	-	-	-
IMPORT	**750**	**-**	**-**	**1,008**	**1,021**	**-**
Corn Soya	-	-	-	505	693	-
Other Products	750	-	-	503	328	-

Source: Cornelder, 2012

ANNEX 5: BEIRA PORT PRODUCTIVITY DATA

Beira Port Productivity Indictors, 2006-2010

			2006	2007	2008	2009	2010
Containers							
	TEU's / Hour Gross		12.6	11.2	11.8	13.3	8.6
	TEU's / Day Gross		302.5	267.8	316.8	319.6	207.0
	TEU's / Hour Net		18.2	15.8	14.0	17.6	10.4
	TEU's / Day Net		435.7	380.2	386.5	422.5	250.0
			0.0	**0**	**0**	**0**	**0**
Tons/Gang Hour Net			0.0	**0**	**0**	**0**	**0**
	Bagged cargo		25.6	25.1	22.3	21.3	21.9
	Bulk cargo		36.6	36.6	33.9	32.7	33.8
	Granite		51.1	47.9	54.3	45.0	48.6
	Steel		55.2	31.1	93.9	-	-
	Scrap Metal		22.2	22.3	19.2	22.3	21.9
	General cargo & others		19.3	12.5	37.2	13.4	15.8
			0.0	**0.0**	**0.0**	**0.0**	**0.0**
Tons/Gang Hour Gross			0	**0**	**0**	**0**	**0**
	Bagged cargo		23.2	21.6	19.7	24.5	26.4
	Bulk cargo		28.4	28.9	29.7	37.3	41.9
	Granite		40.1	37.2	45.3	55.7	61.6
	Steel		49.6	26.3	93.9	-	-
	Scrap Metal		20.4	21.0	17.0	23.8	23.6
	General cargo & others		16.1	11.4	22.9	16.4	20.4
			0.0	**0.0**	**0.0**	**0.0**	**0.0**
Dwell time - Import (days)			0	**0**	**0**	**0**	**0**
	Transit containers		22.7	32.4	25.8	14.6	19.5
	Local containers		14.3	48.0	22.7	18.9	21.6
	Empty containers		38.2	55.2	59.6	**33.4**	**34.8**
			0	**0.0**	**0.0**	**0.0**	**0.0**
Dwell time - Export (days)			0	**0.0**	**0.0**		

	Transit containers	20.0	81.7	25.2	20.8	32.8
	Local containers	15.9	42.1	23.2	23.2	21.8
	Empty containers	33.3	35.9	41.4	**0.0**	**0.0**

Source: Cornelder

Vessel calls at Beira, 2006-2011

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	
Vessel call (excl. Fishing vessel)							
Total	**292**	**304**	**304**	**254**	**285**	**296**	
Bulk	62	68	68	55	44	79	
Container Multipurpose	30	48	48	52	136	135	
General Cargo	174	122	122	118	90	82	
Reefer	18	1	1	-	-	-	
Ro-Ro	6	-	-	-	-	-	
Barge	2	44	44	24	15	-	
Other	4	21	21	5	-	-	

Source: Cornelder

ANNEX 6: NACALA PORT TRAFFIC DATA

INDICADORES / INDICATORS	2007	2008	2009	2010	2011
I. CARGA (10^3 Tons Métricas)	**951,596**	**875,935**	**1,049,753**	**1,155,375**	**1,354,368**
1. NACIONAL	**54,082**	**39,249**	**27,060**	**29,981**	**12,305**
1.1 Embarque / Loading	18,480	9,114	8,064	7,319	4,449
1.2 Desembarque / Discharge	35,602	30,135	18,996	22,662	7,856
2. INTERNACIONAL / INTERNATIONAL	**856,640**	**801,529**	**981,768**	**1,025,630**	**1,177,870**
2.1 Moçambique / Mozambique	**642,411**	**574,421**	**720,882**	**804,912**	**974,973**
2.1.1 Embarque / Loading	218,204	217,720	234,036	332,743	346,104
2.1.2 Desembarque / Discharge	424,207	356,701	486,846	472,169	628,869
2.2 Trânsito / Transit	**214,229**	**227,108**	**260,886**	**220,718**	**202,897**
2.2.1 Embarque / Loading	67,448	75,583	65,496	48,079	81,642
2.2.2 Desembarque / Discharge	146,781	151,525	195,390	172,639	121,255
3. OUTROS MOVIMENTOS / OTHER MOVES	**40,874**	**35,157**	**40,925**	**99,764**	**164,193**
3.1. Baldeacao / Transhipment	40,874	35,157	40,925	99,764	140,865
3.2 Rearrumcao / Restow	**0**	**0**	**0**	**0**	**23,328**
3.2.1 Externa / External					19,869
3.2.1. Interna / Internal					3,459

INDICADORES / INDICATORS	2007	2008	2009	2010	2011
CONTENTORES / CONTAINER (TEUs)	**44,687**	**49,770**	**53,199**	**71,112**	**89,714**
1. NACIONAL	**4,793**	**3,787**	**4,327**	**5,877**	**2,648**
1.1 Embarque / Loading	2,576	1,501	2,237	2,899	1,516
1.2 Desembarque / Discharge	2,217	2,286	2,090	2,978	1,132
2. INTERNACIONAL / INTERNATIONAL	**37,558**	**43,104**	**44,947**	**57,121**	**76,917**
2.1 Moçambique / Mozambique	**31,515**	**36,896**	**38,927**	**52,233**	**70,677**
2.1.1 Embarque / Loading	13,411	18,758	17,521	26,485	33,253
2.1.2 Desembarque / Discharge	18,104	18,138	21,406	25,748	37,424
2.2 Trânsito / Transit	**6,043**	**6,208**	**6,020**	**4,888**	**6,240**
2.2.1 Embarque / Loading	3,647	3,246	3,264	2,515	4,303
2.2.2 Desembarque / Discharge	2,396	2,962	2,756	2,373	1,937
3. OUTROS MOVIMENTOS / OTHER MOVES	**2,336**	**2,879**	**3,925**	**8,114**	**10,149**

3.1. Baldeacao / Transhipment	2,336	2,879	3,925	8,114	8,153
3.2 Rearrumcao / Restow	**0**	**0**	**0**	**0**	**1,996**
3.2.1 Externa / External					1,700
3.2.1. Interna / Internal					296

ANNEX 7: NACALA PORT PRODUCTIVITY DATA

ITEM	CFM					Ave.	CDN						Ave.	Difference	%
	2000	2001	2002	2003	2004		2005	2006	2007	2008	2009	2010			
1. Average berth occupancy/Month															
Container termnal berth	39.5%	37.6%	30.4%	33.6%	48.1%	37.9%	40.0%	27.7%	39.1%	44.8%	28.6%	35.4%	35.1%	-2.7%	-7.8%
General cargo berth	57.8%	47.2%	68.0%	44.2%	56.0%	54.7%	32.0%	58.5%	66.7%	36.4%	44.5%	36.4%	48.5%	-6.2%	-12.7%
Liquid terminal berth	9.5%	14.3%	7.7%	10.4%	15.6%	11.5%	19.0%	13.3%	13.2%	26.5%	18.1%	18.6%	17.9%	6.4%	35.8%
2. Vessel arrival rate per year (units)															
Container ships	122	128	169	161	147	145.40	136	113	115	98	111	145	116.40	(29.00)	-25%
General cargo ships	98	75	93	68	64	79.60	76	67	73	49	57	53	59.80	(19.80)	-33%
Tankers	39	41	32	33	50	39.00	51	50	57	58	68	76	61.80	22.80	37%
3.Turnaround time/Average vessel dwell time in port (hours)															
Container ships	14.0	43.2	37.7	31.6	66.6	38.62	48.0	45.6	64.6	88.9	90.8	61.8	70.34	31.72	45%
General cargo ships	7.4	181.2	161.2	116.6	151.6	123.60	163.0	177.2	166.8	138.7	151.4	112.4	149.30	25.70	17%
Tankers	43.7	80.6	70.6	65.0	72.3	66.43	70.1	65.5	85.3	79.8	77.1	55.7	72.68	6.25	9%
4. Service time/Average vessel berth time (hours)															
Container ships	56.0	50.7	31.1	36.1	56.6	46.10	53.4	42.4	58.7	79.0	44.6	42.2	53.38	7.28	14%
General cargo ships	102.0	108.8	126.3	112.4	151.2	120.13	138.1	150.8	158.0	128.2	135.0	118.7	138.14	18.01	13%
Tankers	42.0	60.4	41.8	54.7	53.8	50.54	50.6	45.9	39.9	79.0	46.1	42.2	50.62	0.08	0%
5. Average operational time (hours)															
Container ships	31.3	29.6	25.7	27.3	42.70	31.32	50.8	32.5	58.7	61.4	58.8	42.8	50.84	19.52	38%
General cargo ships	97.5	82.4	104.3	93.35	110.10	97.53	126.7	126.1	158.0	110.5	125.5	113.4	126.70	29.17	23%
Tankers	26.3	54	25.9	33.4		27.92							-	(27.92)	#DIV/0!
6. Productivity per vessel hour (Gross- berthing)															
Containers	8.0	3.3	6.0	7.0	7.0	6.26	7.0	6.0	6.0	6.0	6.0	8.0	6.40	0.14	2%
General cargo	25.0	35.8	40.1	87.5	93.2	56.32	42.0	72.0	93.0	122.0	106.0	124.0	103.40	47.08	46%
Tanks						-							-	-	#DIV/0!
7. Productivity per vessel hour (Net- operational)															
Containers	8.0	3.3	6.0	7.0	8.0	6.46	8.0	9.0	7.0	7.0	8.0	10.0	8.20	1.74	21%
General cargo	25.0	42.9	37.9	98.3	104.6	61.74	48.5	89.0	104.0	141.0	119.0	126.0	115.80	54.06	47%
Tanks						-							-	-	#DIV/0!
8. Average vessel dwell time / day															
Containers														0.0%	#DIV/0!
General cargo														0.0%	#DIV/0!
Tanks														0.0%	#DIV/0!
9. Cargo Throughput															
Containers (TEUs)	25,207	26,709	28,063	28,527	30,225	27,746.20	31,118	33,128	44,687	49,770	53,215	71,112	50,382.40	22,636.20	45%
General Cargo (TONs - MET 10^3)	672.866	743.108	761.829	743.300	905.143	765.25	744.514	809.131	951.596	875.935	1,049.980	1,155.418	968.41	203.16	21%
Liquids (TONs - MET)						-							-	-	#DIV/0!
10. Number of employees															
Numero de Trabalhadores	774	762	762	762	762	764.40	140	156	169	209	239	239	202.40	(562.00)	-278%
11. Throughput per employee															
Containers (TEUs)	33	35	37	37	40	36.31	222	212	264	238	223	298	247.02	210.71	85%
General Cargo (TONs - MET 10^3)	0.869	0.975	1.000	0.975	1.188	1.00	5.318	5.187	5.631	4.191	4.393	4.834	4.85	3.85	79%
Liquids (TONs - MET)						-							-	-	#DIV/0!

ANNEX 8: BEIRA PORT GATE CLEARANCE DOCUMENTS

Porto da Beira
Carga Geral

Cornelder de Moçambique S.A.

ENTRADA / IN	SAIDA / OUT	Nº GC	043672

VESSEL VOY C/M Nº	AGENT:
ORIGIN	DOCUMENT Nº:
DESTINATION	
TRANSPORT: TRUCK / VAGON_____	DATE:_____/_____/_____
DATE: _____/_____/_____	OFFICE SIGNATURE:_____

Marks and number, kind of Package and description of goods	Peso em Quilogramas Gross Weight	Medição / measurement and volume (CdM)

CORNELDER DE MOÇAMBIQUE
MAIN - GATE
ENTRADA
DATA: ____/____/____
ASSINATURA:

Location offload / load:

Remarks as to the condition
Observações:

S/L - short landed_____
B/K- Damaged / Broken_____
_____
OK - Good Condition_____

Tally clerk name / signature CdM	Assinatura da Entidade que Entrega / Levanta
Esta mercadoria foi Recebida / Levantada em boas condições excepto nos aspectos acima descritos	_____ Esta mercadoria foi Recebida / Levantada em boas condições excepto nos aspectos acima e condicionados aos agentes de acordo com que está regulamento pela CdM

G462 Dyllon - Beira Telef 23322545

Cornelder de Moçambique s.a.r.l.

Main Gate

Controlo de Cargas
Entradas / Saídas

Turno:_____ Data:_____/____/ 20____

	Nº de contentor	Tamanho	Matricula do camião	Transportador	Observações
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

G1245 Dyllon,Lda-Beira

Nome de segurança

CDM A-Check Truck instructions. 30/03/12 14:32:32

Call : 88145 No. Plate : AAL137MP Carrier operator : TRANA

LANE	Hdl Tp.	F E	Pos.	CONTAINER	Line POOL	ISO	Lg	Hg Wd	Tp Mat	CSC-G CSC-D	USAG QUAR
B020112D	IN	F	A	MSKU 705057 0	MSK	2210	20'	8'6 8'0	DV		OK
REF : BKG004250											
SEALS : 717227											
B020108D	IN	F	F	POCU 045715 4	MSK	2210	20'	8'6 8'0	DV		OK
REF : BKG004250											
SEALS : 0717229											

ANNEX 9: BEIRA AND NACALA PORT TARIFFS

Annex 2.F1 Container Handling Charges, 2012 (in USD)					
Description	**Unit**	**Beira Port**		**Nacala Port**	
Mineral Products		20'	40'	20'	40'[1]
Stevedoring	TEU	80.00	144.00	74.00	
Shore-Handling Charge	TEU	165.00	297.00	152.00	
Agricultural Products					
Stevedoring	TEU	80.00	144.00	85.00	
Shore-Handling Charge	TEU	185.00	333.00	197.00	
Products N.E.E. FCL					
Stevedoring	TEU	80.00	144.00	74.00	
Shore-Handling Charge	TEU	235.00	423.00	231.00	
Products N.E.E. LCL					
Stevedoring	TEU	80.00	144.00	74.00	
Shore-Handling Charge	TEU	55.00	55.00	231.00	
Reefer, Abnormal, Platform, & IMDG Containers					
Stevedoring	TEU	100.00	180.00	85.00	
Shore-Handling Charge	TEU	305.00	549.00	310.00	
Empty					
Stevedoring	TEU	70.00	126.00	65.00	
Stripping & Stuffing					
Granite, lose, one consignee, indirect (excluding lashing)	TEU	270.00	468.00		
Break bulk cargo, one, consignee direct	TEU	225.00	405.00		
Break bulk cargo, one, consignee indirect	TEU	245.00	441.00		
Break bulk cargo, one, consignee direct using machine >3 tons)	TEU	310.00	558.00		
Break bulk cargo, one, consignee indirect using machine >3 tons)	TEU	330.00	594.00		
Break bulk cargo, more than one, consignee direct	Port ton	12.00	12.00		
Break bulk cargo more than one, consignee direct	Port ton	15.00	15.00		
Storage					
Empty containers – Free Period	Days	3	3	7	
Empty containers – Following days	TEU	5.00	9.00		
Import Full Containers – Free Period	Days	5	5		

Import Full Containers – Free Period (National & Transshipment	Days	10	10		
Import Full Containers – Following days	TEU	20.00	36.00		
Export Full Containers – Free Period (National & Transshipment	Days	5	5		
Export Full Containers – Free Period (Transit)	Days	15	16		
Export Full Containers – Following days	TEU	8.00	15.00		
Empties with Refrigerated Cargo	Days			51.	
Empties with Goods NE	Days			7	
Empties with Goods NE –Following days	Days			8	

ANNEX 10: OTHER CONTAINER TERMINAL CHARGES, 2012 (IN US$)

Description	Unit	Beira Port		Nacala Port	
Shifting/Re-stowage		**20'**	**40'**	**20'**	**40'**
Internal or External	TEU	120.00	216.00		
Opening & Closing Hatches					
Opening or Closing	each	100.00	100.00		
Various					
Chargeable move	TEU	62.00	111.00		
Loading/Off-loading empty containers	TEU	45.00	81.00		
Connection and PTI fee	TEU x Days	30.00	54.00		
Control of temperature	Unit x Day	1.50	558.00		
Sweeping	TEU	10.00	18.0		
Steam cleaning	TEU	30.00	54.00		
Attachment/Removal of clip-on	each	15.00	15.00		
Administrative Debits					
Photocopying	each	1.00	1.00		
Late arrival of container in the terminal (after ɔsing stack)	Unit	150.00	150.00		
Late presentation of manifests or loading list	each	300.00	300.00		
Cancellation or alteration of invoice/documents	Doc	75.00	75.00		
Mis-declaration of container weight	Unit	175.00	175.00		
Cancellation or alteration with an additional move (stack)	Unit	100.00	100,00		
Alteration of container status from FCL to LCL or ɜe-versa	Unit	80.00	80.00		
Security Surcharge- ISPS					
Containers (only to be loaded)	Unit	6.00	6.00		

ANNEX 11: BENCHMARK ANALYSIS OF EAST AND SOUTHERN AFRICAN PORTS

For purposes of this assessment, benchmarks were used to assess the productivity and efficiency of the ports in eastern and southern Africa against six KPIs of Beira and Nacala Ports. Table below presents the results of the benchmarking analysis. It should be emphasized that benchmarks in the table were derived from 2010 data and represent only a snapshot of the ports in the survey. At the time of the initial report, more recent data were unavailable, and surely many of KPIs used for this benchmark analysis have changed.

1AICD Ports Data Base and individual port data for year 2010

Benchmarking Analysis (2010)					
Port	TEU Throughput ('000s)	Crane Productivity (Tons/hr.)	Crane Productivity (Moves/hr.)	Dwell Times (days)	Truck Cycle Time (hours)
Beira	105.7		8.6	19.5	6
Maputo	143.0		15	22	4
Nacala	71.1		8	30	6
Durban Container	2,510.0		22	3.93	0.58
Port Elizabeth	249.7		27	6	0.30
Cape Town	690.7		22	6	0.25
Durban Pier 1			21	6	0,25
Mombasa	696.0		15	5.7	10
Djibouti	800.0		28	8	12
Dar es Salaam	341.0		19	19	5
Global Best Practices[1]		**>30**	**20-30**	**<7**	**1**

Sources: AICD port database World Bank, Cornelder, CDN, Port Maputo, Transnet Port Terminals, Kenya Port Authority, Djibouti Invest, Ltd, Tanzania Port Authority, 2012

Crane Productivity

The international benchmark for crane productivity is 25 to 30 moves per crane hour for Panamax gantry cranes[9]. The results of the benchmarking analysis in table above reveals that the Port of Djibouti was the "best in class" for crane

[9] The type of crane deployed by the port operator is a major factor affecting in term of the physical limitations of crane productivity resulting varying productivity results. Industry benchmarks of crane production for different crane types are: (i) a Post Panamax gantry cranes is 35 to 45 lifts per hour; (ii) a Panamax gantry crane is 25 to 30 lifts per hour; (iii) a port mobile crane is 18 to 25 lifts per hour; and (iv) ship's gear 8 to 15 lifts per hour.

productivity at 28 moves per hour. The South African Port of Elizabeth at 27 crane moves per hour followed the Port of Djibouti. Tied for third place were Durban Container Terminal (DCT) and the Port of Cape Town at 22 moves per crane hour. Nacala and Beira Ports that are the subject of this assessment had a dismal crane productivity performance at 8.6 and 4.0 crane moves per hour, respectively. Such low crane rates are approximately 3.3 and 7 times less efficient respectively than the Port of Djibouti. Beira and Nacala Ports were between respectively 3.1 to 2.6 and 6.7 to 5.5 times less efficient in crane productivity than any of the three South African ports. However, it should be pointed out that the type of crane deployed by the port operator is a major factor that affects crane productivity. Industry benchmarks of crane productivity for different types of cranes are: (i) a Post Panamax gantry crane is 35 to 45 lifts per hour; (ii) a Panamax gantry crane is 20 to 30 lifts per hour; (iii) a port mobile crane is 18 to 25 lifts per hour; and (iv) ship's gear is 8 to 15 lifts per hour. Both ports rely heavily on ships gear to load and discharge cargo and despite their average crane rates.

Dwell Time

The Nacala and Beira Ports underperformed in 2010 when considering container dwell times. The "*best in class"* in dwell time performance was Durban Container Terminal. DCT's average dwell time was under 4 days (3.93 days to be exact). This is well in the in line with international standards of 3 to 4 days. By comparison, dwell time performance by Beira and Nacala Ports were disappointingly 19.5 days and 26 days respectively. Durban Container Terminal was almost 6 more efficient than Nacala Port and almost 7 times more efficient than Beira port.

Truck Cycle Time

Table below shows the benchmarks on truck cycle time for each port in the study. However, the available benchmark data reveal yet another disappointing story for Beira and Nacala Ports. In 2010, Durban Pier 1 and the Port of Elizabeth had the *"best in class"* performance for average truck cycle times at 15 and 18 minutes, respectively. These are remarkable results because the international standard, which all ports try to achieve, is under one-hour. And by comparison, the average truck cycle time for Beira and Nacala Ports were in the range of 6 hours and tended to go as high as one full day.

As we have already suggested, many factors, including those that are external and those that internal to the port operator's control, influence port performance. The primarily focus of this assessment was on operational efficiency in the three areas that are, indeed, under the Beira and Nacala port operators' control. Such operations include: (i) delivery; (ii) handling and storage; (iii) transfer, and (iv) loading and discharging containers. The results of the Benchmark analysis in the table below indicate that the performance of Beira and Nacala Ports in 2010 were well below that of their peer group in east and southern Africa.

More recent data provided by Beira Port indicate that truck cycles times in 2011 and the first and second quarters of 2012 had begun to show marked declines to

4.1 hours and 3.2 from 6.8 hours in 2010. And although such cycle time reductions show progress, they are still three to four times the international benchmark of one hour.

East and Southern Africa Ports' Performance Benchmarks[1]

Port	TEU Throughput (100,000)	Ship Rate	Berth Occupancy (%)	Crane Productivity (Moves/hr.)	Dwell Times (hours)	Truck Cycle Time (hours)	No. of Berths	No. of Cranes
Beira	105.7	296	77.4	8.6	19.5	6.8	8	10
Maputo	143.1			15	22	2.1	2	5
Nacala	71.1	274	35.4	4	30	6	6	2
Durban Container	996.0	4000		22	3.93	0.58	6	19
Port Elizabeth	2,510.0		65.0	23	6	0.30	3	4
Cape Town	690.7			22	6	0.25	7	8
Durban Pier 1	720.0			21	6	0.25	3	6
Mombasa	696.0			10	5.7	10	5	4
Djibouti	800.0			28	8	12	2	10
Dar es Salaam	341.0	384		19	19	5	11	4

[1] Note: Benchmarks were derived from 2010 data for each port.

Sources: Cornelder, CDN, Port Maputo, Transnet Port Terminals, Kenya Port Authority, Djibouti Invest, Ltd, Tanzania Port Authority, 2012

ANNEX 12: COMMODITY TRADE LOGISTIC COSTS

TABLE 6.2

FERTILIZERS DDU HANDLING COSTS TO MUTARE VIA BEIRA

	ABSOLUTE COSTS, USD / MT									RELATIVE COSTS, AS % OF TOTAL									
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	HAULAGE RAIL	HAULAGE ROAD	CUSTOMS ESCORT	TOTAL LINER OUT		TOTAL FREE OUT		LINER OUT		FREE OUT		LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS						RAIL	ROAD	RAIL	ROAD	PORT	RAIL	PORT	RAIL	PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
1. BULK TO BULK																			
1.1 Wagons	$11.00	$17.05	$44.58	N / A	$1.33	$55.58	N / A	$61.63	N / A	19.8%	80.2%	27.7%	72.3%	N / A	N / A	N / A	N / A	N / A	N / A
1.2 Tipper Trucks	$9.50	$15.55	N / A	$55.00	$1.33	N / A	$65.83	N / A	$71.88	N / A	N / A	N / A	N / A	14.4%	83.5%	21.6%	76.5%	2.0%	1.9%
2. BULK TO 50 KG BAGS																			
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$44.58	$60.00	$1.33	$66.00	$82.75	$72.05	$88.80	32.5%	67.5%	38.1%	61.9%	25.9%	72.5%	30.9%	67.6%	1.6%	1.5%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$44.58	$60.00	$1.33	$70.92	$87.67	$76.96	$93.71	37.1%	62.9%	42.1%	57.9%	30.0%	68.4%	34.6%	64.0%	1.5%	1.4%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$44.58	$60.00	$1.33	$78.95	$95.70	$85.00	$101.75	43.5%	56.5%	47.6%	52.4%	35.9%	62.7%	39.7%	59.0%	1.4%	1.3%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$44.58	$60.00	$1.33	$74.57	$91.32	$80.62	$97.37	40.2%	59.8%	44.7%	55.3%	32.8%	65.7%	37.0%	61.6%	1.5%	1.4%
3. ARRIVING IN < 800 KG BAGS																			
3.1 Loading Direct	$11.20	$21.80	$44.58	$60.00	$1.33	$55.78	$72.53	$66.38	$83.13	20.1%	79.9%	32.8%	67.2%	15.4%	82.7%	26.2%	72.2%	1.8%	1.6%
3.2 Loading Via Port WH	$16.06	$26.66	$44.58	$60.00	$1.33	$60.64	$77.39	$71.24	$87.99	26.5%	73.5%	37.4%	62.6%	20.8%	77.5%	30.3%	68.2%	1.7%	1.5%
3.3 Loading Via Outside WH	$22.80	$33.40	$44.58	$60.00	$1.33	$67.38	$84.13	$77.98	$94.73	33.8%	66.2%	42.8%	57.2%	27.1%	71.3%	35.3%	63.3%	1.6%	1.4%
4. ARRIVING IN ≥ 800 KG BAGS																			
4.1 Loading Direct	$10.45	$20.21	$44.58	$60.00	$1.33	$55.03	$71.78	$64.79	$81.54	19.0%	81.0%	31.2%	68.8%	14.6%	83.6%	24.8%	73.6%	1.9%	1.6%
4.2 Loading Via Port WH	$14.41	$24.16	$44.58	$60.00	$1.33	$58.99	$75.74	$68.74	$85.49	24.4%	75.6%	35.1%	64.9%	19.0%	79.2%	28.3%	70.2%	1.8%	1.6%
4.3 Loading Via Outside WH	$22.05	$31.81	$44.58	$60.00	$1.33	$66.63	$83.38	$76.39	$93.14	33.1%	66.9%	41.6%	58.4%	26.4%	72.0%	34.2%	64.4%	1.6%	1.4%
5. BAGGED FERTS IN CONTAINERS																			
5.1 Stripped Direct Loading	N / A	$40.22	$44.58	$60.00	$1.33	N / A	N / A	$84.80	$101.55	N / A	N / A	47.4%	52.6%	N / A	N / A	39.6%	59.1%	N / A	1.3%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$44.58	$60.00	$1.33	N / A	N / A	$86.10	$102.85	N / A	N / A	48.2%	51.8%	N / A	N / A	40.4%	58.3%	N / A	1.3%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$44.58	$60.00	$1.33	N / A	N / A	$90.84	$107.59	N / A	N / A	50.9%	49.1%	N / A	N / A	43.0%	55.8%	N / A	1.2%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$21.19	$62.96	$1.48	N / A	N / A	$49.12	$92.37	N / A	N / A	56.9%	43.1%	N / A	N / A	30.2%	68.2%	N / A	1.6%
6. BULK FERTS IN CONTAINERS																			
6.1 Stripped In Port, Loading Direct	N / A	$41.66	$44.58	$60.00	$1.33	N / A	N / A	$86.24	$102.99	N / A	N / A	48.3%	51.7%	N / A	N / A	40.5%	58.3%	N / A	1.3%
6.2 Stripped Via Port WH	N / A	$42.93	$44.58	$60.00	$1.33	N / A	N / A	$87.51	$104.26	N / A	N / A	49.1%	57.5%	N / A	N / A	41.2%	57.5%	N / A	1.3%
6.3 Stripped Via Outside WH	N / A	$46.43	$44.58	$60.00	$1.33	N / A	N / A	$91.01	$107.76	N / A	N / A	51.0%	55.7%	N / A	N / A	43.1%	55.7%	N / A	1.2%
6.4 Unstripped, Loading Full Containers	N / A	$27.93	$21.19	$62.96	$1.48	N / A	N / A	$49.12	$92.37	N / A	N / A	56.9%	68.2%	N / A	N / A	30.2%	68.2%	N / A	1.6%

DDU = Delivered Duty Umpaid WH = Warehouse

TABLE 6.3

FERTILIZERS DDU HANDLING COSTS TO HARARE VIA BEIRA

ABSOLUTE COSTS, USD / MT

CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	HAULAGE RAIL	HAULAGE ROAD	CUSTOMS ESCORT	TOTAL LINER OUT		TOTAL FREE OUT	
HANDLING OPTIONS						RAIL	ROAD	RAIL	ROAD
1. BULK TO BULK									
1.1 Wagons	$11.00	$17.05	$57.63	N / A	$1.33	$68.63	N / A	$74.68	N / A
1.2 Tipper Trucks	$9.50	$15.55	N / A	$80.00	$1.33	N / A	$90.83	N / A	$96.88
2. BULK TO 50 KG BAGS									
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$57.63	$80.00	$1.33	$79.05	$102.75	$85.10	$108.80
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$57.63	$80.00	$1.33	$83.97	$107.67	$90.01	$113.71
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$57.63	$80.00	$1.33	$92.00	$115.70	$98.05	$121.75
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$57.63	$80.00	$1.33	$87.62	$111.32	$93.67	$117.37
3. ARRIVING IN < 800 KG BAGS									
3.1 Loading Direct	$11.20	$21.80	$57.63	$80.00	$1.33	$68.83	$92.53	$79.43	$103.13
3.2 Loading Via Port WH	$16.06	$26.66	$57.63	$80.00	$1.33	$73.69	$97.39	$84.29	$107.99
3.3 Loading Via Outside WH	$22.80	$33.40	$57.63	$80.00	$1.33	$80.43	$104.13	$91.03	$114.73
4. ARRIVING IN ≥ 800 KG BAGS									
4.1 Loading Direct	$10.45	$20.21	$57.63	$80.00	$1.33	$68.08	$91.78	$77.84	$101.54
4.2 Loading Via Port WH	$14.41	$24.16	$57.63	$80.00	$1.33	$72.04	$95.74	$81.79	$105.49
4.3 Loading Via Outside WH	$22.05	$31.81	$57.63	$80.00	$1.33	$79.68	$103.38	$89.44	$113.14
5. BAGGED FERTS IN CONTAINERS									
5.1 Stripped Direct Loading	N / A	$40.22	$57.63	$80.00	$1.33	N / A	N / A	$97.85	$121.55
5.2 Stripped Loading Via Port WH	N / A	$41.52	$57.63	$80.00	$1.33	N / A	N / A	$99.15	$122.85
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$57.63	$80.00	$1.33	N / A	N / A	$103.89	$127.59
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$29.13	$85.19	$1.48	N / A	N / A	$57.06	$114.60
6. BULK FERTS IN CONTAINERS									
6.1 Stripped In Port, Loading Direct	N / A	$41.66	$57.63	$80.00	$1.33	N / A	N / A	$99.29	$122.99
6.2 Stripped Via Port WH	N / A	$42.93	$57.63	$80.00	$1.33	N / A	N / A	$100.56	$124.26
6.3 Stripped Via Outside WH	N / A	$46.43	$57.63	$80.00	$1.33	N / A	N / A	$104.06	$127.76
6.4 Unstripped, Loading Full Containers	N / A	$27.93	$29.13	$85.19	$1.48	N / A	N / A	$57.06	$114.60

RELATIVE COSTS, AS % OF TOTAL DDU HARARE

LINER OUT		FREE OUT		LINER OUT		FREE OUT		CUSTOMS ESCORT	
PORT	RAIL	PORT	RAIL	PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
16.0%	84.0%	22.8%	77.2%	N / A	N / A	N / A	N / A	N / A	N / A
N / A	N / A	N / A	N / A	10.5%	88.1%	16.1%	82.6%	1.5%	1.4%
27.1%	72.9%	32.3%	67.7%	20.8%	77.9%	25.2%	73.5%	1.3%	1.2%
31.4%	68.6%	36.0%	64.0%	24.5%	74.3%	28.5%	70.4%	1.2%	1.2%
37.4%	62.6%	41.2%	58.8%	29.7%	69.1%	33.2%	65.7%	1.1%	1.1%
34.2%	65.8%	38.5%	61.5%	26.9%	71.9%	30.7%	68.2%	1.2%	1.1%
16.3%	83.7%	27.4%	72.6%	12.1%	86.5%	21.1%	77.6%	1.4%	1.3%
21.8%	78.2%	31.6%	68.4%	16.5%	82.1%	24.7%	74.1%	1.4%	1.2%
28.3%	71.7%	36.7%	63.3%	21.9%	76.8%	29.1%	69.7%	1.3%	1.2%
15.3%	84.7%	26.0%	74.0%	11.4%	87.2%	19.9%	78.8%	1.4%	1.3%
20.0%	80.0%	29.5%	70.5%	15.1%	83.6%	22.9%	75.8%	1.4%	1.3%
27.7%	72.3%	35.6%	64.4%	21.3%	77.4%	28.1%	70.7%	1.3%	1.2%
N / A	N / A	41.1%	58.9%	N / A	N / A	33.1%	65.8%	N / A	1.1%
N / A	N / A	41.9%	58.1%	N / A	N / A	33.8%	65.1%	N / A	1.1%
N / A	N / A	44.5%	55.5%	N / A	N / A	36.3%	62.7%	N / A	1.0%
N / A	N / A	48.9%	51.1%	N / A	N / A	24.4%	74.3%	N / A	1.3%
N / A	N / A	42.0%	58.0%	N / A	N / A	33.9%	65.0%	N / A	1.1%
N / A	N / A	42.7%	64.4%	N / A	N / A	34.5%	64.4%	N / A	1.1%
N / A	N / A	44.6%	62.6%	N / A	N / A	36.3%	62.6%	N / A	1.0%
N / A	N / A	48.9%	74.3%	N / A	N / A	24.4%	74.3%	N / A	1.3%

DDU = Delivered Duty Umpaid

WH = Warehouse

TABLE 6.4

FERTILIZERS DDU HANDLING COSTS TO BULAWAYO VIA BEIRA

	ABSOLUTE COSTS, USD / MT									RELATIVE COSTS, AS % OF TOTAL DDU BULAWAYO									
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	HAULAGE RAIL	HAULAGE ROAD	CUSTOMS ESCORT	TOTAL LINER OUT		TOTAL FREE OUT		LINER OUT		FREE OUT		LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS						RAIL	ROAD	RAIL	ROAD	PORT	RAIL	PORT	RAIL	PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
1. BULK TO BULK																			
1.1 Wagons	$11.00	$17.05	$80.87	N / A	$1.33	$91.87	N / A	$97.92	N / A	12.0%	88.0%	17.4%	82.6%	N / A	N / A	N / A	N / A	N / A	N / A
1.2 Tipper Trucks	$9.50	$15.55	N / A	$110.00	$1.33	N / A	$120.83	N / A	$126.88	N / A	N / A	N / A	N / A	7.9%	91.0%	12.3%	86.7%	1.1%	1.0%
2. BULK TO 50 KG BAGS																			
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$80.87	$125.00	$1.33	$102.29	$147.75	$108.34	$153.80	20.9%	79.1%	25.4%	74.6%	14.5%	84.6%	17.9%	81.3%	0.9%	0.9%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$80.87	$125.00	$1.33	$107.21	$152.67	$113.25	$158.71	24.6%	75.4%	28.6%	71.4%	17.3%	81.9%	20.4%	78.8%	0.9%	0.8%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$80.87	$125.00	$1.33	$115.24	$160.70	$121.29	$166.75	29.8%	70.2%	33.3%	66.7%	21.4%	77.8%	24.2%	75.0%	0.8%	0.8%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$80.87	$125.00	$1.33	$110.86	$156.32	$116.91	$162.37	27.1%	72.9%	30.8%	69.2%	19.2%	80.0%	22.2%	77.0%	0.9%	0.8%
3. ARRIVING IN < 800 KG BAGS																			
3.1 Loading Direct	11.2	21.8	$80.87	$125.00	$1.33	$92.07	$137.53	$102.67	$148.13	12.2%	87.8%	21.2%	78.8%	8.1%	90.9%	14.7%	84.4%	1.0%	0.9%
3.2 Loading Via Port WH	16.06	26.66	$80.87	$125.00	$1.33	$96.93	$142.39	$107.53	$152.99	16.6%	83.4%	24.8%	75.2%	11.3%	87.8%	17.4%	81.7%	0.9%	0.9%
3.3 Loading Via Outside WH	22.8	33.4	$80.87	$125.00	$1.33	$103.67	$149.13	$114.27	$159.73	22.0%	78.0%	29.2%	70.8%	15.3%	83.8%	20.9%	78.3%	0.9%	0.8%
4. ARRIVING IN ≥ 800 KG BAGS																			
4.1 Loading Direct	10.45	20.21	$80.87	$125.00	$1.33	$91.32	$136.78	$101.08	$146.54	11.4%	88.6%	20.0%	80.0%	7.6%	91.4%	13.8%	85.3%	1.0%	0.9%
4.2 Loading Via Port WH	14.41	24.16	$80.87	$125.00	$1.33	$95.28	$140.74	$105.03	$150.49	15.1%	84.9%	23.0%	77.0%	10.2%	88.8%	16.1%	83.1%	0.9%	0.9%
4.3 Loading Via Outside WH	22.05	31.81	$80.87	$125.00	$1.33	$102.92	$148.38	$112.68	$158.14	21.4%	78.6%	28.2%	71.8%	14.9%	84.2%	20.1%	79.0%	0.9%	0.8%
5. BAGGED FERTS IN CONTAINERS																			
5.1 Stripped Direct Loading	N / A	$40.22	$80.87	$125.00	1.33	N / A	N / A	$121.09	$166.55	N / A	N / A	33.2%	66.8%	N / A	N / A	24.1%	75.1%	N / A	0.8%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$80.87	$125.00	1.33	N / A	N / A	$122.39	$167.85	N / A	N / A	33.9%	66.1%	N / A	N / A	24.7%	74.5%	N / A	0.8%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$80.87	$125.00	1.33	N / A	N / A	$127.13	$172.59	N / A	N / A	36.4%	63.6%	N / A	N / A	26.8%	72.4%	N / A	0.8%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$35.04	$118.52	1.48	N / A	N / A	$62.97	$147.93	N / A	N / A	44.4%	55.6%	N / A	N / A	18.9%	80.1%	N / A	1.0%
6. BULK FERTS IN CONTAINERS																			
6.1 Stripped In Port, Loading Direct	N / A	41.66	$80.87	$125.00	1.33	N / A	N / A	$122.53	$167.99	N / A	N / A	34.0%	66.0%	N / A	N / A	24.8%	74.4%	N / A	0.8%
6.2 Stripped Via Port WH	N / A	42.93	$80.87	$125.00	1.33	N / A	N / A	$123.80	$169.26	N / A	N / A	34.7%	73.9%	N / A	N / A	25.4%	73.9%	N / A	0.8%
6.3 Stripped Via Outside WH	N / A	46.43	$80.87	$125.00	1.33	N / A	N / A	$127.30	$172.76	N / A	N / A	36.5%	72.4%	N / A	N / A	26.9%	72.4%	N / A	0.8%
6.4 Unstripped, Loading Full Containers	N / A	27.93	$35.04	$118.52	1.48	N / A	N / A	$62.97	$147.93	N / A	N / A	44.4%	80.1%	N / A	N / A	18.9%	80.1%	N / A	1.0%

DDU = Delivered Duty Umpaid

WH = Warehouse

TABLE 6.5

FERTILIZERS DDU HANDLING COSTS TO LUSAKA VIA BEIRA

ABSOLUTE COSTS, USD / MT							RELATIVE COSTS, AS % OF TOTAL DDU LUSAKA					
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	ROAD HAULAGE	CUSTOMS ESCORT	TOTAL LINER OUT	TOTAL FREE OUT	LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS							PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
1. BULK TO BULK												
Tipper Trucks	$9.50	$15.55	$150.00	$1.33	$160.83	$166.88	5.9%	93.3%	9.3%	89.9%	0.8%	0.8%
2. BULK TO 50 KG BAGS												
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$120.00	$1.33	$142.75	$148.80	15.0%	84.1%	18.5%	80.6%	0.9%	0.9%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$120.00	$1.33	$147.67	$153.71	17.8%	81.3%	21.1%	78.1%	0.9%	0.9%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$120.00	$1.33	$155.70	$161.75	22.1%	77.1%	25.0%	74.2%	0.9%	0.8%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$120.00	$1.33	$151.32	$157.37	19.8%	79.3%	22.9%	76.3%	0.9%	0.8%
3. ARRIVING IN < 800 KG BAGS												
3.1 Loading Direct	11.2	21.8	$120.00	$1.33	$132.53	$143.13	8.5%	90.5%	15.2%	83.8%	1.0%	0.9%
3.2 Loading Via Port WH	16.06	26.66	$120.00	$1.33	$137.39	$147.99	11.7%	87.3%	18.0%	81.1%	1.0%	0.9%
3.3 Loading Via Outside WH	22.8	33.4	$120.00	$1.33	$144.13	$154.73	15.8%	83.3%	21.6%	77.6%	0.9%	0.9%
4. ARRIVING IN ≥ 800 KG BAGS												
4.1 Loading Direct	10.45	20.21	$120.00	$1.33	$131.78	$141.54	7.9%	91.1%	14.3%	84.8%	1.0%	0.9%
4.2 Loading Via Port WH	14.41	24.16	$120.00	$1.33	$135.74	$145.49	10.6%	88.4%	16.6%	82.5%	1.0%	0.9%
4.3 Loading Via Outside WH	22.05	31.81	$120.00	$1.33	$143.38	$153.14	15.4%	83.7%	20.8%	78.4%	0.9%	0.9%
5. BAGGED FERTS IN CONTAINERS												
5.1 Stripped Direct Loading	N / A	$40.22	$120.00	1.33	N / A	$161.55	N / A	N / A	24.9%	74.3%	N / A	0.8%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$120.00	1.33	N / A	$162.85	N / A	N / A	25.5%	73.7%	N / A	0.8%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$120.00	1.33	N / A	$167.59	N / A	N / A	27.6%	71.6%	N / A	0.8%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$140.74	1.48	N / A	$170.15	N / A	N / A	16.4%	82.7%	N / A	0.9%
6. BULK FERTS IN CONTAINERS												
6.1 Stripped In Port, Loading Direct	N / A	41.66	$120.00	1.33	N / A	$162.99	N / A	N / A	25.6%	73.6%	N / A	0.8%
6.2 Stripped Via Port WH	N / A	42.93	$120.00	1.33	N / A	$164.26	N / A	N / A	26.1%	73.1%	N / A	0.8%
6.3 Stripped Via Outside WH	N / A	46.43	$120.00	1.33	N / A	$167.76	N / A	N / A	27.7%	71.5%	N / A	0.8%
6.4 Unstripped, Loading Full Containers	N / A	27.93	$140.74	1.48	N / A	$170.15	N / A	N / A	16.4%	82.7%	N / A	0.9%

DDU = Delivered Duty Umpaid

WH = Warehouse

TABLE 6.6

FERTILIZERS DDU HANDLING COSTS TO NDOLA AND KITWE VIA BEIRA

ABSOLUTE COSTS, USD / MT							RELATIVE COSTS, AS % OF TOTAL DDU NDOLA - KITWE					
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	ROAD HAULAGE	CUSTOMS ESCORT	TOTAL LINER OUT	TOTAL FREE OUT	LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS							PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
1. BULK TO BULK												
Tipper Trucks	$9.50	$15.55	$190.00	$1.33	$200.83	$206.88	4.7%	94.6%	7.5%	91.8%	0.7%	0.6%
2. BULK TO 50 KG BAGS												
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$143.33	$1.33	$166.08	$172.13	12.9%	86.3%	16.0%	83.3%	0.8%	0.8%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$143.33	$1.33	$171.00	$177.04	15.4%	83.8%	18.3%	81.0%	0.8%	0.8%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$143.33	$1.33	$179.03	$185.08	19.2%	80.1%	21.8%	77.4%	0.7%	0.7%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$143.33	$1.33	$174.65	$180.70	17.2%	82.1%	19.9%	79.3%	0.8%	0.7%
3. ARRIVING IN < 800 KG BAGS												
3.1 Loading Direct	11.2	21.8	$143.33	$1.33	$155.86	$166.46	7.2%	92.0%	13.1%	86.1%	0.9%	0.8%
3.2 Loading Via Port WH	16.06	26.66	$143.33	$1.33	$160.72	$171.32	10.0%	89.2%	15.6%	83.7%	0.8%	0.8%
3.3 Loading Via Outside WH	22.8	33.4	$143.33	$1.33	$167.46	$178.06	13.6%	85.6%	18.8%	80.5%	0.8%	0.7%
4. ARRIVING IN ≥ 800 KG BAGS												
4.1 Loading Direct	10.45	20.21	$143.33	$1.33	$155.11	$164.87	6.7%	92.4%	12.3%	86.9%	0.9%	0.8%
4.2 Loading Via Port WH	14.41	24.16	$143.33	$1.33	$159.07	$168.82	9.1%	90.1%	14.3%	84.9%	0.8%	0.8%
4.3 Loading Via Outside WH	22.05	31.81	$143.33	$1.33	$166.71	$176.47	13.2%	86.0%	18.0%	81.2%	0.8%	0.8%
5. BAGGED FERTS IN CONTAINERS												
5.1 Stripped Direct Loading	N / A	$40.22	$143.33	1.33	N / A	$184.88	N / A	N / A	21.8%	77.5%	N / A	0.7%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$143.33	1.33	N / A	$186.18	N / A	N / A	22.3%	77.0%	N / A	0.7%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$143.33	1.33	N / A	$190.92	N / A	N / A	24.2%	75.1%	N / A	0.7%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$155.55	1.48	N / A	$184.96	N / A	N / A	15.1%	84.1%	N / A	0.8%
6. BULK FERTS IN CONTAINERS												
6.1 Stripped In Port, Loading Direct	N / A	41.66	$143.33	1.33	N / A	$186.32	N / A	N / A	22.4%	76.9%	N / A	0.7%
6.2 Stripped Via Port WH	N / A	42.93	$120.00	1.33	N / A	$164.26	N / A	N / A	26.1%	73.1%	N / A	0.8%
6.3 Stripped Via Outside WH	N / A	46.43	$120.00	1.33	N / A	$167.76	N / A	N / A	27.7%	71.5%	N / A	0.8%
6.4 Unstripped, Loading Full Containers	N / A	27.93	$155.55	1.48	N / A	$184.96	N / A	N / A	15.1%	84.1%	N / A	0.8%

DDU = Delivered Duty Umpaid
WH = Warehouse

TABLE 6.7

FERTILIZERS DDU HANDLING COSTS TO BLANTYRE VIA BEIRA

	ABSOLUTE COSTS, USD / MT						RELATIVE COSTS, AS % OF TOTAL DDU BLANTYRE					
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	ROAD HAULAGE	CUSTOMS ESCORT	TOTAL LINER OUT	TOTAL FREE OUT	LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS							PORT	ROAD	PORT	ROAD	OUT	OUT
1. BULK TO BULK												
Tipper Trucks	$9.50	$15.55	$100.00	$2.06	$111.56	$117.61	8.5%	89.6%	13.2%	85.0%	1.8%	1.8%
2. BULK TO 50 KG BAGS												
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$94.00	$2.06	$117.48	$123.53	18.2%	80.0%	22.2%	76.1%	1.8%	1.7%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$94.00	$2.06	$122.40	$128.44	21.5%	76.8%	25.2%	73.2%	1.7%	1.6%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$94.00	$2.06	$130.43	$136.48	26.4%	72.1%	29.6%	68.9%	1.6%	1.5%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$94.00	$2.06	$126.05	$132.10	23.8%	74.6%	27.3%	71.2%	1.6%	1.6%
3. ARRIVING IN < 800 KG BAGS												
3.1 Loading Direct	11.2	21.8	$94.00	$2.06	$107.26	$117.86	10.4%	87.6%	18.5%	79.8%	1.9%	1.7%
3.2 Loading Via Port WH	16.06	26.66	$94.00	$2.06	$112.12	$122.72	14.3%	83.8%	21.7%	76.6%	1.8%	1.7%
3.3 Loading Via Outside WH	22.8	33.4	$94.00	$2.06	$118.86	$129.46	19.2%	79.1%	25.8%	72.6%	1.7%	1.6%
4. ARRIVING IN ≥ 800 KG BAGS												
4.1 Loading Direct	10.45	20.21	$94.00	$2.06	$106.51	$116.27	9.8%	88.3%	17.4%	80.8%	1.9%	1.8%
4.2 Loading Via Port WH	14.41	24.16	$94.00	$2.06	$110.47	$120.22	13.0%	85.1%	20.1%	78.2%	1.9%	1.7%
4.3 Loading Via Outside WH	22.05	31.81	$94.00	$2.06	$118.11	$127.87	18.7%	79.6%	24.9%	73.5%	1.7%	1.6%
5. BAGGED FERTS IN CONTAINERS												
5.1 Stripped Direct Loading	N / A	$40.22	$94.00	$2.06	N / A	$136.28	N / A	N / A	29.5%	69.0%	N / A	1.5%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$94.00	$2.06	N / A	$137.58	N / A	N / A	30.2%	68.3%	N / A	1.5%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$94.00	$2.06	N / A	$142.32	N / A	N / A	32.5%	66.0%	N / A	1.4%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$96.30	$2.30	N / A	$126.53	N / A	N / A	22.1%	76.1%	N / A	1.8%
6. BULK FERTS IN CONTAINERS												
6.1 Stripped In Port, Loading Direct	N / A	41.66	$94.00	$2.06	N / A	$137.72	N / A	N / A	30.2%	68.3%	N / A	1.5%
6.2 Stripped Via Port WH	N / A	42.93	$94.00	$2.06	N / A	$138.99	N / A	N / A	30.9%	67.6%	N / A	1.5%
6.3 Stripped Via Outside WH	N / A	46.43	$94.00	$2.06	N / A	$142.49	N / A	N / A	32.6%	66.0%	N / A	1.4%
6.4 Unstripped, Loading Full Containers	N / A	27.93	$96.30	$2.30	N / A	$126.53	N / A	N / A	22.1%	76.1%	N / A	1.8%

DDU = Delivered Duty Umpaid

WH = Warehouse

TABLE 6.8

FERTILIZERS DDU HANDLING COSTS TO LILONGWE VIA BEIRA

ABSOLUTE COSTS, DDU LILONGWE, USD / MT							RELATIVE COSTS, AS % OF TOTAL DDU LILONGWE					
CHARGES EXCLUDING AD VALOREM (1.70% ON FOB VALUE FOR BULK & BREAK BULK)	LINER OUT	FREE OUT	ROAD HAULAGE	CUSTOMS ESCORT	TOTAL LINER OUT	TOTAL FREE OUT	LINER OUT		FREE OUT		CUSTOMS ESCORT	
HANDLING OPTIONS							PORT	ROAD	PORT	ROAD	LINER OUT	FREE OUT
1. BULK TO BULK												
Tipper Trucks	$9.50	$15.55	$110.00	$2.63	$122.13	$128.18	7.8%	90.1%	12.1%	85.8%	2.2%	2.1%
2. BULK TO 50 KG BAGS												
2.1 Bagged In Port, Loading Direct	$21.42	$27.47	$103.33	$1.33	$126.08	$132.13	17.0%	82.0%	20.8%	78.2%	1.1%	1.0%
2.2 Bagged In Port, Loading Via Port WH	$26.34	$32.38	$120.00	$1.33	$147.67	$153.71	17.8%	81.3%	21.1%	78.1%	0.9%	0.9%
2.3 Bagged In Port, Loading Via Outside WH	$34.37	$40.42	$120.00	$1.33	$155.70	$161.75	22.1%	77.1%	25.0%	74.2%	0.9%	0.8%
2.4 Bagged & Loading Via Outside WH	$29.99	$36.04	$120.00	$1.33	$151.32	$157.37	19.8%	79.3%	22.9%	76.3%	0.9%	0.8%
3. ARRIVING IN < 800 KG BAGS												
3.1 Loading Direct	11.2	21.8	$120.00	$1.33	$132.53	$143.13	8.5%	90.5%	15.2%	83.8%	1.0%	0.9%
3.2 Loading Via Port WH	16.06	26.66	$120.00	$1.33	$137.39	$147.99	11.7%	87.3%	18.0%	81.1%	1.0%	0.9%
3.3 Loading Via Outside WH	22.8	33.4	$120.00	$1.33	$144.13	$154.73	15.8%	83.3%	21.6%	77.6%	0.9%	0.9%
4. ARRIVING IN ≥ 800 KG BAGS												
4.1 Loading Direct	10.45	20.21	$120.00	$1.33	$131.78	$141.54	7.9%	91.1%	14.3%	84.8%	1.0%	0.9%
4.2 Loading Via Port WH	14.41	24.16	$120.00	$1.33	$135.74	$145.49	10.6%	88.4%	16.6%	82.5%	1.0%	0.9%
4.3 Loading Via Outside WH	22.05	31.81	$120.00	$1.33	$143.38	$153.14	15.4%	83.7%	20.8%	78.4%	0.9%	0.9%
5. BAGGED FERTS IN CONTAINERS												
5.1 Stripped Direct Loading	N / A	$40.22	$120.00	1.33	N / A	$161.55	N / A	N / A	24.9%	74.3%	N / A	0.8%
5.2 Stripped Loading Via Port WH	N / A	$41.52	$120.00	1.33	N / A	$162.85	N / A	N / A	25.5%	73.7%	N / A	0.8%
5.3 Stripped Loading Via Outside WH	N / A	$46.26	$120.00	1.33	N / A	$167.59	N / A	N / A	27.6%	71.6%	N / A	0.8%
5.4 Unstripped, Loading Full Containers	N / A	$27.93	$100.00	2.93	N / A	$130.86	N / A	N / A	21.3%	76.4%	N / A	2.2%
6. BULK FERTS IN CONTAINERS												
6.1 Stripped In Port, Loading Direct	N / A	41.66	$120.00	1.33	N / A	$162.99	N / A	N / A	25.6%	73.6%	N / A	0.8%
6.2 Stripped Via Port WH	N / A	42.93	$120.00	1.33	N / A	$164.26	N / A	N / A	26.1%	73.1%	N / A	0.8%
6.3 Stripped Via Outside WH	N / A	46.43	$120.00	1.33	N / A	$167.76	N / A	N / A	27.7%	71.5%	N / A	0.8%
6.4 Unstripped, Loading Full Containers	N / A	27.93	$140.74	1.33	N / A	$170.00	N / A	N / A	16.4%	82.8%	N / A	0.8%

DDU = Delivered Duty Umpaid

WH = Warehouse

TABLE 6.9

COSTS FOR HANDLING LOCAL PIGEON PEAS (DHAL) VIA BEIRA, IN USD

FROM FREE ON TRUCK TO FREE ON BOARD BEIRA PORT (Excluding Broker and Storage Charges)

USD PER 20 FT STUFFED VIA				USD PER MT, STUFFED VIA		
	OWN W/HOUSE	PORT W/HOUSE	AGENT WH	OWN W/HOUSE	PORT W/HOUSE	AGENT WH
1. FROM FOT TO FAS BEIRA QUAY				**FROM FOT TO FAS BEIRA QUAY**		
PORT REMOVAL	$45.00	$124.00	$45.00	$1.80	$4.96	$1.80
PORT SHORE HANDLING	$185.00	$185.00	$185.00	$7.40	$7.40	$7.40
PORT SECURITY FEE	$6.00	$6.00	$6.00	$0.24	$0.24	$0.24
SCANNING FEE FULL	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00
SCANNING FEE EMPTY	$7.50	$7.50	$7.50	$0.30	$0.30	$0.30
TRANSPORT EMPTY PORT / WHOUSE	$36.00	$0.00	$50.00	$1.44	$0.00	$2.00
LIFT OFF EMPTY	$0.00	$0.00	$25.00	$0.00	$0.00	$1.00
STUFFING	$0.00	$245.00	$0.00	$0.00	$9.80	$0.00
CUSTOMS ATTENDENCE STUFFING	$10.00	$10.00	$10.00	$0.40	$0.40	$0.40
LIFT ON FULL	$0.00	$0.00	$45.00	$0.00	$0.00	$1.80
TRANSPORT FULL OUTSIDE WH / PORT	$94.00	$0.00	$100.00	$3.76	$0.00	$4.00
HANDLING IN AND OUT	$60.00	$0.00	$100.00	$2.40	$0.00	$4.00
PHYTOSANITARY INSPECTION	$10.00	$10.00	$10.00	$0.40	$0.40	$0.40
CERTIFICATE OF ORIGIN	$2.00	$2.00	$2.00	$0.08	$0.08	$0.08
QUALITY CERTIFICATE	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20
COMMUNICATION	$5.50	$5.50	$5.50	$0.22	$0.22	$0.22
DOCUMENTATION	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20
AGENCY FEE	$0.00	$60.00	$60.00	$0.00	$2.40	$2.40
BANK CHARGES	$0.00	$5.00	$5.00	$0.00	$0.20	$0.20
SUB-TOTAL 1	**$521.00**	**$720.00**	**$716.00**	**$20.84**	**$28.80**	**$28.64**
2. FROM FAS TO FOB BEIRA PORT				**FROM FAS TO FOB BEIRA PORT**		
THC	$100.00	$100.00	$100.00	$4.00	$4.00	$4.00
BL RELEASE	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36
SEAL FEE	$2.00	$2.00	$2.00	$0.08	$0.08	$0.08
OTHER (BL AMMENDMENT FEE, ETC.)	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36
SUB-TOTAL 2	**$120.00**	**$120.00**	**$120.00**	**$4.80**	**$4.80**	**$4.80**
TOTAL (1 + 2)	**$641.00**	**$840.00**	**$836.00**	**$25.64**	**$33.60**	**$33.44**
2. INDEPENDENT TALLY IIf Required)	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00
3. PORT STORAGE (CONTAINERS)						
Free Storage Period (Days)	5	5	5	5	5	5
Thereafter Per Box Per Day	$8.00	$8.00	$8.00	$0.32	$0.32	$0.32
4. STORAGE COVERED SPACE / FREIGHT TON						
Free Storage Period (Days)	N / A	3	7	N / A	3	7
Thereafter Per Freight Ton Per Day	$0.10	$0.40	$0.20	$0.08	$0.40	$0.20
5. CUSTOMS BROKER FEE	0,5% On FOB Value			0,5% On FOB Value		

KEY NOTES	BASIC ASSUMPTIONS
1. FAS = Free Alongside Ship	1. Average Shipment Size of 750 MT
2. FOB = Free On Board	2. Average Loading of 25 MT per 20' Container
3. FOT = Free On Truck	3. Average of 10 x 20' Containers Per BL
4. MT = Metric Ton	4. Average Traders Warehousing Cost of $2.00 / M² (Owned And Rented Premises)
5. W/HOUSE or WH = Warehouse	5. Average Warehouse Size of 1,000 M²
6. CTR = Container	6. Average Rotation of 3,000 MT Per Month
	7. Average Storage Period of 7 Days Per MT

TABLE 6.10

COSTS FOR HANDLING TRANSIT PIGEON PEAS (DHAL) VIA BEIRA IN USD

FROM FREE ON TRUCK TO FREE ON BOARD BEIRA PORT (Excluding Storage Charges)

	USD PER 20 FT STUFFED VIA				USD PER MT, STUFFED VIA			
	DIRECT FROM TRUCK TO	PORT W/HOUSE	AGENT WH	INLAND W/HOUSE (ORIGIN)	DIRECT FROM TRUCK	PORT W/HOUSE	AGENT WH	INLAND W/HOUSE (ORIGIN)
1. FROM FOT TO FAS BEIRA QUAY					**FROM FOT TO FAS BEIRA QUAY**			
PORT REMOVAL	$124.00	$124.00	$45.00	$0.00	$4.96	$4.96	$1.80	$0.00
PORT SHORE HANDLING	$185.00	$185.00	$185.00	$185.00	$7.40	$7.40	$7.40	$7.40
PORT SECURITY FEE	$6.00	$6.00	$6.00	$6.00	$0.24	$0.24	$0.24	$0.24
SCANNING FEE FULL	$18.75	$18.75	$25.00	$25.00	$0.75	$0.75	$1.00	$1.00
SCANNING FEE EMPTY	$7.50	$7.50	$7.50	$7.50	$0.30	$0.30	$0.30	$0.30
TRANSPORT EMPTY PORT / WHOUSE	$0.00	$0.00	$50.00	$0.00	$0.00	$0.00	$2.00	$0.00
LIFT OFF EMPTY	$0.00	$0.00	$25.00	$0.00	$0.00	$0.00	$1.00	$0.00
STUFFING	$225.00	$245.00	$0.00	$0.00	$9.00	$9.80	$0.00	$0.00
CUSTOMS ATTENDENCE STUFFING	$10.00	$10.00	$10.00	$0.00	$0.40	$0.40	$0.40	$0.00
CUSTOMS TRANSIT DUES	$15.00	$15.00	$15.00	$15.00	$0.60	$0.60	$0.60	$0.60
CUSTOMS IN / OUT OF BOND	$0.00	$35.00	$35.00	$0.00	$0.00	$1.40	$1.40	$0.00
CUSTOMS BROKER FEE	$35.00	$35.00	$35.00	$35.00	$1.40	$1.40	$1.40	$1.40
LIFT ON FULL	$0.00	$0.00	$45.00	$0.00	$0.00	$0.00	$1.80	$0.00
TRANSPORT FULL OUTSIDE WH / PORT	$0.00	$0.00	$100.00	$0.00	$0.00	$0.00	$4.00	$0.00
HANDLING IN AND OUT	$0.00	$0.00	$80.00	$0.00	$0.00	$0.00	$3.20	$0.00
PHYTOSANITARY INSPECTION	$10.00	$10.00	$10.00	$0.00	$0.40	$0.40	$0.40	$0.00
INDEPENDENT TALLY	$35.00	$50.00	$50.00	$0.00	$1.40	$2.00	$2.00	$0.00
COMMUNICATION	$5.50	$5.50	$5.50	$5.50	$0.22	$0.22	$0.22	$0.22
DOCUMENTATION	$5.00	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20	$0.20
AGENCY FEE	$60.00	$60.00	$60.00	$60.00	$2.40	$2.40	$2.40	$2.40
BANK CHARGES	$5.25	$5.25	$5.00	$5.00	$0.21	$0.21	$0.20	$0.20
SUB-TOTAL 1	**$747.00**	**$817.00**	**$799.00**	**$349.00**	**$29.88**	**$32.68**	**$31.96**	**$13.96**
2. FROM FAS TO FOB BEIRA PORT					**FROM FAS TO FOB BEIRA PORT**			
THC	$100.00	$100.00	$100.00	$100.00	$4.00	$4.00	$4.00	$4.00
BL RELEASE	$9.00	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36	$0.36
SEAL FEE	$2.00	$2.00	$2.00	$0.00	$0.08	$0.08	$0.08	$0.00
OTHER (BL AMMENDMENT FEE, ETC.)	$9.00	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36	$0.36
SUB-TOTAL 2	**$120.00**	**$120.00**	**$120.00**	**$118.00**	**$4.80**	**$4.80**	**$4.80**	**$4.72**
TOTAL (1 + 2)	**$867.00**	**$937.00**	**$919.00**	**$467.00**	**$34.68**	**$37.48**	**$36.76**	**$18.68**
2. PORT STORAGE (CONTAINERS)								
Free Storage Period (Days)	15	15	15	15	15	15	15	15
Thereafter Per Box Per Day	$8.00	$8.00	$8.00	$8.00	$0.32	$0.32	$0.32	$0.32
3. STORAGE COVERED SPACE / FREIGHT TON								
Free Storage Period (Days)	N/A	7	7	N/A	N/A	7	15	N/A
Thereafter Per Day	$0.08	$0.40	$0.20	N/A	N/A	$0.40	$0.20	N/A

KEY NOTES	BASIC ASSUMPTIONS
1. FAS = Free Alongside Ship	1. Average Shipment Size of 750 MT
2. FOB = Free On Board	2. Average Loading of 25 MT per 20' Container
3. FOT = Free On Truck	3. Average of 10 x 20' Containers Per BL
4. MT = Metric Ton	4. Average Traders Warehousing Cost of $2.00 / M^2 (Owned And Rented Premises)
5. W/HOUSE or WH = Warehouse	5. Average Warehouse Size of 1,000 M^2
6. CTR = Container	6. Average Rotation of 3,000 MT Per Month
	7. Average Storage Period of 7 Days Per MT

TABLE 6.11

COSTS FOR HANDLING LOCAL PIGEON PEAS (DHAL) VIA NACALA, IN USD

FROM FREE ON TRUCK TO FREE ON BOARD NACALA PORT (Excluding Broker and Storage Cha

	USD PER 20 FT STUFFED VIA			USD PER MT, STUFFED VIA		
	OWN W/HOUSE	PORT W/HOUSE	NCL W/HOUSE	OWN W/HOUSE	PORT W/HOUSE	NCL W/HOUSE
1. FROM FOT TO FAS NACALA QUAY				**FROM FOT TO FAS NACALA QUAY**		
PORT REMOVAL	$40.00	$136.00	$40.00	$1.60	$5.44	$1.60
PORT SHORE HANDLING	$197.00	$197.00	$197.00	$7.88	$7.88	$7.88
PORT SECURITY FEE	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SCANNING FEE FULL	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00
SCANNING FEE EMPTY	$7.50	$7.50	$7.50	$0.30	$0.30	$0.30
TRANSPORT EMPTY PORT / WHOUSE	$50.00	$0.00	$150.00	$2.00	$0.00	$6.00
LIFT OFF EMPTY	$0.00	$0.00	$25.00	$0.00	$0.00	$1.00
STUFFING	$0.00	$147.00	$0.00	$0.00	$5.88	$0.00
CUSTOMS ATTENDANCE STUFFING	$10.00	$10.00	$10.00	$0.40	$0.40	$0.40
LIFT ON FULL	$0.00	$0.00	$45.00	$0.00	$0.00	$1.80
TRANSPORT FULL OUTSIDE WH / PORT	$150.00	$0.00	$150.00	$6.00	$0.00	$6.00
HANDLING IN AND OUT	$60.00	$0.00	$60.00	$2.40	$0.00	$2.40
TRANSPORT OF BREAK BULK TO WH	$0.00	$0.00	$150.00	$0.00	$0.00	$6.00
PHYTOSANITARY INSPECTION	$10.00	$10.00	$10.00	$0.40	$0.40	$0.40
CERTIFICATE OF ORIGIN	$2.00	$2.00	$2.00	$0.08	$0.08	$0.08
QUALITY CERTIFICATE	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20
WEIGHBRIDGE	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00
COMMUNICATION	$5.50	$5.50	$5.50	$0.22	$0.22	$0.22
DOCUMENTATION	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20
NCL TERMINAL HANDLING FEE	$0.00	$0.00	$150.00	$0.00	$0.00	$6.00
AGENCY FEE	$0.00	$60.00	$0.00	$0.00	$2.40	$0.00
BANK CHARGES	$0.00	$5.00	$0.00	$0.00	$0.20	$0.00
SUB-TOTAL 1	**$642.00**	**$690.00**	**$1,112.00**	**$25.68**	**$27.60**	**$44.48**
2. FROM FAS TO FOB NACALA PORT				**FROM FAS TO FOB NACALA PORT**		
THC	$100.00	$100.00	$100.00	$4.00	$4.00	$4.00
BL RELEASE	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36
SEAL FEE	$2.00	$2.00	$2.00	$0.08	$0.08	$0.08
OTHER (BL AMMENDMENT FEE, ETC.)	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36
SUB-TOTAL 2	**$120.00**	**$120.00**	**$120.00**	**$4.80**	**$4.80**	**$4.80**
TOTAL (1+2)	**$762.00**	**$810.00**	**$1,232.00**	**$30.48**	**$32.40**	**$49.28**
2. INDEPENDENT TALLY IIf Required)	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00
3. PORT STORAGE (CONTAINERS)						
Free Storage Period (Days)	N/A	3	3	3	3	3
Following 7 Days Per Box Per day	$7.00	$7.00	$9.80	$0.28	$0.28	$0.39
Subesequent 7 Days Per Day	$8.00	$8.00	$9.80	$0.32	$0.32	$0.39
Thereafter Per Box Per Day	$8.00	$8.00	$13.70	$0.32	$0.32	$0.55
4. STORAGE COVERED SPACE / FREIGHT TON						
Free Storage Period (Days)	N/A	3	3	N/A	3	3
Following 7 Days Per Day	N/A	$0.23	$2.18	N/A	$0.23	$2.18
Thereafter Per Freight Ton Per Day	N/A	$0.34	$2.18	N/A	$0.34	$2.18
5. CUSTOMS BROKER FEE	0,5% On FOB Value			0,5% On FOB Value		

KEY NOTES	BASIC ASSUMPTIONS
1 FAS = Free Alongside Ship	1. Average Shipment Size of 750 MT
2. FOB = Free On Board	2. Average Loading of 25 MT per 20' Container
3. FOT = Free On Truck	3. Average of 10 x 20' Containers Per BL
4. MT = Metric Ton	4. Average Traders Warehousing Cost of $2.00 / M^2 (Owned And Rented Premises)
5. W/HOUSE or WH = Warehouse	5. Average Warehouse Size of 1,000 M^2
6. CTR = Container	6. Average Rotation of 3,000 MT Per Month
	7. Average Storage Period of 7 Days Per MT

TABLE 6.12

COSTS FOR HANDLING TRANSIT PIGEON PEAS (DHAL) VIA NACALA IN USD

FROM FREE ON TRUCK TO FREE ON BOARD NACALA PORT (Excluding Storage Charges)

	USD PER 20 FT STUFFED VIA				USD PER MT, STUFFED VIA			
	FROM TRUCK TO CTR INSIDE	PORT WH	AGENT WH	INLAND W/HOUSE (ORIGIN)	DIRECT FROM TRUCK TO CTR INSIDE PORT	PORT WH	AGENT WH	INLAND W/HOUSE (ORIGIN)
1. FROM FOT TO FAS NACALA QUAY					FROM FOT TO FAS NACALA QUAY			
PORT REMOVAL	$136.00	$136.00	$40.00	$0.00	$5.44	$5.44	$1.60	$0.00
PORT SHORE HANDLING	$197.00	$197.00	$197.00	$197.00	$7.88	$7.88	$7.88	$7.88
PORT SECURITY FEE	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SCANNING FEE FULL	$18.75	$18.75	$25.00	$25.00	$0.75	$0.75	$1.00	$1.00
SCANNING FEE EMPTY	$7.50	$7.50	$7.50	$7.50	$0.30	$0.30	$0.30	$0.30
TRANSPORT EMPTY PORT / WHOUSE	$0.00	$0.00	$150.00	$0.00	$0.00	$0.00	$6.00	$0.00
LIFT OFF EMPTY	$0.00	$0.00	$25.00	$0.00	$0.00	$0.00	$1.00	$0.00
STUFFING	$124.00	$147.00	$0.00	$0.00	$4.96	$5.88	$0.00	$0.00
CUSTOMS ATTENDENCE STUFFING	$10.00	$10.00	$10.00	$0.00	$0.40	$0.40	$0.40	$0.00
CUSTOMS TRANSIT DUES	$15.00	$15.00	$15.00	$15.00	$0.60	$0.60	$0.60	$0.60
CUSTOMS IN/ OUT OF BOND	$0.00	$35.00	$35.00	$0.00	$0.00	$1.40	$1.40	$0.00
CUSTOMS BROKER FEE	$35.00	$35.00	$35.00	$35.00	$1.40	$1.40	$1.40	$1.40
LIFT ON FULL	$0.00	$0.00	$45.00	$0.00	$0.00	$0.00	$1.80	$0.00
TRANSPORT FULL OUTSIDE WH / PORT	$0.00	$0.00	$150.00	$0.00	$0.00	$0.00	$6.00	$0.00
HANDLING IN AND OUT	$0.00	$0.00	$60.00	$0.00	$0.00	$0.00	$2.40	$0.00
TRANSPORT OF BREAK BULK TO WH	$0.00	$0.00	$150.00	$0.00	$0.00	$0.00	$6.00	$0.00
PHYTOSANITARY INSPECTION	$10.00	$10.00	$10.00	$0.00	$0.40	$0.40	$0.40	$0.00
INDEPENDENT TALLY	$35.00	$50.00	$50.00	$0.00	$1.40	$2.00	$2.00	$0.00
WEIGHBRIDGE	$50.00	$50.00	$50.00	$50.00	$2.00	$2.00	$2.00	$2.00
COMMUNICATION	$5.75	$5.75	$5.50	$5.50	$0.23	$0.23	$0.22	$0.22
DOCUMENTATION	$5.00	$5.00	$5.00	$5.00	$0.20	$0.20	$0.20	$0.20
NCL HANDLING FEE	$0.00	$0.00	$150.00	$0.00	$0.00	$0.00	$6.00	$0.00
AGENCY FEE	$0.00	$60.00	$60.00	$60.00	$0.00	$2.40	$2.40	$2.40
BANK CHARGES	$0.00	$5.00	$5.00	$5.00	$0.00	$0.20	$0.20	$0.20
SUB-TOTAL 1	$649.00	$787.00	$1,280.00	$406.00	$26.98	$31.48	$51.20	$16.20
2. FROM FAS TO FOB NACALA PORT					FROM FAS TO FOB NACALA PORT			
THC	$100.00	$100.00	$100.00	$100.00	$4.00	$4.00	$4.00	$4.00
BL RELEASE	$9.00	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36	$0.36
SEAL FEE	$2.00	$2.00	$2.00	$0.00	$0.08	$0.08	$0.08	$0.00
OTHER (BL AMMENDMENT FEE, ETC.)	$9.00	$9.00	$9.00	$9.00	$0.36	$0.36	$0.36	$0.36
SUB-TOTAL 2	$120.00	$120.00	$120.00	$118.00	$4.80	$4.80	$4.80	$4.72
TOTAL (1+2)	$769.00	$907.00	$1,400.00	$523.00	$30.78	$36.28	$56.00	$20.92
3. PORT STORAGE (CONTAINERS)								
Free Storage Period (Days)	3	3	3	3	5	5	5	5
Following 7 Days Per Day	$7.00	$7.00	$9.80	$7.00	$0.28	$0.28	$0.39	$0.28
Subsequent 7 Days Per Day	$8.00	$8.00	$9.80	$8.00	$0.32	$0.32	$0.39	$0.32
Thereafter Per Box Per Day	$8.00	$8.00	$13.70	$8.00	$0.32	$0.32	$0.55	$0.32
4. STORAGE COVERED SPACE / FREIGHT TON								
Following Day Per Freight Ton Per Day	N/A	$0.23	$2.18	N/A	N/A	$0.23	$2.18	N/A
Thereafter Per Freight Ton Per Day	N/A	$0.34	$2.18	N/A	N/A	$0.34	$2.18	N/A

KEY NOTES	BASIC ASSUMPTIONS
1. FAS = Free Alongside Ship	1. Average Shipment Size of 750 MT
2. FOB = Free On Board	2. Average Loading of 25 MT per 20' Container
3. FOT = Free On Truck	3. Average of 10 x 20' Containers Per BL
4. MT = Metric Ton	4. Average Traders Warehousing Cost of $2.00 / M² (Owned And Rented Premises)
5. W/HOUSE or WH = Warehouse	5. Average Warehouse Size of 1,000 M²
6. CTR = Container	6. Average Rotation of 3,000 MT Per Month
	7. Average Storage Period of 7 Days Per MT