Nacala Port and International Corridor Development Promotion

Final Report

January 2026

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.
Eight-Japan Engineering Consultants Inc.
Pacific Consultants Co., Ltd.

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Summary

This report is the final report of a JICA technical assistance project under the Grant Account, which analyzed the current status and challenges of Nacala Port and the Nacala Corridor in the African region. It clarifies the significance of Japan's support and proposes future cooperation policies and project development. The target countries are Mozambique, Malawi, and Zambia. It evaluates the potential of the corridor as a vital international logistics route connecting these nations and outlines specific measures to contribute to sustainable economic development and infrastructure improvement.

Introduction: Project Overview

This project stems from JICA's long history of supporting the Nacala Corridor development and the need to formulate projects that leverage the corridor's potential as an international transport route. Since TICAD V in 2013, the Nacala Corridor has been a key focus of Japan's support, receiving multifaceted assistance including road improvements, port functionality upgrades at Nacala Port, and the formulation of the Regional Development Strategy (PEDEC-Nacala). However, significant challenges remain, including unimproved sections, cumbersome customs procedures, and security issues. The survey commenced in September 2024, conducting field investigations and stakeholder interviews across three countries to assess the actual situation.

Chapter 1 Current Situation at Nacala Port and the International Corridor

1.1 Transported Goods and Transportation Conditions

The Nacala Corridor connects Nacala Port to Lusaka in eastern Zambia via a network of railways and roads, offering diverse routes. Railway freight transport is managed by Nacala Logistics. While coal transport remains the core, general cargo is also increasing. However, current utilization is only about 40% of transport capacity. Notably, rail handles approximately 90% of logistics from Nacala Port to Malawi.

1.2 Policies and Collaboration Regarding Corridor Development

Established in 2000, the Nacala Corridor Development Coordination Committee (NDCMC) operates with support from the World Bank's Southern Africa Trade and Connectivity Project (SATCP). It leads corridor development across the three countries. While the NDCMC implements activities supporting corridor development through sector-specific clusters, challenges remain in achieving political and institutional alignment.

1.3 Utilization of Private Enterprises

Interviews with private sector stakeholders indicated several challenges, including the low level of awareness of the Nacala Corridor, low morale among customs officials, complex customs procedures, and insufficient road, rail, and port infrastructure. At the same time, respondents expressed expectations that utilization of the Nacala Corridor could expand if enabling conditions are met, such as improved convenience of rail transport and the introduction of RORO vessel services.

1.4 Challenges with Border Facilities and Customs Procedures

Major border crossings face numerous challenges, including power shortages, insufficient parking space, lack of scanners, inadequate countermeasures against smuggling, and insufficient staff housing. Particularly concerning is the inefficient operation of the OSBP between Malawi and Mozambique due to poor coordination, and the lack of interoperability in bonded transport systems across countries, which requires improvement.

1.5 Operation, Management, and Utilization of Nacala Port

Nacala Port was operated under a concession contract by CDN (Northern Corridor Development Company) from 2005 until its expiration in 2020. It is now directly managed by CFM (Mozambique Railways and Ports Authority). The new container terminal at the North Pier, constructed under a yen loan project, commenced operations in October 2023, and a liquid bulk berth was also developed. However, the South Pier shows significant deterioration. While port throughput is steadily increasing, it remains smaller in scale compared to Beira Port and Maputo Port. Challenges persist in several areas, including port facility maintenance and management, and staff training is ongoing.

1.6 Security Situation

Security along the Nacala Corridor is at the average level for Southern Africa and is considered safer than the mineral transport routes leading to Durban Port in South Africa. However, security concerns in northern Mozambique remain persistent.

1.7 Comparison with Neighboring Ports and Corridors

Nacala Port holds advantages with its deep-water berths and rail freight capabilities, but handles fewer cargo volumes and container routes than the ports of Durban or Maputo. Synergies with the Lobito Corridor are also anticipated to enhance the land bridge effect.

1.8 Roadmap Considering Stages of Economic Development

The corridor's development stages were conceptually organized into three phases: initial operation as a corridor for bulk transport, followed by diversification and value-added transport in the medium term, and ultimately progression to further sophistication. The roadmap also emphasized the need to consider smart corridor development through DX/IoT utilization.

Chapter 2 Support Status at Nacala Port and the International Corridor

2.1 Previous Surveys and Project Overview

This project reviewed past JICA initiatives, including grant aid, yen loan projects, and technical cooperation, alongside support projects from the World Bank and the EU. These include: revising demand forecasts for Nacala Port; supporting the formulation of a port operation improvement plan; the Lusaka Metropolitan Area Integrated Development Plan in Zambia; and the Road Vulnerability Assessment Project in Malawi.

2.2 Project Status, Achievements, and Challenges of Other Donors

The World Bank supports corridor development through SATCP, but insufficient coordination among member countries remains a challenge. The EU supports road development and standardization, but faces funding and time constraints. Future cooperation from the WFP and TMA is also anticipated.

2.3 Dashboard Development

The planned dashboard for centralized management of support projects related to the Nacala Corridor was modified from the original plan and will now be limited to data sharing.

2.4 Consideration of Offer-Based Cooperation

The outcomes of this project are expected to be utilized for the "Nacala Corridor Wide-Area Offer-Based Cooperation" initiative proposed at TICAD-9, representing a potential avenue for offer-based cooperation in collaboration with Japanese companies.

Chapter 3 Review of the Draft JICA Cooperation Policy

3.1 Feasibility Study of Potential Cooperation Projects

The potential of the Nacala Corridor as an international corridor was presented in five hypotheses: (1) development of the agricultural product processing industry, (2) green corridor/climate change response, (3) transport corridor supporting economic development, (4) mineral transport corridor, and (5) land bridge effect with the Lobito Corridor. To leverage these, we proposed a scenario to provide phased support for promoting the establishment of a rail freight transport system, raising awareness of the corridor, maintaining reliability, stimulating new transport demand, and developing the economy and improving living standards in areas along the corridor.

We also organized specific candidate cooperation projects for Zambia, Malawi, and Mozambique (grant aid, technical cooperation, and future yen loan projects). Examples include the Chipata Logistics Base (access road to the rail freight station) development project in Zambia, the M1 road rehabilitation project in Malawi, and the Nacala Port access road improvement project in Mozambique. Furthermore, it clearly identified issues requiring joint efforts by multiple countries.

3.2 Proposals on the Significance of Japan's Development Cooperation for the Nacala Corridor

This section reviews JICA's history of support for the Nacala Corridor and presents a medium-to-long-term cooperation policy based on the "Wide-Area Offer-Based Cooperation" proposed at TICAD-9. This was organized as a roadmap to comprehensively promote the following: resolving logistics bottlenecks, enhancing corridor reliability, creating new transport demand, developing the economies along the corridor, and improving quality of life—all based on the rail freight transport system, which is the strength of the Nacala Corridor. It also highlighted the importance of collaboration with diverse entities utilizing Japanese corporate technologies and solutions, achieved through ensuring the sustainability of infrastructure operation via public-private partnerships and establishing platforms for creating new business opportunities.

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Abbreviation List

Abbreviation	Original Sentence
ABE initiative	African Business Education for Youth
ADIN	Agência de Desenvolvimento Integrado do Norte
AfDB	African Development Bank
AGL	Africa Global Logistics
AICC	African Institute of Corporate Citizenship
AIS	Automatic Identification System
ANE	Aministraçao Nacional de Estradas
APIEX	Agência para a Promoção de Investimento e Exportações
ARR	Afforestation, Reforestation, or Revegetation
ASYCUDA	Automated SYStem for CUstoms Data
ATMM strategy	Agriculture, Tourism, Mining, Manufacturing strategy
AU	African Union
AVC	Agri Value Chain
CAGR	Compound Annual Growth Rate
CASCADE	Catalyzing Strengthened Agricultural Capacity for Enhanced Development
CBD	Central Business District
CCTV	Closed-Circuit Television
CDM	Clean Development Mechanism
CDN	Corredor de Desenvolvimanto do Norte
CEAR	Central East African Railways Company
CFM	Caminhos de Ferro de Moçambique
CFS	Container Freight Station
CIF	Cost, Insurance and Freight
CLA	Companhia Logística de África, Lda.
CLN	Corredor Logístico Integrado de Nacala
CMA-CGM	CMA CGM Group
COMESA	Common Market for Eastern and Southern Africa
COSCO	China COSCO Shipping Corporation Limited
COVID-19	Coronavirus Disease 2019
CSR	Corporate Social Responsibility
DPAP	Direcção Provincial de Agricultura e Pescas
DX	Digital Transformation
EAC	East African Community
EDF	EU Development Fund
EIB	European Investment Bank
ENDE	Estratégia Nacional de Desenvolvimento
EU	European Union
FAST	Flexible Anti-Smuggling Team
FC	Full Container
FCDO	Foreign, Commonwealth & Development Office
FOB	Free On Board
FOIZ	Fujarirah Oil Industry Zone

Abbreviation	Original Sentence
FOTT	Fujairah Oil Tanker Terminal
FOIP	Free and Open Indo-Pacific
F/S	Feasibility Study
FR	Final Report
G7	Group of Seven
GAIN	The Global Alliance for Improved Nutrition
GC	General Cargo
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für. Internationale Zusammenarbeit
GMS	Greater Mekong Subregion
GPS	Global Positioning System
GX	Green Transformation
IAR	Instituto Agrario de Ribáuè
ICD	Inland Container Depot
ICT	Information and Communication Technology
IFC	International Finance Corporation
IFEPOM	Instituto Ferro-Portuario de Moçambique
IIAM	Mozambique Institute of Agricultural Research
IMF	International Monetary Fund
IMO	International Maritime Organization
IoT	Internet of Things
JBCA	Japan Business Council for Africa
JBIC	Japan Bank for International
JCM	Joint Crediting Mechanism; JCM
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
KPA	Kenya Ports Authority
LCL	Less-than-Container Load
MA	Ministry of Agriculture
MBS	Malawi Bureau of Standards
MCC	Millennium Challenge Corporation
MCDT	Ministry of Communication and Digital Transformation
MCNET	Mozambique Community Network
MCTI	Ministry of Commerce, Trade and Industry
MFEA	Ministry of Finance and Economic Affairs
MFEZ	Multi-facility Economic Zone
MGL	Ministry of Local Government and Rural Development
MIHUD	Ministry of Infrastructure, Housing and Urban Development
MLGRD	Ministry of Local Government and Rural Development
MMMD	Ministry of Mines and Minerals Development
MOA	Ministry of Agriculture
MOFNP	Ministry of Finance and National Planning
MoIT	Ministry of Information and Technology
MOTW	Ministry of Transport and Works

Abbreviation	Original Sentence
MOTL	Ministry of Transport and Logistics
MOU	Memorandum Of Understanding
MP	Master Plan
MRA	Malawi Revenue Authority
MSC	Mediterranean Shipping Company
MTL	Ministry of Transport and Logistics
MTPI	Ministry of Trade and Industry
MTPW	Ministry of Transport and Public Works
MRA	Malawi Revenue Authority
MW2063	Malawi's Vision MALAWI 2063
NAO	National Authorizing Office
NDCMC	Nacala Development Corridor Management Committee
NRFA	National Road Fund Agency
NTMP	National Transport Master Plan
OGBP	One Go-Border Post
OSBP	One Stop Border Post
PAD	Project Appraisal Document
PCS	Port Community System
PDU	Presidential Delivery Unit
PEDEC-Nacala	Projecto das Estratégias de Desenvolvimento Económico do Corredor de Nacala
PIDA	Programme for Infrastructure Development in Africa
PIDA-PAP	PIDA Priority Action Plan
PIL	Pacific International Lines (Pte) Ltd
PIU	Project Implementation Unit
PISCA	Participatory Integrate Climate Services for Agriculture
PN	Porto do Norte
PPP	Public Private Partnership
QOL	Quality of Life
RDA	Road Development Authority
REDD＋	Reducing Emissions from Deforestation and Forest Degradation
RORO 船	Roll On/Roll Off ship
RTG	Rubber-tyred Gantry Crane
RTSA	Road Transport and Safety Agency
SADC	Southern African Development Community
SATCP	Southern Africa Trade and Connectivity Project
SATREPS	Science and Technology Research Partnership for Sustainable Development
SDAE	Serviços Distritais de Actividades Económicas
SDCN	Sociedade de Desenvolvimento do Corredor do Nacala
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprises
SQAM	Standard, Quality Assurance, Accreditation and Methodorogy
SSCBTI	Small-scale Cross Border Trade Initiative
SWOT	Strengths, Weaknesses, Opportunities and Threats
SZI	SMART Zambia Institute

Abbreviation	Original Sentence
TEU	Twenty-foot Equivalent Unit
THC	Terminal Handling Charge
TICAD	Tokyo International Conference on African Development
TIPDeP	Trade, Industry and Private Sector Development Partners
TMA	Trade Mark Africa
TPA	Transnet Port Terminal
TRACER	Transport Corridors for Economic Resilience
TTTFP	Tripartite Transport & Transit Facilitation Programme
UAFL	United Africa Feeder Line
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
USAID	U. S. Agency for International Development
UTI-PEDEC	Unidade Técnica de Implementação do PEDEC
WB	World Bank
WFP	World Food Programme
WITS	World Integrated Trade Solution
WTO	World Trade Organization
ZCCM	Zambia Consolidated Copper Mines
ZDA	Zambia Development Agency
ZIPAR	Zambia Institute for Policy Analysis & Research
ZR	Zambia Railways Limited
ZRA	Zambia Revenue Authority
ZRL	Zambia Railways Limited

Introduction　Project Overview

Background and Purpose of the Project

The purpose of this project is to analyze the current status and challenges of Nacala Port and the Nacala Corridor, clarify the significance of Japan's support, and formulate future policies. This will enable the creation of projects that leverage the corridor's potential as an international corridor, ultimately contributing to infrastructure development and industrial promotion in the Nacala Corridor region. The background for undertaking this project consists of the following two points.

(1)　JICA's Long-Term Support for the Nacala Corridor Development

The Nacala Corridor, a vital international corridor spanning Malawi, Zambia, and Mozambique, has been positioned as one of the "Three Priority Corridors" supported by JICA since its importance was highlighted at TICAD Ⅴ in 2013. The Nacala Corridor development aligns with the Programme for Infrastructure Development in Africa (PIDA), a policy under the African Union's (AU) long-term development vision "Agenda 2063. " Consequently, it represents a significant development priority for Japan. JICA has consistently supported Nacala Corridor development through the following projects:

- Improvement of the "Nampula–Cuamba Section (350 km)" (co-financed by JICA and the African Development Bank (AfDB)) to ensure year-round possibility of the main trunk road forming the foundation for transport along the international corridor. The status is as follows: The road between Cuamba, Mandimba, and Lichinga has been completed (the section between Cuamba, Mandimba, and Massangulo was funded by AfDB), and AfDB is planning to provide equipment for the Mandimba OSBP. Although some sections remain unfinished, it contributes to improving the movement and exchange of people and goods within the corridor region. Furthermore, development is underway on the main road of the Nacala Corridor within Mozambique that follows this section (Cuamba–Mandimba–Lichinga: including plans for a One-Stop Border Post (OSBP) at Mandimba).
- As the corridor's international gateway, the "Nacala Port Development Project (Yen Loan)" aimed at enhancing the port's functionality held its completion ceremony in October 2023. This marked the establishment of its port functions. Furthermore, technical transfer related to improving port operations was implemented in parallel during the development phase.
- Beyond developing transport infrastructure along the corridor, the long-term direction outlined in the "Regional Development Strategy"—the "Nacala Corridor Economic Development Strategy (PEDEC-Nacala)"—aims to foster broader economic development in the corridor region (including the movement and exchange of people and goods, and fostering regional industries), the "Nacala Corridor Economic Development Strategy (PEDEC-Nacala)" was formulated as a regional development strategy in collaboration with the provincial government of the northern region and other relevant ministries. To drive its cabinet approval and implementation, the Technical Implementation Unit for PEDEC-Nacala (UTI-PEDEC) was established within APIEX (Agency for Investment and Export Promotion).

- During the formulation of PEDEC-Nacala, we recommended and subsequently implemented the call to action to relevant countries during the JICA support period. This led to the realization of an International Seminar involving three countries, including Malawi and Zambia, and the signing of an MOU among the relevant institutions (2013). This is believed to have paved the way for the subsequent establishment of the Secretariat of the Nacala Corridor Development Management Committee (NDCMC) among the three countries.

In northern Mozambique, the corridor region had been devastated by civil war, which destroyed infrastructure and led to social fragmentation and mutual distrust, causing industrial stagnation and exhaustion. However, it is well known that during the pre-colonial era, railways were laid, and it flourished as a transport corridor known as the Cotton Corridor and Salt Corridor. The aforementioned JICA support is understood to have been undertaken to revive this corridor, recognizing its potential as an internationally significant route that once thrived. Against this backdrop, the PEDEC-Nacala initiative was formulated. At the time, it involved implementing a series of projects to promote industrial development in the Nacala Corridor region and revitalize it as an international corridor. This was achieved by leveraging the ongoing rehabilitation of railways for coal transportation by Japanese companies and the emerging private investment, including from Mozambique and Japanese firms, for gas field development.

(2) Potential for Project Development Leveraging the Nacala Corridor's Potential as an International Corridor

The development of the Nacala Corridor from Nacala Port to Zambia has received extensive support not only from JICA but also from the AfDB, EU, and World Bank (WB). Within the corridor region, where road improvements have progressed, local economic development is advancing through the exchange of people and goods, and small-scale challenges in new business ventures are also underway. Japanese companies are also showing signs of investment in various industries, recognizing the corridor's potential (e. g., agricultural exports by ETG, invested in by Mitsui & Co. ; moringa and jatropha projects; and companies in Malawi).

However, from a corridor-wide perspective, numerous challenges persist. These include unfinished infrastructure sections, lack of necessary facilities, complex customs procedures at border crossings and port-related logistics, and vulnerability to natural disasters such as landslides during the rainy season. Furthermore, the slump in coal transportation was expected to drive corridor development along with deteriorating security and restrictions on human movement due to COVID-19.

Despite these challenges, during the completion ceremony for Nacala Port development supported by Japan, the leaders of the three countries in the Nacala Corridor region agreed to enhance cooperation on corridor development. Meetings and activities related to cooperation at the implementing agency level in each country have become more active. Furthermore, the US and EU have begun strengthening support for the Lobito Corridor, which uses the Atlantic-side port of Lobito as its exit point. Given the high level of attention on Zambia's copper and cobalt mining areas, the inland starting point of this corridor, momentum is building to explore support that would promote development. This is particularly

relevant from the perspective of G7 collaboration on African development, focusing on connectivity and coordination between the Lobito and Nacala Corridors, both of which originate in Zambia.

Countries and Regions Covered by this project

The scope of activities covers regions related to the revitalization of the Nacala Corridor in the Republic of Mozambique, the Republic of Malawi, and the Republic of Zambia.

Interviewed Institutions and Organizations

Interviews were conducted with the following government agencies, international donors, and private companies. However, in Mozambique, due to the time required for the formation of a new cabinet following the October 9, 2024 presidential election and the resolution of disputes with the opposition, it was difficult to secure appointments for interviews with suitable individuals during the March 2025 field survey. Consequently, visits were limited to specific organizations within the available timeframe.

(1) Republic of Mozambique

Ministry of Transport and Communications(Ministério dos Transportes e Comunicações; MTL), National Roads Administration (Administração Nacional de Estradas; ANE), Mozambique Ports and Railways (Caminhos de Ferro de Moçambique; CFM), Agency for Promotion of Investment and Exports (Agência para a Promoção de Investimentos e Exportações; APIEX), Northern Integrated Development Agency (Agência de Desenvolvimento Integrado do Norte; ADIN), Government of Nampula Province (Department of Construction and Environment), Ministry of Science, Technology and Higher Education (online)

(2) Republic of Malawi

Ministry of Transport and Public Works (Department of Roads / Public Works), Ministry of Agriculture, Ministry of Water and Sanitation, Ministry of Trade and Industry, Ministry of Tourism, Ministry of Finance and Economic Affairs (Revenue Authority, Roads Fund Administration), Bureau of Standards, Police Service, Ministry of Local Government, National Unity and Culture, Ministry of Energy, Ministry of Mining, Ministry of Natural Resources and Climate Change, Road Authority, Road Authority, NDCMC SATCP (Southern Africa Trade and Connectivity Project), UNDP, African Institute of Corporate Citizenship (AICC), Malawi Cargo Centres, Paramount. Co., Arizo Co., Tokyo 8 Global. Co

(3) Republic of Zambia

Ministry of Infrastructure, Housing and Urban Development, Ministry of Transport and Logistics, Ministry of Agriculture, Ministry of Commerce, Trade and Industry, Ministry of Mines and Minerals Development, Ministry of Finance and National Planning, Revenue Authority, Ministry of Local Government and Rural Development, Ministry of Fisheries and Livestock, Cabinet Office, SMART Zambia Institute, Zambia Railways Limited, Roads Development Agency, National Road Fund Agency, Road Transport and Safety Agency, Development Agency, EDF, Zambia Compulsory Standards

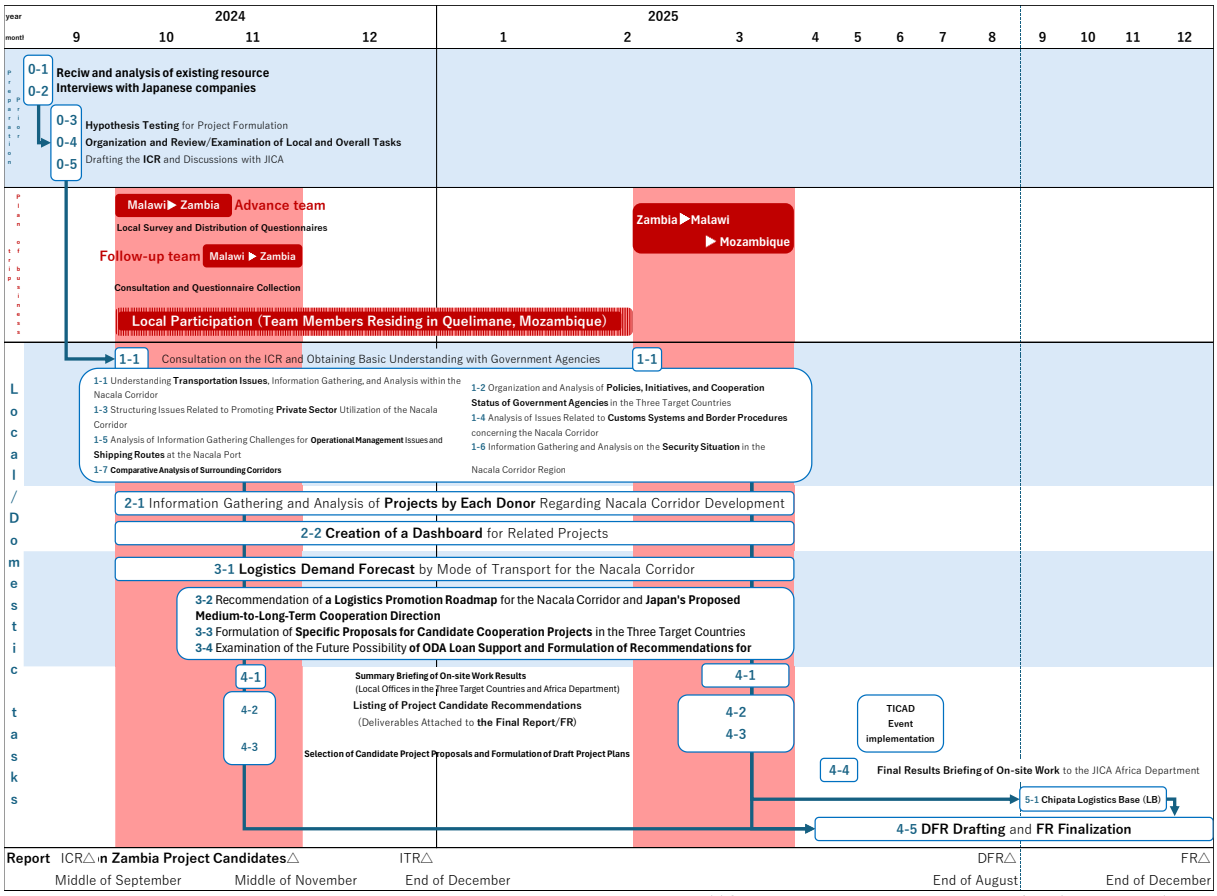
Agency, Zambia Policy Institute, COMESA, EU, WB, Hitachi Construction Machinery Zambia, AGL. Co Zambia Office, Alistair. Co Zambia Office

In addition to these national agencies, interviews were conducted online with Japanese companies (Mitsui & Co., Ltd., Mitsui O. S. K. Lines, Ltd., Nishizawa), and TMA (Trade Mark Africa), which has provided logistics support primarily in East Africa.

Implementation Procedures and Schedule

After commencing operations in September 2024, we collected information and data from existing survey results and related materials in Japan, followed by content analysis of various information. Subsequently, from October to November, we conducted the first field survey in Zambia and Malawi, including a survey of all roads along the Nacala Corridor, inspections of border facilities, and on-site surveys of railway stations and transshipment facilities. Based on this information, we collected and analyzed data related to the Nacala Corridor. A second field survey was conducted in the three target countries from February to March 2025. Regarding Mozambique, considering the deteriorating security situation due to riots stemming from protests over the October 2024 presidential election results, and in accordance with JICA's travel ban to Mozambique (until the end of February), the field survey was conducted in March. After returning, based on the results of the field survey and interviews, we formulated specific proposals for candidate cooperation projects (grant aid and technical cooperation) in each country to promote logistics along the Nacala Corridor. We also explored the potential for future yen loan support and developed concrete project proposals. Furthermore, at JICA's request, the project manager participated in the "Nacala Corridor Development Potential" seminar hosted by the Japan Business Council for Africa (JBCA) as an event related to TICAD 9. The manager presented the survey findings and facilitated a panel discussion.

A flow chart detailing the activities currently being implemented in this project and their timing is shown at Figure 1.



Source: JST

Figure 1　Flow chart for this project (as of the work plan)

Final Report (FR) Structure

The FR structure deepens understanding of the current status of the Nacala Corridor in "Chapter 1: Current Status of Nacala Port and the International Corridor, " analyzes challenges for promoting logistics, and organizes the support situation, including JICA, in "Chapter 2: Support Situation for Nacala Port and the International Corridor". "Chapter 3: Review of JICA's Proposed Cooperation Policy" proposes potential cooperation projects (Grant Aid and Technical Cooperation), the possibility of future support through yen loans, and specific project candidates.

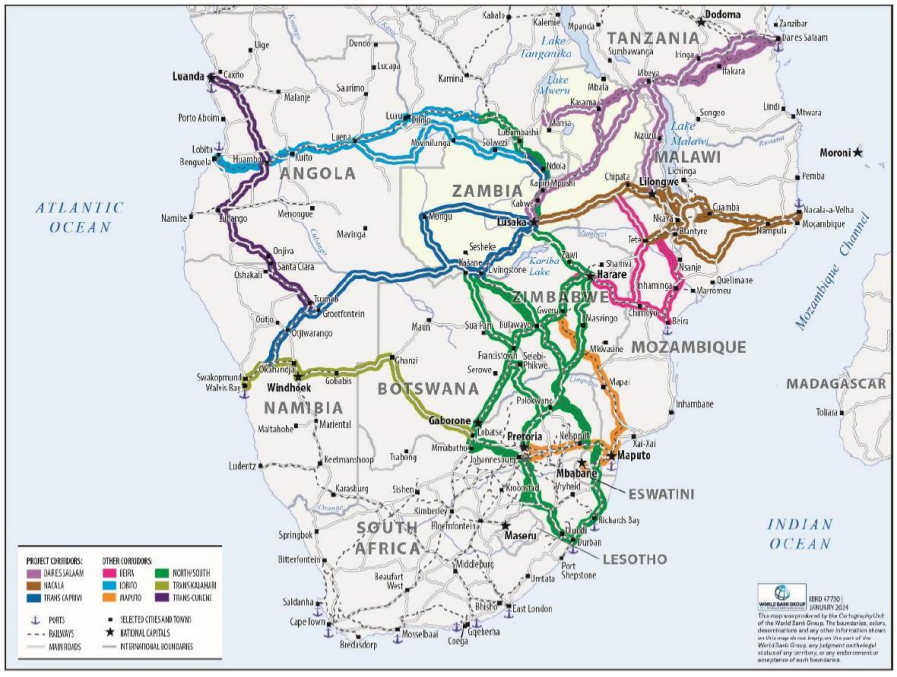
Chapter 1 Current Situation at Nacala Port and the International Corridor

1.1 Transported Goods and Transportation Conditions

1.1.1 Overview of the Nacala Corridor (Route and Characteristics)

The route for the "Nacala Corridor" is being considered flexibly, primarily focusing on the routes from Nacala Port to Chiponde (Chiponde), Mandimba to Chipata, and Mchinji to Lusaka. According to Zambia's Ministry of Transport and Communications, the Tripartite Agreement concerning the Nacala Corridor includes, in addition to the aforementioned routes, the route from Beira Port to the Chandima border. Furthermore, it was stated that the route incorporating railway development via the Tazara Railway to Chipata in eastern Zambia would also be included within the Nacala Corridor. Furthermore, it was noted that due to the Zimbabwean government introducing a "Transit Exclusion Import Duty" on fuel passing through Zimbabwe, requiring advance payment of this duty at the point of entry into Zimbabwe, a route bypassing Zimbabwe—entering Zambia directly via the Chanida border from Tete—is also considered part of the Nacala Corridor. In Malawi, it was found that multiple routes are used on roads within Malawi leading to Mandimba, and that routes via southern Malawi's border that do not pass through Mandimba are also referred to as the Nacala Corridor. Figure 1-1 shows the routes of 11 major transport corridors as documented in the Project Appraisal Document (PAD) for the Transport Corridors for Economic Resilience Project (TRACER, Project ID: P18081), a grant project for Zambia approved by the World Bank in January 2024.

Given the above context, this study broadly defines the Nacala Corridor as "the main road and railway line connecting Nacala Port to Lusaka, along with its surrounding areas. "

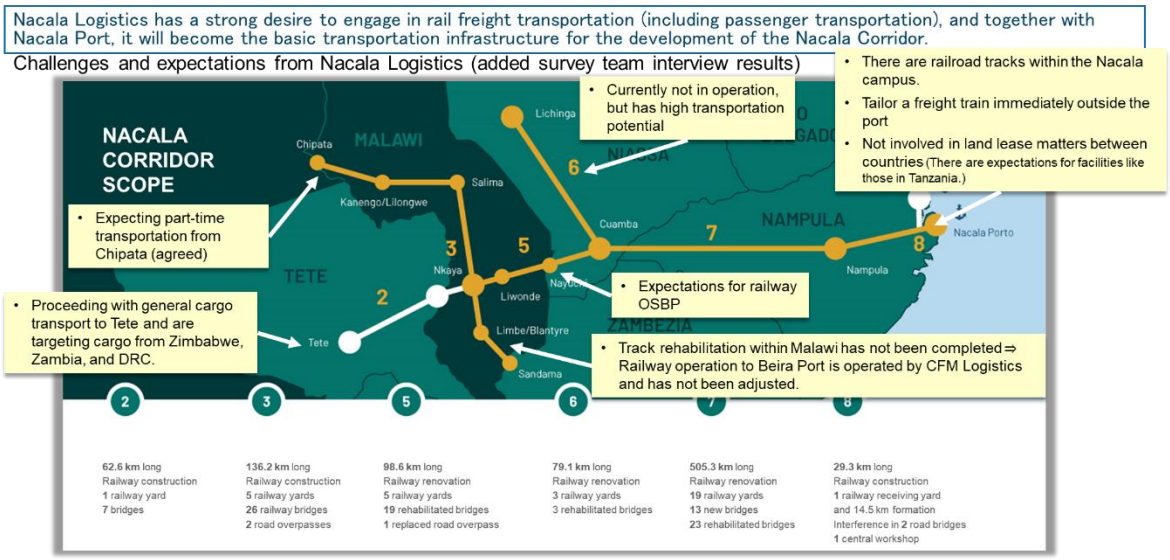


Source: Project Appraisal Document (PAD) for Transport Corridors for Economic Resilience (TRACER) (P180801), ANNEX 7 Maps, 2024. 1

Figure 1-1 Routes of 11 Major Transport Corridors in the Southern African Region (Nacala Corridor: Brown)

1.1.2 Latest Status of Rail Freight Transport in the Nacala Corridor

Currently, rail transport from Nacala Port is handled by Nacala Logistics, established in 2020 (Figure 1-2). The company operates the 1,700 km rail network connecting Mozambique and Malawi, as well as the dedicated coal export port located in Nacala Velha, Mozambique[1]. It handles coal transport, general cargo transport, and passenger transport. In practice, it is a collective branding name for a consortium of general freight and passenger operator companies from each country: CDN (Mozambique's domestic railway operator: state-owned), CLN/CLA (railway operator for coal transport from the Moatize mine: private concessionaire), and CEAR (Malawi's domestic railway operator: state-owned). The Malawi section was privatized from Malawi Railways in 1995, with Malawi Railways (1994) Limited (MR94) commencing operations. Subsequently, following an international tender in 1999, CEAR acquired a 20-year operating concession, and a concession agreement was signed between MR94 and CEAR. Furthermore, this contract was extended mid-term for 30 years, with the current concession contract set to expire in 2046. Meanwhile, the railway concession in Mozambique is held by the state-owned railways CFM and CDN. This concession contract was extended for 15 years in 2020, with the contract scheduled to expire in 2035. Within this railway network, the construction of the coal transport route was realized by Valle and Mitsui & Co. through the improvement of over 1,500 km of existing railways and the development of new lines. Subsequently, it was transferred to the Vulcan Group[2].



Source: Based on Nacala Logistics (December 2024, obtained by the JST) materials, with additions by the JST

Figure 1-2 Railway Transport Network and Its Challenges and Expectations

According to the company, general cargo shipments from Nacala Port have steadily increased since 2022 (within the concession contract's transport capacity) (Figure 1-3). According to March 2024 data, the annual cargo throughput is projected to be 548,000 tons in 2023 and 900,000 tons in 2024. The journey time from Nacala Port to Blantyre is 36 hours, with each train capable of carrying cargo

[1] Through interviews conducted for this survey, it became clear that definitions for facilities such as dry ports and ICDs (Inland Container Depots) are not necessarily standardized across the target countries. The terminology used for transshipment facilities in this survey is clarified in Section 1.4.3.

[2] Vulcan International, the investor behind Vulcan Mozambique, Lda., has shareholder ties with Jindal Shadeed Iron and Steel LLC (JSIS), one of the largest steel companies in the Middle East.

equivalent to 85-90 trucks at once (currently operating 12 coal trains/day, 120 wagons (approx. 2km) (the concession agreement stipulates daily operation of 2 general cargo trains and 1 passenger train). Current general cargo transport is said to be operating at about 40% of its transport capacity (the document states an annual cargo transport capacity of 4 million tons). Furthermore, according to Nacala Logistics. The proportion of cargo transported by rail among goods arriving from or departing to Malawi that are loaded/unloaded at Nacala Port reaches 90%.

Note: From 2019 to 2022, rail transport volumes also declined due to the impact of the novel coronavirus. Recovery has been observed since 2023, with transport volumes beginning to increase.

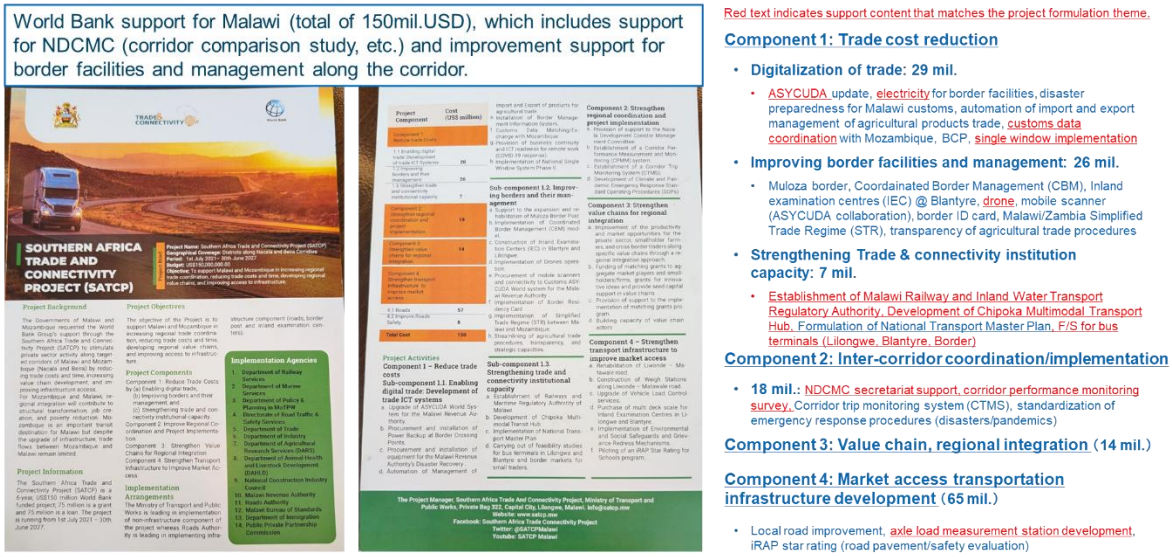
Source: Nacala Logistics, March 2024

Figure 1-3 Nacala Logistics materials (General Railway Freight Transport Performance) presented at the 8th NDCMC (March 2024)

1.2 Policies and Cooperation Status of the Three Target Countries Related to Corridor Development

The Tripartite Nacala Development Corridor Management Committee (NDCMC), established in 2000 to utilize the Nacala Corridor, plays a leading role. Under Tripartite Agreements (covering the overall corridor, roads, and railways), a meeting body for corridor development and management has been organized. To date, nine meetings have been held (9th Meeting: March 10-13, 2025, in Lilongwe,

Malawi) Discussions are progressing within ten clusters[3] for each sector. The NDCMC's activities are supported by the World Bank's SATCP (Southern Africa Trade and Connectivity, Project ID: P16487). A Project Implementation Unit (PIU) has been established within Malawi's Ministry of Transport and is actively engaged in its work (support period: 2021–2027). The support amount of 380 million USD covers not only meeting operational costs but also the "Corridor performance measurement and monitoring" survey, a Joint Operation Survey by customs officials, OSBP (road) development, and ASYCUDA upgrades (Figure 1-4).



Source: JST (Photo in Figure obtained from WB-SATCP Newsletter via Malawi Ministry of Transport)

Figure 1-4 Support Project for NDCMC: Overview of WB SATCP (Southern Africa Trade and Connectivity)

Additionally, beyond the WB, technical cooperation and support related to SQAM (Standardization, Quality Assurance, Accreditation, and Metrology) provided by the EU and UNDP-UNIDO to the Malawi Bureau of Standards (MBS) (2012-16) also constitutes an initiative aimed at enhancing Malawi's export and import capacity, thereby contributing to the promotion of the use of the Nacala Corridor.

Therefore, when presenting JICA's support for utilizing the Nacala Corridor, it is important to explicitly identify the areas proposed by JICA, taking into account these NDCMC activities, WB support for SATCP, and support from other donors such as SQAM. This ensures that JICA's support is "incorporated" as one of the NDCMC's activities, which is crucial for the feasibility of project candidates and for realizing effects across the entire corridor.

1.3 Utilization of the Nacala Corridor by Private Companies (including Japanese Companies)

This survey revealed through interviews with private companies (refer to Table 1-1) that high expectations exist for rail transport from Nacala Port, while low awareness of Nacala Corridor remains a challenge.

[3] 1. Customs, 2. Sanitary and Phytosanitary (SPS) Agriculture, 3. Immigration, 4. Road Transport Operations and Safety, 5. Climate Resilience and Pandemic Response, 6. Industry, 7. Trade, 8. Standard, Quality Assurance, Accreditation and Methodology (SQAM), 9. Railways, 10. Transport Infrastructure

For shipping companies determining import/export routes, it has been demonstrated that significant advantages or distinctive features (differences from other ports) are necessary to shift from established shipping routes to new ones. Hitachi Construction Machinery Zambia, which handles large construction machinery for mines in the Copperbelt region, currently has a distribution center in South Africa. It primarily transports not only the construction machinery vehicles themselves but also repair and consumable parts needed for maintenance from the Port of Durban (South Africa) (Urgent parts are handled via air transport.). Reducing land transport time and ensuring punctuality are critical. If conditions such as improving Nacala Port operations, securing punctuality and speed via rail transport, and establishing a transport method for large construction machinery through RORO ship service to Nacala Port are met, this could become an opportunity to utilize Nacala Port and the corridor (By 2025, the volume of construction machinery handled is expected to double from the current 100 units, making securing transport routes critical). Furthermore, according to AGL, one of Africa's major logistics companies, challenges identified for the Nacala Corridor in terms of soft infrastructure include low awareness among customs brokers, low morale among Mozambican customs officials, and complex clearance procedures. Regarding physical infrastructure, while roads, railways, and ports are all inadequate in terms of condition and facilities, it was indicated that if rail freight transport becomes available all the way to Zambia, they would like to utilize it. Furthermore, an interview with Alistair, a competitor, revealed that the route from Zambia via Malawi using the Nacala Port is not sufficiently recognized by transport companies at present; the reality is that the ports of Durban and Dar es Salaam are being used. Other challenges cited included language barriers with Mozambican stakeholders and security concerns in northern Mozambique, where the Nacala Corridor is located (while it was also noted that the currently used Durban port route faces difficulties in responding to attacks by armed groups).

Therefore, focusing on promoting the transport advantages of the Nacala Corridor to shipping companies operating in Africa and customers requiring transport services is considered effective for enhancing the utilization of the Nacala Corridor. Furthermore, for forwarders handling containers, the balance of container imports and exports at the port and ease of transshipment are shown to be major factors in selecting ports, corridors, and routes. It is also considered important to develop export products and ensure sufficient space for transshipment operations of fertilizers and fuels at Nacala Port, along with adequate warehouses for storing cargo, to increase upstream transport volumes. Table 1-1 summarizes the findings from interviews conducted with private sector companies (logistics providers, shippers, etc.) in Malawi, Zambia, and Mozambique regarding utilization and bottlenecks at Nacala Port and Nacala Corridor.

Table 1-1 Summary of Private Sector Opinions on the Nacala Port and Corridor (Interview Results)

Company Name	Business Overview	Utilization Status and Bottlenecks of Nacala Port and Corridor
Japanese Companies (Interview Results in Malawi and Zambia)		
Tokyo8 [Malawi]	Manufacture and sale of liquid organic fertilizer using microbial plant activators	Port Nacala is not currently utilized. Currently, the plan is to transport goods overland from Maputo Port to various countries. Due to the still small scale of production and transportation, rail is not being used. Besides shipping by sea to Maputo Port, air transport is also being considered. • Recognizes that tariff issues remain a challenge. Transporting from Mozambique to various countries involves multiple customs clearances, incurring clearance fees each time. However, compared to conventional chemical fertilizers, this product is naturally derived, resulting in lower tariff rates. • Concerns regarding transportation infrastructure include road flooding during the rainy season.
Hitachi Construction Machinery Zambia [Zambia]	Sales, service, and parts supply for general construction machinery and mining equipment	[Hardware Aspects] • Items shipped directly from Japan are repair parts that barely fit into a 20-foot container. If a port can accommodate RORO ships, we would prefer to use Nacala Port. • If regular shipping from Japan to Nacala Port were available, it would be beneficial for us as it would reduce transit time. [Software Aspects] • As mentioned above, during the 2010 review, we determined that import customs clearance procedures were slow.
Dai Nippon Construction / Katahira Engineering International [Malawi]	Construction Industry (Currently implementing the new Lilongwe River Bridge as grant aid)	Regarding the import of materials and equipment, Japanese shipping companies recommended using either Dar es Salaam Port or Beira Port; Nacala Port was not mentioned.
Mitsui & Co. [Mozambique]	Trading Company	[Hardware Aspects] • The ability to transport goods by rail from Malawi to the port is attractive, and we wish to utilize this option. [Soft Aspects] • A major factor deterring foreign investment is the occurrence of smuggling, such as drugs, along the coast associated with the Nacala Corridor. This country lacks a coast guard, and enforcement against such activities is insufficient. On land, police enforcement is also inadequate.
MOL [Mozambique]	Logistics Company	• For the ongoing power transmission line project in Nacala, we wish to improve the transmission lines and substations (should the project proceed, it is anticipated that the Nacala Port could be utilized for transporting materials and equipment).
Local Companies (Findings from on-site interviews in Malawi and Zambia)		
AGL (Africa Global Logistics) [Zambia]	Logistics company	[Hardware Aspects] • Currently, for overland transport from Lusaka to the east, Beira Port is the most convenient option. The distance to Nacala Port is twice that of Beira Port, incurring extra costs. Additionally, the poor road conditions between Chipata-Mchinji-Nampula pose a significant challenge. • Since Beira Port is shallow, goods that cannot be transported via Beira Port are instead shipped through Durban Port. • The choice of port and route is primarily decided by the shipper, though our company sometimes provides consulting. For example, we consult for major companies handling copper. The same applies to imports. It also depends on

Company Name	Business Overview	Utilization Status and Bottlenecks of Nacala Port and Corridor
		which shipping company and vessel type they wish to use. For instance, bulk shipments of chemicals or grains use Tanga (northern Tanzania), while container shipments of machinery or mineral resources use Durban. [Soft Aspects] • Customs brokers are unfamiliar with the Nacala Corridor. Its relative obscurity is also an issue. • There are problems with Mozambique's customs officials. Clearance procedures are complex. Port operational conditions are also poor. • Strategy regarding which commodities to handle is crucial for promoting port usage. Port usage fees are also a major factor.
Alistair [Zambia]	Trucking Companies	[Hardware Aspects] • The reason Port Nacala has historically been underutilized is that the roads to Maputo Port and Beira Port are well-maintained and easy to use. [Software Aspects] • The route from Zambia through Malawi to use Nacala Port is not well known to transport companies. Therefore, ports like Durban and Dar es Salaam are used instead. When using Port of Beira, the route through Catete to Tete is used, not Chipata. Other challenges include language barriers and the perception that northern Mozambique is a dangerous region.
Arizo Investment [Malawi]	Trade, investment, and consulting company in sectors including healthcare, agriculture, energy, construction, and manufacturing	[Hardware Aspects] • Depending on volume, using the Port of Dar es Salaam is standard for bulk shipments. Air freight is also sometimes used. [Soft Aspects] • Existing customers and products already have established shipping routes; switching to use Nacala Port is difficult without significant incentives. Furthermore, awareness of Nacala Port and the Corridor needs to be raised. Platforms such as a website introducing Nacala Corridor may be necessary.
Paramaunt [Malawi]	Trading Companies	[Hardware Aspects] • Regarding connections with Japanese companies, they are an authorized dealer for Yamaha motorcycle sales and supply sesame to Itochu, but they use Beira Port. • The road conditions between Mandimba and Lilongwe are poor and recognized as hazardous. • Rail transport from Nacala Port commenced in October 2024. Whether to increase its use going forward is under consideration. [Software Aspects] • The reasons for not using Nacala Port are the Terminal Handling Charge (THC) (approximately 1. 5 times higher than Beira Port) and the increased truck transportation costs.
Agri Value Chain (AVC) [Malawi]	ETG Group's agricultural trading company (Sesame export business to Japan with Mitsui & Co.)	[Hardware Aspects] • Rail transport is the primary method, with 90% of goods from Blantyre using Nacala Port and the remaining 10% using the Beira Port. While rail operations faced challenges in the past, they have improved over the last three to four years, enabling delivery in as little as 48 hours (though delays of up to a week can occur during peak rail usage). • We understand that dedicated port facilities for Malawi, including storage, handling, licensing procedures, inspections, and customs clearance, will be developed at Nacala Port within the next two to three years. This is expected to further enhance service and reduce transit times.
Salima Mango [Malawi]	Export, processing, and sales of export-grade mangoes	[Hardware Aspects] • At the start of operations, freight rail services were unavailable, eliminating the option to use the Nacala Corridor. Consequently, land transport by truck is primarily used for shipments to South Africa, while exports to Europe also utilize the Durban Port.

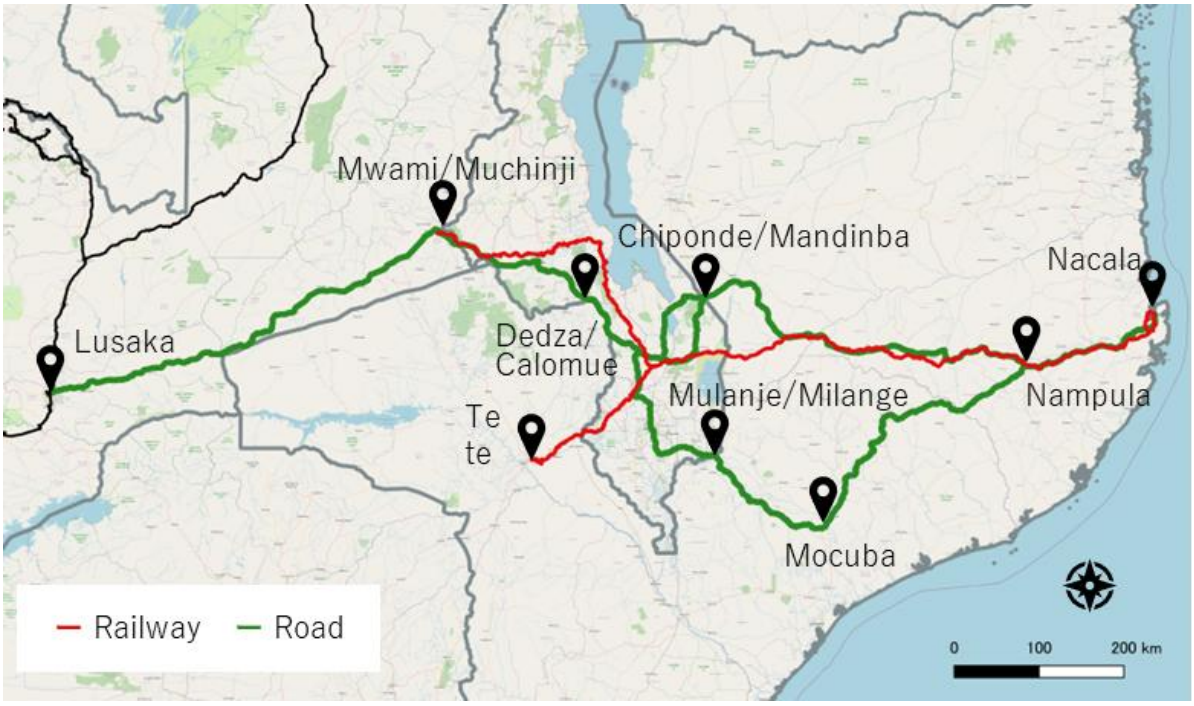
Company Name	Business Overview	Utilization Status and Bottlenecks of Nacala Port and Corridor
		• Major retailers transport mangoes to South Africa as return cargo on trucks that have delivered goods within Malawi. • However, since a railway runs near the processing plant, if refrigerated container transport infrastructure is established, utilizing the Nacala Corridor could be considered, depending on the transit time via Nacala Port.
SATREPS & Cape Maclear Tour Guide Association [Malawi]	Research conducted across multiple components including artificial reef fisheries resource management, agricultural resource management, forest resource management, tourism resource management, and nature reserve management. For tourism resource management, collaboration with the Cape Maclear Tour Guide Association.	[Hardware Aspects] • Regarding roads along the Nacala Corridor, the road condition from Nampula to Mandimba is good, but the road from Mandimba to Mulanje is poor. • For tourist flows, the Mwanza border crossing is frequently used. The Chiponde border crossing, closest to Cape Maclear, is rarely used because there are no major cities on the Mozambican side with significant demand. • The resumption of passenger rail service is anticipated. If travelers switch to cars from the nearby Golomoti station via rail, significant revitalization is expected. • Roadside stations, similar to highway rest areas, are anticipated. In Malawi, trading centers in each district serve such functions. While they operate as wholesale markets on weekdays, weekend markets catering to citizens are held. These initiatives began voluntarily by local residents, and similar efforts can be seen nationwide at.
Maldeco Fisheries [Malawi]	Fish farming, processing, and sales	[Hardware Aspects] • Currently focused solely on domestic sales, but export is under consideration, targeting markets such as South Africa, the United Kingdom, and the Democratic Republic of the Congo. • The company owns refrigerated trucks, and transportation is handled by contracted carriers. With sales outlets nationwide equipped with refrigeration and freezing facilities, products can be transported while maintaining quality. • Regarding domestic transport, while we are aware some roads are in poor condition (e. g., the Salima road), this does not pose a significant challenge.
Manica Freight Services S. A. [Mozambique]	Shipping Agency & Logistics Provider	[Hardware Aspects] • Shippers avoid using Nacala Port because there are no warehouses within the port area. [Software Aspects] • Railway operations prioritize coal transport, resulting in low general cargo handling volumes that fail to meet demand.
Transnet [Mozambique]	Integrated Shipping Company	• Currently handles cargo primarily between Maputo and Johannesburg, so has no operational history at Nacala Port. However, Nacala Port has high potential (likely hinting at the ongoing natural gas project in the north), and the company wishes to conduct business there as well.

Source: JST

1.4 Analysis of Customs Facilities and Border Procedures along the Nacala Corridor

1.4.1 Current State of Borders

The main border crossings along the Nacala Corridor are: - The Mwami/Mchinji border crossing between Zambia and Malawi - The Chiponde/Mandimba border crossing and the Dedza/Calomue border crossing between Malawi and Mozambique the Zobue/Mwanza Border (which also overlaps with the Beira Corridor). The railway border is the Nayuchi/Entre Lagos Border[4] (Figure 1-5).



Source: JST

Figure 1-5 Location of borders within the Nacala Corridor

Border management is primarily operated by the Revenue Agency under the Ministry of Finance[5]. During the field survey, we visited the organizations and personnel listed in Table 1-2 as institutions related to border facilities and customs to gather information on the current situation and challenges.

Table 1-2 Summary of Opinions from Nacala Port and Corridor Border and Customs Officials (Field Survey and Interview Results)

Visited Locations	Issues
Mwami OSBP (Mwami/Mchinji border) (Zambia)	[Infrastructure] • Frequent operational interruptions due to power shortages. Additionally, reliance on generators increases operational costs. • Dust levels are severe due to poorly maintained surrounding roads. • Although the facility spans 22 hectares, parking space (for approximately 130 vehicles) is insufficient at certain times, posing a challenge. • Road conditions from Luangwa Bridge towards Lusaka are poor. • While improvements to the Nacala Corridor road conditions are necessary, the ability to use

[4] Although overlapping with the Beira Corridor, roads passing through the Mozambique-Malawi border crossings "Karove/Dessa Border" and "Zove/Mwanza Border" are sometimes referred to as the Nacala Corridor.

[5] In Zambia, this refers to the Zambia Revenue Authority under the Ministry of Finance and National Planning; in Malawi, the Malawi Revenue Authority under the Minister of Finance and Economic Affairs; and in Mozambique, the Mozambique Revenue Authority under the Ministry of Finance.

Visited Locations	Issues
	rail is a strength. It reduces transportation costs compared to trucks. Especially for bulk shipments, using rail is more efficient. [Staff Capability] • Import procedures take up to 48 hours. Despite a national policy aimed at efficiency, which reduced staff numbers through organizational consolidation within the OSBP, this has not led to shorter processing times.
Mchinji OSBP (Mwami/Mchinji border) (Malawi)	[Infrastructure] • Power shortages frequently interrupt operations. Additionally, relying on generators increases operational costs, posing a challenge. • COMESA is planning to expand the unloading warehouse, but implementation is stalled due to insufficient funding. The current parking area accommodates approximately 100 vehicles. • With EDF support, OSBP upgrades are underway. While the scanner building has been constructed, no scanner is currently installed. [Staff Capability] • Customs clearance procedures take between 3 hours and up to 48 hours.
Dedza OSBP (Dedza/Colomue border) (Malawi)	[Infrastructure] • Smuggling is a major challenge (frequently occurring on local roads near the border), and countermeasures against nighttime smuggling are not fully implemented. Plans are currently underway to utilize drones for patrols and monitoring. • Break bulk cargo is common, and inspections are conducted visually. Since it is not containerized, simplified customs clearance is not possible, making border procedures time-consuming and labor-intensive. For container bonded transport, the GPS Cargo Tracking System (GPS Cargo Tracking System: GPS Cargo Tracking System) provided by COMESA is operational (the scanner is currently out of service due to malfunction). • M1 The access road from the highway to OSBP is not designated as a national highway and lacks a clearly defined governing authority. Although it requires maintenance, no action has been taken. • There is a solar power generation facility, but the charger only lasts about one hour. [Bilateral Coordination] • A No-man's Land (a buffer zone belonging to neither country) exists between the two nations' borders, keeping their respective border facilities separated. Although space was allocated within the OSBP facility on the Malawi side for Mozambican staff to be stationed, bilateral coordination has not progressed, and Mozambican staff have not yet been stationed at this facility.
Mwanza Border Post (Mwanza/Zobue border) (Malawi) * OSBP facilities have been developed with support from the World Bank	[Infrastructure] • Customs fees can only be paid in cash, and the lack of currency exchange at the border is an issue. The Zobue border side has not implemented ASYCUDA. Instead, it uses its own platform (MCNET) based on the Single Window System, preventing direct information exchange with the ASYCUDA system implemented by Malawi. An OSBP facility has been constructed on the Malawi side, and a window for Mozambique is prepared, but Mozambican staff have not been stationed there. There is no window staffed by Malawi personnel at the Mozambican side facility. • The scanner is malfunctioning and not operational. • Similar to Dedza, there is a high volume of break bulk cargo, leading to similar issues. • A border facility was established as an OSBP for passengers (including buses), but Mozambique has not yet assigned staff to it.
Nayuchi Border Post (Nyuchi/Entre-Lagos border) (Malawi)	[Infrastructure] • Document checks take about 30 minutes, but additional waiting time occurs for trains to pass each other. [Procedures] • Mozambique and Malawi do not have unified databases, making it extremely inconvenient as trade documents are shared as PDFs or photos (Portuguese is not understood). A unified platform is needed.
Chiponde Border Post (Chiponde/Mandimba border) (OSBP under construction)	[Infrastructure] • Smuggling is rampant because the border post is only 4km inside the border. About 80% likely use side roads. We want an OSBP established near the border. • Road conditions from the border are poor, becoming impassable during heavy rains. Parking space is borrowed from a school field.

Visited Locations	Issues
(Malawi)	• The systems of MBS (Malawi Bureau of Standards) and MRA (Malawi Revenue Authority) were integrated in 2024, but MBS checks can sometimes take 3-4 hours. Otherwise, procedures take about 2 hours. • The Malawi side has implemented the latest version of ASYCUDA (ASYCUDA World), but the Mozambique side has not yet done so. At the Mandimba border, procedures are still conducted manually using paper documents. It is hoped that progress will be made on introducing OSBP, implementing ASYCUDA systems on the Mozambique side, and enhancing information compatibility through intergovernmental coordination. [Smuggling] • Informal trade bypassing the border checkpoint is rampant, and police patrols alone are insufficient to prevent it.
Mandimba Border (Chiponde /Mandimba border) (OSBP under construction) (Mozambique)	[Infrastructure] • Access roads to the border and the road conditions between Kwamba and Nampula are poor. • Smuggling is rampant. • As part of the WB's SATCP, the Project Fronteira Unica initiative (2021-2026, investing $150 million in Malawi and $230 million in Mozambique) is underway.
Mr. Sydney Chibbabbuka (Former Commissioner, Zambia Revenue Authority)	[Infrastructure] • Improving road infrastructure is the biggest challenge. Utilizing railways is also considered essential for revitalization. • The biggest challenge at the Mwami border is smuggling. This is because there are no natural barriers (such as rivers) at this border. We expect JICA to engage in the ICT sector. We aim to create a No-stop Border Post (a border improved not only in infrastructure but also in soft aspects like reducing corruption during customs clearance and cutting clearance times). [Staff Capability] While promoting the use of the Zambia Electronic Single Window, a challenge is that some ministries cannot connect to it (due to funding shortages. GIZ provided support around 2019 (TaxOnPhone), but it did not become the real-time system the Zambian government desired). Strengthening the technical capabilities of staff using the system is also a challenge.
Malawi Revenue Authority	[Infrastructure] • The Deza and Chiponde borders face issues like insufficient offices and staff (particularly personnel to handle contingencies), but the primary challenge is a lack of housing for border personnel. While operations should run until 9 p.m., they sometimes close around 6 p.m. due to a lack of relief staff. • The current situation requires time-consuming visual cargo inspections for containers and break bulk due to the lack of scanning equipment. • For customs officials, the lack of a fully developed Evaluation Database for calculating customs duties is a significant challenge. While most countries typically maintain their own databases, and developed nations reportedly share information, Malawi currently relies primarily on historical data. The reality is that the country lacks the capacity to build such a database domestically (interest was also expressed in this area as a potential field for technical cooperation support). In the past, when introducing the ASYCUDA system, the use of UNCTAD's database was recommended. However, the cost of using this database was high, leading to the decision not to adopt it. • With support from the AfDB and the EU, a project to establish an OSBP at the Chiponde border is currently underway. [Smuggling] For counter-smuggling efforts, securing the understanding of police and local residents regarding border management is crucial. Particularly, since the access road to the border runs through villages, the following measures are being taken to prevent smuggling: (ⅰ) CSR activities to gain local residents' understanding, (ⅱ) establishing a reporting system/scheme from local residents, (iii) strengthening checkpoints along the road, and establishing FAST (Flexible Anti-Smuggling Team). Additionally, (iv) aerial surveillance using drones is planned, with several units to be provided by the World Bank.

Visited Locations	Issues

Summary of Challenges:
The challenges outlined above can be summarized as follows.

Border Name	Country	Infrastructure			Software		Other	
		Power Supply	Facilities (Access Roads, Site, Buildings)	Equipment and Materials (Internet, Scanner)	Human Resources	Personnel	Smuggling	Bilateral Coordination
Mwami	Zambia	○	○		○	○		
Mchinji	Malawi	○	○	○	○			
Dedza	Malawi	○	○	○			○	○
Mwanza	Malawi			○				○
Nayuchi	Malawi							○
Chiponde	Malawi		○				○	
Mandimba	Mozambique		○	○			○	

Source: JST

Based on field surveys and interviews at the above border facilities, we understand that the following challenges currently exist at borders where development is underway to promote international and regional flows of people and goods.

- **Lack of scanners / Inadequate inspection procedures and systems**: Currently, handling break bulk cargo, which is predominant in the region, is a challenge.
- **Insufficient vehicle space and layout deficiencies**: In addition to the interview findings, according to SADC (October 30, 2024), approximately 300 trucks cross the Mwami/Mchinji border on a daily basis. It was also noted that, particularly for small and medium-sized logistics operators, cargo is often transloaded at the border facility to other vehicles (either registered in the transit or destination country). As a result, there is a shortage of parking and waiting areas within the border facility, as well as insufficient covered workspaces during rainy conditions. Furthermore, there is also a lack of designated parking spaces for vehicles requiring extended customs clearance procedures, for which charges apply after the tenth day.
- **Inadequate power and waste management**: Prolonged reliance on diesel generators due to power outages caused by insufficient electricity supply is driving up operational costs. Waste disposal and management are also inadequate.
- **Insufficient coordination with axle load measurement stations (overloading countermeasures)**: The monitoring of axle loads at border facilities is inefficient and insufficiently counteracts overloading, as there is no data linkage with the newly established axle load measurement stations along the Great East Road corridor within Zambia.
- **Lack of Containerization (Requiring Extensive Procedures and Inspection Time)**: As mentioned earlier, the predominant use of breakbulk cargo necessitates numerous border procedures, requiring extensive inspections and time, resulting in prolonged dwell times.
- **Lack of 24-hour operation and fragile internet environment**: Zambia and Malawi have implemented the ASYCUDA system, but communication is often unstable and time-consuming

(processing frequently extends beyond business hours into the next day). Crucially, the lack of staff housing prevents the realization of 24-hour border facility operations.

- **Insufficient Coordination Between Neighboring Countries**: At the OSBP facility on the Malawi-Mozambique border, preparations for joint operations between Mozambican and Malawian staff are incomplete. Coordination issues persist between Malawi and Mozambique, notably regarding the "no man's land" area prone to smuggling and other crimes (currently being addressed by the NDCMC).
- **Insufficient countermeasures against smuggling and border trade**: The MRA (Malawi Revenue Authority) views collaboration with local residents as key to addressing these issues and also expects benefits from introducing drone and camera systems at the border (information indicates the WB has begun introducing several units). Additionally, in Mozambique, there is a need for inspections, equipment, and technical guidance to strengthen coastal security (based on interviews with participants in JICA's issue-specific training and customs administration courses, and with Japanese private companies).
- **Streamlining and expediting customs procedures**: Enhancing information compatibility through system standardization is one countermeasure. Therefore, Mozambique is expected to advance its transition to ASYCUDA, including infrastructure and human resource development. Furthermore, at the Mwami/Mchinji OSBP on the Zambia-Malawi border, COMESA is promoting border facilitation support under EDF assistance, aiming to strengthen ICT through initiatives like introducing smart gates and quarantine labs. However, achieving unified specifications across multiple countries is expected to take time. Additionally, the MRA has pointed out that developing the customs valuation database and the customs valuation database are challenges.
- **Benefits for Local Communities and Users**: Local administrative bodies expressed hopes for improvements to bus terminals and markets that generate tax revenue.
- **Unfinished OSBP Implementation at Railway Borders**: At the Malawi/Mozambique railway border, procedures currently require separate processing on both the Nayuchi and Entre Lagos sides, taking over two hours. Furthermore, seamless operation of international passenger trains has not yet commenced.

Considering these challenges, the following three points should be taken into account when JICA considers project formulation:

Activities to invigorate land (truck) transport and passenger movement should be designed with the resolution of the above issues in mind (the AfDB must enhance the development plan for the Mandimba/Chiponde OSBP, scheduled for construction, to address these challenges).

For effective OSBP development, beyond infrastructure improvements, exploring possibilities such as individual technical cooperation addressing the above challenges and applying Japanese technologies and solutions is beneficial (WB-SATCP should clarify areas it cannot address (please refer to "2.2.2Achievements and Challenges of Other Donors' Projects).

To enhance economic efficiency and safety, the implementation of OSBP in railways and the development of a logistics base in Chipata, as discussed later, are considered to have high potential effectiveness.

Additionally, field interviews revealed that Zambia is promoting the use of PPPs for future border-related infrastructure development. At the Kasumbalesa border (with the Democratic Republic of Congo), a PPP project has improved roads near the border (a concession project generating revenue through a $100 one-way toll for commercial trucks: a 22-year concession agreement was signed with ZDA).

1.4.2 Current Status of Bonded Transport

Along the Nacala Corridor spanning Zambia, Malawi, and Mozambique, each country has its own bonded transport system (for bonded imports/exports within their respective territories). However, the absence of a common registration system incurs human and time costs for information exchange. Therefore, enhancing system compatibility is required. Additionally, ensuring safe and scheduled transport is essential under the system, making improvements to road safety also expected.

The procedures for bonded transport are as shown in Table 1-3 ~ Table 1-6 and are implemented through the following mechanisms.

- The number of days required for goods to pass through each country as bonded cargo is legally stipulated for each nation. Customs brokers deposit a bond with the revenue authority until the goods cross the border.
- For customs payment procedures, ASYQUDA is used in Zambia and Malawi. In Mozambique, due to delays in developing border infrastructure including customs systems and its non-membership in COMESA, MCNet is utilized. Regarding MCNet, usage fees are charged based on the handling of the target cargo and the FOB price of the cargo (Ministerial Decree of the Ministry of Finance No. 25/2012 dated March 12, 2012).
- Malawi has Customs Inland Ports (three locations: Lilongwe, Blantyre, and Mzuzu, operated by the MRA), but Zambia has no official bonded zones, only privately operated bonded warehouses.

Table 1-3 The case of Imports from Nacala Port to Zambia

	Customs clearance procedures	Site	Container shipping	Breakbulk shipping	Customs clearance procedures	Truck (bulk) +Rail (bulk/container) transport
Mozambique	**Transit clearance**	Nacala Port	・Unloading ・Submission of bonded transport documents ・(Simplified) inspection	・Unloading ・Debarking ・Submission of bonded transport documents ・(Simplified) inspection	**Transit clearance**	・Unloading ・Submission of bonded transport documents ・(Simplified) inspection
		↓	・Transportation	・Transportation		・Rail transport
		Border	・Submission of bonded transport documents ・(Simplified) inspection	・Submission of bonded transport documents ・(Simplified) inspection		・Submission of bonded transport documents
Malawi	**Transit clearance**	Border	・Submission of bonded transport documents ・(Simplified) inspection	・Submission of bonded transport documents ・(Simplified) inspection	**Final clearance**	**Liwonde** ・Customs document verification ・Simple baggage inspection **Blantyre/Lilongwe** ・Customs document submission ・Customs duty payment ・Quarantine and inspection ・Truck loading
		↓	・Transportation	・Transportation		・Transportation ・Transshipment (rail → truck)
		Border	・Submission of bonded transport documents ・(Simplified) inspection	・Submission of bonded transport documents ・(Simplified) inspection	**Export clearance**	・Submission of bonded transport documents ・(Simplified) inspection
Zambia	**Import clearance**	Border/ Bonded warehouse	・Customs document submission ・Customs duty payment ・Quarantine and inspection ・Debanding	・Submission of customs documents ・Payment of customs duties ・Quarantine and inspection	**Import clearance**	・Customs document submission ・Customs duty payment ・Quarantine and inspection ・Truck loading and unloading

Source: JST

For imports from Zambia Port, customs documentation checks and duty payments are conducted in Zambia, the destination country. However, in transit countries Mozambique and Malawi, only simplified verification of customs documents and transit fees are applied.

Table 1-4 For exports from Zambia via Port Nacala

	Customs clearance procedures	Site	Container shipping	Breakbulk shipping	Customs clearance procedures	Truck (bulk) +Rail (bulk/container) transport
Zambia	**Export clearance**	Border/ Bonded warehouse	・Vanning (@Warehouse) ・Customs document submission	・Loading trucks (@warehouse) ・Submitting customs documents	**Export clearance**	・Loading trucks (@warehouse) ・Submitting customs documents
Malawi	**Transit clearance**	Border	・Submission of bonded transport documents ・(Simplified) quarantine and inspection	・Submission of bonded transport documents ・(Simplified) quarantine and inspection	**Import clearance**	・Submission of customs documents ・Payment of customs duties ・Quarantine and inspection
		↓	・Transportation	・Transportation		・Transportation ・Transshipment (truck → rail)
		Border	・Submission of bonded transport documents ・(Simplified) quarantine and inspection	・Submission of bonded transport documents	**Export clearance**	**Blantyre/Lilongwe** ・Railway stacking (@warehouse) ・Customs document submission **Liwonde** ・Customs document verification ・Simple baggage inspection
Mozambique	**Transit clearance**	Border	・Submission of bonded transport documents ・(Simplified) quarantine and inspection	・(Simplified) quarantine and inspection	**Transit clearance**	・Submission of bonded transport documents ・(Simplified) inspection
		↓	・Transportation	・Transportation		・Transportation
		Nacala Port	・Submit bonded transport documents ・Pay royalty fee to the Revenue Agency ・(Simplified) Quarantine	・Vessel loading ・Submission of bonded transport documents ・Payment of royalty fee to the Revenue Agency		・Submit bonded transport documents ・Pay royalty fee to the Revenue Agency ・(Simplified) inspection

Source: JST

For exports from Zambia via Nacala Port, inspection of bonded procedure documents and payment of customs duties are conducted at the destination port. However, in transit countries Malawi and Mozambique, simplified verification of customs documents and transit fees are imposed.

Table 1-5　For imports from Port Nacala to Malawi

	Customs clearance procedures	Site	Truck (Container) Transport	Truck (Breakbulk) Transport	Customs clearance procedures	Rail (Bulk/Container) + Truck (Bulk) Transport
Mozambique	**Transit clearance**	Nacala Port	・Unloading ・Submission of bonded transport documents ・(Simplified) inspection	・Unloading ・Debarking ・Submission of bonded transport documents ・(Simplified) inspection	**Transit clearance**	・Unloading ・Submission of bonded transport documents ・(Simplified) inspection
		↓	・Transportation	・Transportation		・Rail transport
		Border	・Submission of bonded transport documents ・(Simplified) inspection	・Submission of bonded transport documents ・(Simplified) inspection		・Submission of bonded transport documents (immediate)
Malawi	**Import clearance**	Border /Bonded warehouse	・Customs documentation submission ・Customs duty payment ・Quarantine and inspection ・Debanning	・Submission of customs documents ・Payment of customs duties ・Quarantine and inspection	**Import clearance**	**Liwonde** ・Customs document verification ・Simple baggage inspection **Blantyre/Lilongwe** ・Customs document submission ・Customs duty payment ・Quarantine and inspection ・Truck loading

Source: JST

For imports from Nacala Port to Malawi, inspection of bonded procedure documents and payment of customs duties are conducted at the destination in Malawi. However, in Mozambique, the transit country, a simplified verification of customs documents and a transit fee are imposed.

Table 1-6　For exports from Malawi via Nacala Port

	Customs Procedure	Location	Container Transport	Breakbulk Transport	Customs Procedure	Truck(Bulk) +Rail(Bulk/Container) Tranport
Malawi	**Export clearance**	Border/ Bonded Warehouse	・Vanning (@Warehouse) ・Submission of customs documents	・Cargo loading onto trucks (@Warehouse) ・Submission of customs documents	**Export clearance**	・Truck Transport **Blantyre/Lilongwe** ・Rail loading (@Warehouse) ・Submission of customs documents **Liwonde** ・Customs document verification ・Simplified cargo inspection
Mozambique	**Transit clearance**	Border	・Submission of bonded transport documents ・(Simplified) Quarantine and inspection	・Submission of bonded transport documents ・(Simplified) Quarantine and inspection	**Transit clearance**	・Submission of bonded transport documents ・(Simplified) Quarantine and inspection
		↓	・Transport	・Transport		・Transport
		Nacala Port	・Submission of bonded transport documents ・Payment of royalty fee to Revenue Authority ・(Simplified) Quarantine and inspection ・Loading onto vessel	・Vanning ・Submission of bonded transport documents ・Payment of royalty fee to Revenue Authority ・(Simplified) Quarantine and inspection ・Loading onto vessel		・Submission of bonded transport documents ・Payment of royalty fee to Revenue Authority ・(Simplified) Quarantine and inspection ・Loading onto vessel

Source: JST

For exports from Malawi via Nacala Port, inspection of bonded procedure documents and payment of customs duties are conducted at the destination of the goods. However, in Mozambique, as the transit country, only simplified verification of customs documents is carried out and transit fees are imposed.

1.4.3 Current Status of Transshipment Facilities

Efforts to establish hubs for consolidating, distributing, and changing modes of transport to achieve efficient cargo movement are underway worldwide, including in Africa. These are referred to as Inland Container Depots (ICDs) or Dry Ports. Their characteristics are outlined below. Based on field surveys and interviews with stakeholders, the following differences exist regarding the roles each facility performs and their ability to handle international trade and customs procedures.

Table 1-7 Characteristics of Inland Container Depots and Dry Ports

Item	Inland Container Depot (ICD)	Dry Port
Primary Role	Consolidation and distribution of cargo, short-term storage	Port congestion relief Conducting international trade and customs procedures Consolidation and distribution of cargo, short-term storage
Customs functions	Some may not be available	Available
Connections	Between multiple transport modes Often connected to railways	Includes connections to ports, between multiple transport modes
Remarks	May also handle non-containerized cargo May also be referred to as an Inland Depot	May also be referred to as an inland port

* The Customs inland port in Malawi described in Chapter 1.4.2 refers to a facility where the MRA conducts customs clearance procedures within Malawi, not a facility primarily engaged in cargo transshipment.

Source: JST

An Inland Container Depot (ICD) capable of handling international trade and customs procedures with good port connectivity is a facility that can also be referred to as a dry port. Some shipping companies explicitly state that they are the same thing[6]. Consequently, in the Nacala Corridor region, cases where the two names are not distinguished or are confused are frequently observed. This project proceeded with careful consideration of these distinctions. Specifically, since transshipment facilities along the Nacala Corridor handle not only maritime cargo transiting through Nacala Port but also international cargo between neighboring countries along the corridor, this project will utilize the term ICD.

1.5 Operational Management and Utilization Status of Nacala Port

1.5.1 Overview of Nacala Port Operations Management

Nacala Port is operated under a 15-year concession agreement starting in 2005. The concession is held by a joint venture between the state-owned enterprise CFM and eight private companies (Vale (Brazil), Mitsui & Co. (Japan), and six local private companies from northern Mozambique) called the Northern Corridor Development Company (Corredor de Desenvolvimento do Norte: CDN). However, the

[6] Maersk, Inland container depot (ICD): Definition, services, and costs involved, https://www.maersk.com/logistics-explained/transportation-and-freight/2024/09/05/inland-container-depot, (accessed January 7, 2025)

concession agreement expired in January 2020 without renewal. Since then, and as of the end of 2024, CFM has been managing and operating Nacala Port in place of CDN.

Through the Grant Aid "Nacala Port Emergency Rehabilitation Project" (completed in 2015) and the Loan Aid "Nacala Port Development Project I & II" (completed in 2023), the North Pier of Nacala Port has been developed. This includes a 14-meter-deep quay, two gantry cranes, eight transfer cranes, a container yard (including a rail yard), gate facilities, among others. Additionally, a liquid bulk berth for gasoline, diesel, jet fuel, etc., was developed. Consequently, the South Pier, which previously handled containers, is now used as a terminal for dry bulk and general cargo. This South Pier, constructed in 1974, is deteriorating and requires rehabilitation.

The following is foundational information for understanding the current status of Nacala Port, based on cargo handling volume data (covering approximately the past 10 years up to 2023) for various ports within Mozambique[7].

(1) Master Plan for Port Development and Expansion

The National Development Strategy (ENDE) 2025-2044 was approved by the Mozambican Government (Council of Ministers) in June 2024 and ratified by the Mozambican Parliament (Assembly of the Republic) in April 2025. ENDE 2025-2044 is a planning and budgeting document that will guide Mozambique's development over the next 20 years (revising ENDE 2015-2035).

ENDE 2025-2044 is a strategy based on the vision of being "a prosperous middle-income country where fairness, safety, and welfare for its citizens are guaranteed, and sustainability and competitiveness are priorities." It consists of the following five pillars: (i) Economic Structural Reform, (ii) Social and Demographic Transformation, (iii) Infrastructure, Institutions, and National Land Development, (iv) Governance, Peace, and Security, and (v) Environmental Sustainability, Climate Change, and Circular Economy. Within ENDE 2025-2044, matters related to port development and expansion are primarily outlined in the section "Strategic Implementation Pillar III: Infrastructure, Institutions, and National Land Development" (see Supplement [1-1]).

(2) Legal Framework for Port Operations

In Mozambique, the legal and regulatory framework governing the port sector is established through the enactment of the CFM Establishment Law, the Public Enterprises Law, and the PPP Law. There is no separate law comprehensively managing and operating port administration[8]. Therefore, the government has enacted decrees each time a concession contract was approved, such as Decree No. 20/2000 concerning the Nacala Port Concession, Decree No. 22/2000 concerning the Maputo Port Concession,

[7] As noted in the previous section (1.1.1 Overview of the Nacala Corridor (Route and Characteristics)), efforts and transport performance for rail freight by Nacala Logistics (established 2020), which connects to the Port of Nacala and handles rail freight transport to Malawi, are as follows: General cargo: 548 thousand tons (2023), 900 thousand tons (2024 forecast), transport capacity up to 4 million tons/year, coal cargo: 13.7 million tons (2023), transport capacity up to 18 million tons/year), while also considering the situation where integrated rail transport from Nacala Port to Chipata in eastern Zambia will commence after 2026. It is necessary to understand the figures from previous years in light of this context.

[8] The PPP Act and PPP Cabinet Order establish policies and procedures concerning the contracting, implementation, and monitoring processes for PPP projects, respectively. However, these apply to all sectors and do not contain specific interpretations pertaining to the port sector.

and Decree No. 47/2014 concerning the Beira Port Concession. While these decrees outline basic aspects of the concession contracts, such as the scope of the contract, the descriptions of the respective authorities and responsibilities of the parties involved are ambiguous.

The September 2021 Cabinet Decision (Government Decree No. 84/2021) established the Railway and Port Authority (hereinafter IFEPOM).

IFEPOM serves as the regulatory agency overseeing activities in the railway and port sectors (Article 3 of the same Decree), with the following objectives: (ⅰ) Proposing legislation and national port policies concerning ports; (ⅱ) Preparing and implementing bidding for concession contracts after government approval; (ⅲ) Supervising and regulating port activities, with a focus on port management and standardizing concession criteria; (ⅳ) monitoring concessionaires' and operators' business activities to ensure compliance with the law and the terms of each concession contract.

The table below lists IFEPOM's three specific functions: (ⅰ) Port Authority functions, (ⅱ) Concession management and implementation functions, and (ⅲ) Port location, policy, and planning functions.

Table 1-8 IFEPOM's Primary Functions (Excerpted from Article 7)

Port Authority Functions	i) Establishment of ISPS-compliant regulations ii) Regulation, Authorization, and Supervision of Pilots and Tugs iii) Establishment of Pricing Principles iv) Licensing and supervision of port infrastructure utilization and construction v) Supervision and management of port operations safety within port jurisdictions
Concession management and implementation functions	i) Preparing public tenders for port concession contracts ii) Monitoring the performance and compliance of concession contracts with applicable laws iii) Assigning licenses to port operators iv) Promoting free competition and preventing anti-competitive practices and abuse of dominant positions
Functions related to port location, policy, and planning	i) Proposing port-related legislation ii) Formulation of national port policy iii) Regulating port planning and the establishment/closure of port terminals

Source: Prepared by the JST based on Cabinet Order No. 84/2021

(3) Staff capacity development and training

To ensure optimal operation of all equipment, including the latest cargo-handling machinery introduced for the Nacala Port Development Project, CFM has invested in a new 1,000 sqm maintenance workshop on the north side of Nacala Port's North Pier and conducts ongoing training. As a result, as of mid-2024, 44 operators are assigned to the Rubber-tyred Gantry Cranes (RTG), 19 to the Quayside Gantry Cranes, and 13 are equipment maintenance technicians. Other personnel training consists of various courses and sessions designed to enhance the skills of all port staff in line with current best practices, aiming to strengthen health and safety and improve operational efficiency.

CFM actively dispatches personnel to JICA's specialized training programs in the port sector. As shown in Table 1-9, trainees from CFM, including the CFM Nampula Office, participate in multiple JICA

specialized port-related training programs each fiscal year. While there has been no participation from CFM in FY2025, it is hoped that this training program will continue to be utilized going forward.

Table 1-9 Participation Record from Mozambique in JICA Specialized Training Programs (Port-Related Courses)

JICA Thematic Training Training Course Name	Port Development and Planning (for Port Engineers)	Port Maintenance and Management Planning	Port Strategy and Operations
Implementation Period	Approximately May to July	Around September to October	January–February
Participants from Mozambique (◎ CFM Nampula, ■ CFMs other than Nampula)			
2022	◎	Participants from MTC	None
2023	■	◎	◎
2024	◎	■	◎
2025	None	(Before training begins)	(Before training begins)

Source: JST

1.5.2 Utilization Status of Mozambique's Major Ports

To assess the utilization status of Mozambique's major ports, the following data for each port has been compiled: (ⅰ) cargo throughput, (ⅱ) container cargo volume, (ⅲ) cargo throughput by commodity, packaging type, and destination, and (ⅳ) transit cargo throughput.

(1) Cargo Handling Volume[9] (Total bulk and container cargo handled (tons))

Table 1-10, Figure 1-6 show the trends in cargo handling volumes at Mozambique's ports from 2004 to 2023. The cargo handling performance at each port within Mozambique, as evident from this data, is as follows.

- **Maputo Port**: Handles the largest cargo volume in Mozambique, surging by approximately 1.5 times over the last three years to exceed 30 million tons in 2023.
- **Beira Port**: A major northern port, its cargo volume in 2023 increased to approximately half that of Maputo Port (about 14 million tons).
- **Nacala Port**: While its cargo growth pace is slower compared to the above two ports, it has been steadily increasing, surpassing 3 million tons in 2023. The cargo volume handled solely at Nacala Port is one-tenth that of Port of Maputo, and one-fifth that of Beira Port. However, since 2015, when the coal export port of Nacala-a-Bela (located in the same bay as Nacala Port) began coal transportation and exports via rail from Tete, its cargo handling volume has surged. Combined, the cargo volumes of these two ports have already surpassed that of Beira Port (total approx. 17 million tons).

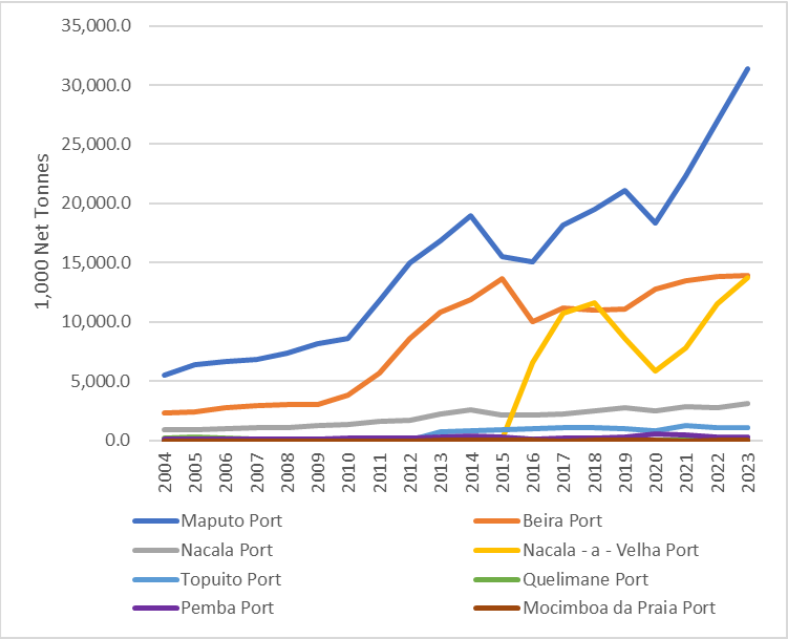
[9] Refers to the total cargo handled (in tons) based on bulk cargo (actual figures) and containerized cargo (estimated from container counts). This figure alone does not reveal fluctuations due to cargo form or commodity type within the port, making it unsuitable for simple comparisons.

Table 1-10 Trends in Cargo Handling Volumes at Mozambique's Ports (2004–2023)

1000 Net Tonnes

Designation	Maputo Port	Beira Port	Nacala Port	Nacala - a - Velha Port	Topuito Port	Quelimane Port	Pemba Port	Mocimboa da Praia Port	Total
2004	5,540.5	2,273.5	906.9	-	-	217.4	79.7	-	9,018.0
2005	6,366.9	2,419.0	875.5	-	-	243.4	77.6	-	9,982.4
2006	6,672.2	2,737.0	950.1	-	-	218.5	105.0	-	10,682.8
2007	6,826.0	2,961.1	1,100.2	-	-	85.7	113.1	-	11,086.1
2008	7,374.6	3,036.9	1,045.9	-	-	65.7	120.2	-	11,643.3
2009	8,167.1	3,029.7	1,270.2	-	-	70.2	114.4	-	12,651.6
2010	8,605.8	3,805.1	1,376.5	-	-	131.4	159.9	-	14,078.7
2011	11,761.8	5,704.3	1,628.7	-	-	186.0	177.5	-	19,458.3
2012	14,987.0	8,637.9	1,664.2	-	-	202.7	233.3	-	25,725.1
2013	16,830.7	10,858.5	2,250.4	-	678.0	203.0	290.4	0.8	31,111.8
2014	18,979.6	11,888.8	2,591.7	-	799.6	258.8	355.5	19.5	34,893.5
2015	15,528.9	13,626.0	2,101.3	70.0	857.6	186.5	265.9	5.2	32,641.4
2016	15,078.1	10,059.1	2,145.8	6,545.0	1,023.8	126.2	125.8	0.8	35,104.7
2017	18,213.8	11,196.3	2,236.8	10,717.3	1,070.5	73.4	149.8	-	43,657.8
2018	19,526.7	11,021.0	2,474.4	11,615.6	1,082.2	60.8	171.5	11.4	45,963.5
2019	21,065.9	11,055.9	2,747.6	8,611.1	1,026.0	33.3	251.4	20.4	44,811.6
2020	18,378.0	12,789.4	2,524.8	5,855.6	853.2	7.7	551.8	53.0	41,013.6
2021	22,305.6	13,474.2	2,882.4	7,850.7	1,281.8	5.7	426.5	-	48,226.9
2022	26,913.3	13,841.8	2,740.4	11,562.0	1,073.1	11.6	311.0	0.5	56,453.6
2023	31,336.8	13,887.2	3,083.3	13,730.3	1,046.0	16.6	256.5	4.4	63,361.1

Source: Compiled by JST based on CFM data



Source: Compiled by JST based on CFM data

Figure 1-6 Trends in Cargo Volume Handled at Mozambique Ports (2004–2023)

(2) Container Cargo Volume[10] (TEU)

Table 1-11, Figure 1-7 shows the trend in container cargo volume (TEU) at Mozambique's ports from 2014 to 2023. Beira Port has the largest container handling volume in Mozambique, exceeding 300,000 TEU in 2023. Maputo Port follows, reaching approximately half of Beira Port's volume at 130,000 TEU. Nacala Port had seen a declining trend in container throughput since 2014. However, it turned upward in 2023, reaching approximately 98,000 TEUs, following the commencement of operations at a full-scale container terminal (capacity: 300,000 TEUs/year) developed through a yen loan project[11]. This result slightly exceeded the 2014 throughput level, marking the port's highest-ever container throughput[12].

Table 1-11 Trends in Container Cargo Volume at Mozambique Ports (2014–2023)

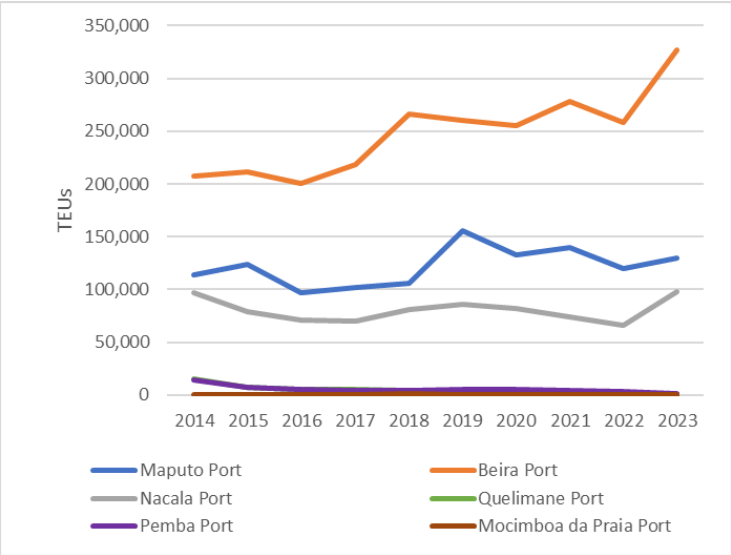
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Maputo Port	114,135	124,170	97,352	101,995	105,667	155,776	133,006	139,655	120,218	130,125
Beira Port	207,102	211,371	200,301	218,876	266,336	259,938	255,459	278,582	258,570	327,333
Nacala Port	97,024	79,417	71,142	70,248	81,217	86,327	81,608	73,915	66,588	97,988
Quelimane Port	15,607	7,275	5,245	4,916	4,601	1,947	671	256	180	82
Pemba Port	13,990	7,399	5,649	4,410	3,893	5,529	5,006	4,365	2,987	1,740
Mocimboa da Praia Port	99	12	-	-	946	729	606	-	17	11
Total	333,822	305,474	282,337	298,450	462,660	510,246	476,356	496,773	448,560	557,279

Source: Compiled by JST based on CFM data

[10] The aggregated value of port cargo handled via containers within the aforementioned total cargo throughput. TEU (twenty-foot equivalent unit) represents the number of containers equivalent to 20-foot containers. A 40-foot container equals 2 TEU.The specific contents of containers are not disclosed in port statistics. However, in addition to general merchandise, examples include used vehicles, minerals, and agricultural products transported in containers under bonded shipping arrangements. Cargo forms other than containers are referred to as bulk cargo, and records by commodity are obtained as port statistics.

[11] This handling capacity is determined by the quay's processing capability, based on the number of gantry cranes and their loading/unloading efficiency, and the number of containers handled per vessel. It is estimated to be between 250,000 TEU/year and 300,000 TEU/year. The storage capacity of the container yard (determined by factors such as yard area and average container dwell time within the yard) is estimated to be between 150,000 TEU/year and 190, 000 TEU/year. Therefore, it is understood that resolving the constraints on the container yard storage capacity is a key challenge for the Nacala Port Container Terminal to achieve its 300,000 TEU/year handling capacity (measures such as securing empty container storage areas outside the terminal are necessary).Furthermore, CFM statistical data indicates Nacala Port's total handling capacity (including non-container cargo) as 3 million tons in 2022 and 10 million tons in 2023.

[12] Regarding Beira Port, information gathered in 2022 for the "Support for Formulating the Nacala Port Operation and Management Plan" indicates plans to increase the container handling capacity of existing facilities to 750,000 TEUs by 2024, with a concept for establishing a new container terminal (Q11) after 2027.



Source: Compiled by the JST based on CFM data

Figure 1-7 Trends in Container Cargo Volume at Mozambique Ports (2014–2023)

Furthermore, calculating the tonnage per 1TEU based on the container cargo tonnage (tons) for each port from the aforementioned cargo handling volume (tons) shows that for the 2023 data, Maputo Port, Beira Port, and Nacala Port are 14.0, 15.3, and 13.2 tons/TEU, respectively. Based on experience in Japan, when containers primarily handle metal industrial products like machinery, the tonnage per TEU tends to be heavier. Therefore, the lower tonnage per TEU at Nacala Port is likely linked to the industrial structure of its hinterland, where agriculture is the primary industry. It is inferred that containers handled at this port contain fewer machinery items used in manufacturing plants compared to Maputo Port and Beira Port, and instead have a higher proportion of agricultural supplies and general household goods.

(3) Volume by cargo type, packaging, and destination (domestic imports/exports, imports/exports by landlocked countries, etc.)[13]

(ⅰ) Trends in cargo volume by packaging type (upper line graph), and (ⅱ) Trends in cargo volume by destination for each packaging type (estimated based on item information) (stacked bar graph) were compared for Maputo Port, Beira Port, and Nacala Port (refer to Figure 1-8)[14].

The destination designations in the following tables are as follows:

- **Domestic**: Referred to as cabotage, this involves movement within Mozambique via domestic shipping, not imports or exports.
- **International**: Imports and exports from Mozambique via ports such as Nacala
- **Transit**: Imports/exports from landlocked countries transiting through Mozambique via ports like Nacala
- **Transhipment**: Goods transferred to a different vessel at Nacala Port, etc., bound for another destination

[13] Analysis of each port's characteristics based on detailed port statistics data.
[14] Referenced trends in cargo volume (tons) by port (Maputo, Beira, Nampula), by type (domestic, international, transit, transshipment), and by commodity category for 2019–2023 (estimated from Supplementary Notes [1–5]).

Furthermore, the color coding for cargo types in Table 1-12, Figure 1-8, and Figure 1-16 is as follows:

- **Container**: Pink
- **Liquid Bulk**: Light Blue (listed by estimated item name)
- **Dry Bulk/General Cargo**: Orange (listed by estimated item name)

Maputo Port

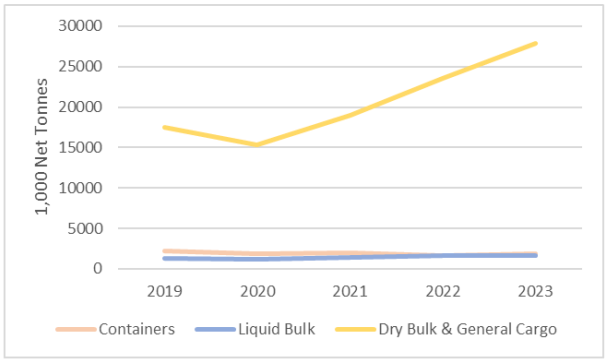
Containers + Liquid Bulk + Dry Bulk & General Cargo — 1000 Net Tonnes

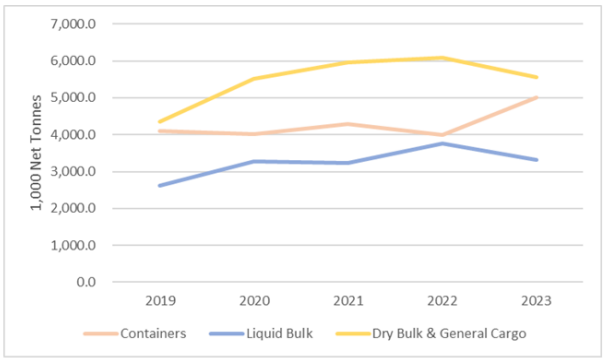
	2019	2020	2021	2022	2023
Containers	2,255.8	1,862.1	1,962.1	1,683.0	1,821.8
Liquid Bulk	1,325.9	1,210.3	1,415.0	1,674.6	1,620.9
Dry Bulk & General Cargo	17,484.2	15,305.5	18,928.7	23,594.3	27,893.7

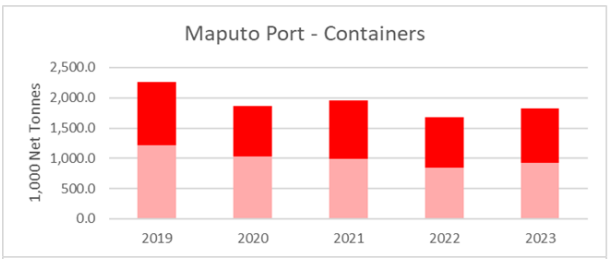
Beira Port

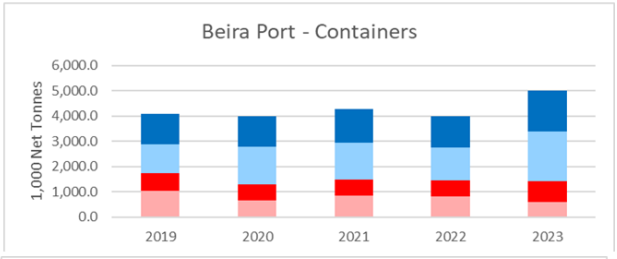
Containers + Liquid Bulk + Dry Bulk & General Cargo — 1000 Net Tonnes

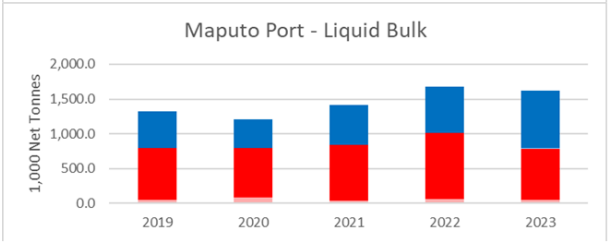
	2019	2020	2021	2022	2023
Containers	4,089.5	4,006.0	4,282.4	3,994.8	5,011.7
Liquid Bulk	2,612.9	3,266.2	3,228.2	3,753.5	3,310.4
Dry Bulk & General Cargo	4,353.6	5,517.4	5,963.2	6,093.5	5,565.4

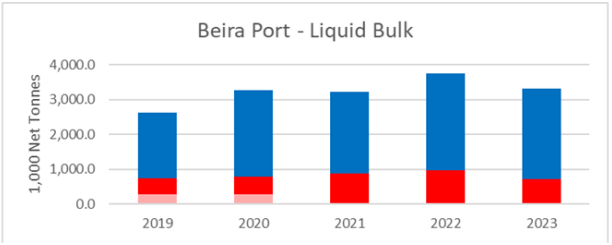


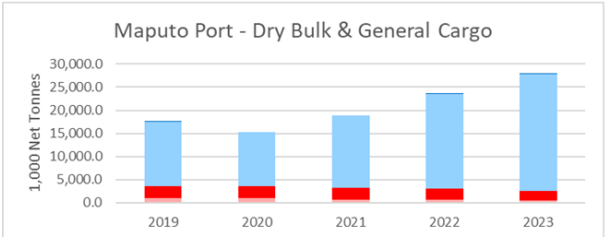


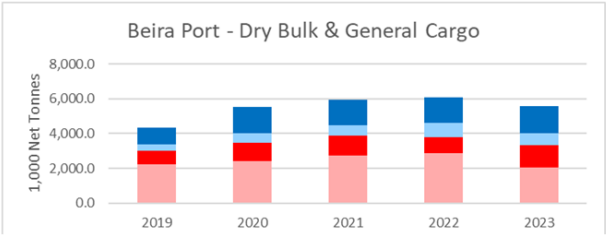








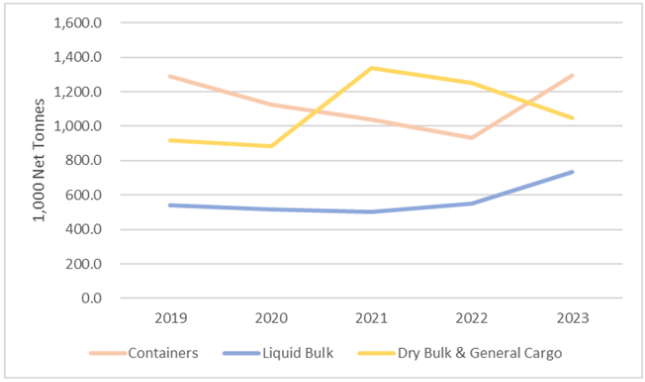


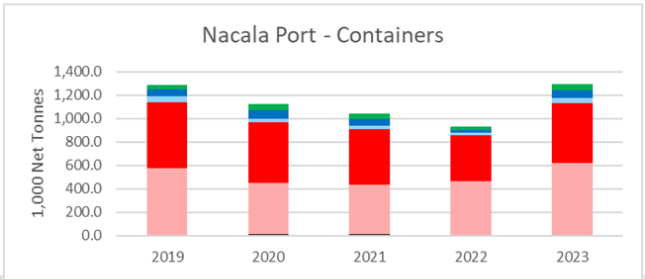


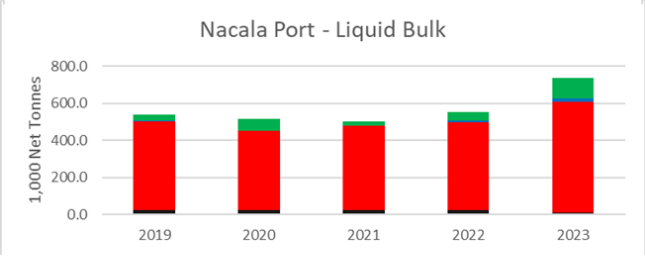
Nacala Port

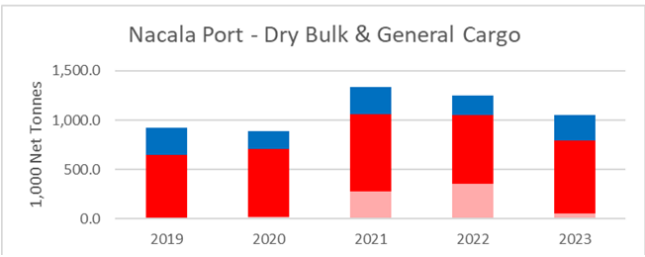
Containers + Liquid Bulk + Dry Bulk & General Cargo — 1000 Net Tonnes

	2019	2020	2021	2022	2023
Containers	1,290.2	1,123.9	1,038.7	932.0	1,293.8
Liquid Bulk	538.5	514.7	501.0	552.7	736.4
Dry Bulk & General Cargo	918.9	886.1	1,338.8	1,252.0	1,048.5









Notes: The stacked bar graph shows the breakdown and trends by destination. Light colors (pink, light blue) represent cargo leaving the port (exports, transit exports), while dark colors (red, blue) represent cargo entering the port (imports, transit imports). Green indicates cargo transshipped at the port (transhipment cargo volume).

Source: Compiled by the JST based on CFM data

Figure 1-8 Trends in Cargo Volume by Type and Destination for Maputo, Beira, and Nacala Ports (2019–2023)

The characteristics of each port shown in Figure 1-8 are summarized in Table 1-12. Nacala Port is increasing its container cargo handling volume, and further expansion is expected.

Table 1-12 Characteristics by Cargo Type and Purpose Based on Port Statistics Data

Port	Characteristics of Cargo Volume by Packaging Type and Purpose	Reference for Figure 1-8
Nacala Port	• Containers(ton-based) and dry bulk fluctuate in size relative to each other from year to year, with containers surpassing dry bulk in 2023 when the full-scale container terminal commenced operations.	Upper Line Graph
	• Compared to Beira Port, transit cargo (light blue/blue) is lower for all cargo types. Notably, transit liquid bulk (e. g., to Malawi) has not been observed until now (it is presumed that fuel shipments to Malawi via the resumed freight railway by Nacala Logistics began in 2024).	Stacked bar graph
	• For dry bulk and general cargo, imports destined for Mozambique (clinker, wheat, rice) dominated (red) until 2023, while transit imports (blue) were primarily fertilizers. Exports from Mozambique (pink) consist of pulses, raising hopes for a potential resumption.	Stacked bar chart (bottom row) Table 1-6
	• Transhipment (green) shows a slight difference compared to other ports (presumably cargo destined for island nations closer to Nacala Port, such as the Comoros)	Stacked Bar Chart
Beira Port	• The trend for dry bulk and general cargo shifted from slowing growth to a decline by 2023 (understood to be influenced by a nearly 30% year-on-year decrease in coal exports in 2023). • Regarding exports, domestic Mozambique (pink) handles coal, while transit exports (light blue) consist of mineral products such as chrome ore, its intermediate product ferrochrome, and granite. • For imports, domestic Mozambique (red) receives clinker, wheat, fertilizer, and rice, while transit (blue) includes fertilizer, sulfur, wheat, and rice.	Upper line graph Table 1-5
Maputo Port	• Dry bulk and general cargo overwhelmingly dominate cargo volume compared to containers and liquid bulk. Specific items include transit exports of mineral products like chrome ore, its intermediate product ferrochrome, coal, and magnetite, as well as imports of alumina. • Transit exports (light blue) have surged since 2000, accounting for 90% of dry bulk and general cargo in 2023 (mineral products like chrome ore, its intermediate product ferrochrome, coal, and magnetite). • Imports into Mozambique are predominantly alumina (others include wheat, rice, and coke). Exports consist of aluminum.	Table 1-4
Common Characteristics of the Three Ports	• The balance of container movements in and out of the port is generally well-maintained, indicating the potential for effective utilization of container boxes as transport containers in both directions[15].	Stacked bar graph (second row): Light-colored and dark-colored sections are equal in volume

Source: JST's interpretation based on CFM data

(4) Transit cargo (imports/exports from the port to landlocked countries) volume

1) Share of cargo by port for each importing/exporting country

Table 1-13 shows the trend in transit cargo volumes by importing/exporting country via Maputo Port, Beira Port, and Nacala Port from 2019 to 2023. It is evident that transit cargo volumes for South African imports and exports via Maputo Port are exceptionally high. Additionally, Figure 1-9 shows a graph displaying the trend of pairs ranked second and below in terms of 2023 transshipment cargo

[15] While these figures suggest the container market in the hinterlands of these three ports is favorable for container shipping companies, the specific types of goods exported via container remain unknown. Furthermore, information on Mozambique's and neighboring countries' export industries is currently insufficient. Therefore, these statistical figures alone make it difficult to accurately grasp the full picture of the container market in this region, limiting analysis to speculation.

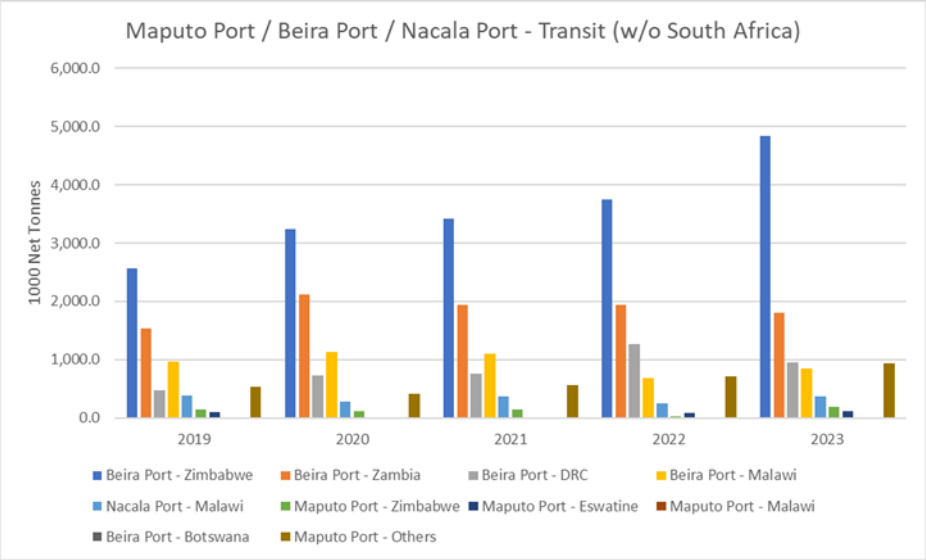
volume, excluding the exceptionally high volume pair of Maputo Port and South Africa. This graph sorts these pairs from the Table 1-13, which lists port-of-transit and import/export country pairs.

Ranked second is the blue Beira Port–Zimbabwe pair, showing steady growth. Third is the orange Beira–Zambia pair, which has stagnated since 2020. Fourth is the Beira Port–Democratic Republic of Congo (DRC) pair, which grew steadily until 2022 and has since surpassed the fifth-ranked Beira Port–Malawi pair. Nacala Port–Malawi ranks sixth, fluctuating annually.

Table 1-13 Comparison of Transit Cargo by Country from Mozambique Ports (2019–2023)

1000 Net Tonnes

	2019	2020	2021	2022	2023
Maputo Port - South Africa	13,726.4	11,584.9	15,577.7	20,368.3	24,916.6
Maputo Port - Eswatine	101.8	-	-	88.2	114.5
Maputo Port - Zimbabwe	154.7	123.6	140.9	21.6	194.0
Maputo Port - Malawi	-	-	-	-	7.5
Maputo Port - Others	529.5	415.0	571.4	721.2	939.2
Beira Port - Malawi	975.0	1,126.8	1,105.3	687.0	849.2
Beira Port - DRC	483.6	730.0	763.6	1,269.0	956.5
Beira Port - Zambia	1,539.8	2,112.5	1,933.0	1,931.9	1,808.2
Beira Port - Zimbabwe	2,564.9	3,241.4	3,419.7	3,741.2	4,832.5
Beira Port - Botswana	-	-	-	0.3	0.1
Nacala Port - Malawi	385.9	285.0	377.9	254.6	378.7



Source: Compiled by the JST based on CFM data

Figure 1-9 Trends in Transit Cargo Volume (Imports and Exports) Between Ports and Inland Countries (2019–2023, excluding South Africa)

2) Share of Transit Cargo from Zambia and Malawi by Port

Table 1-14 shows the trend in cargo volume for Zambia and Malawi transit cargo (imports and exports) at Mozambique ports (Nacala Port, Beira Port) from 2019 to 2023. Additionally, Figure 1-10 to Figure 1-16 are graphs showing this trend by total volume, by imports/exports, by cargo type, and by major commodity. Below are the characteristics of port shares in transit cargo (imports and exports) for each country. Note that in the statistical data, transit cargo (exports) is almost entirely

containerized transport. However, whether the containers are assembled in the respective countries or near the ports, or whether they are bonded shipments, is unclear from the port statistics.

Transit Cargo in Zambia

While there is no cargo via Nacala Port, recent rail freight transport by Nacala Logistics has seen examples where goods transported to Malawi are then moved overland to Zambia (with fertilizer being the main item). In such cases, this volume may not appear in the statistics.

Transit cargo via Malawi

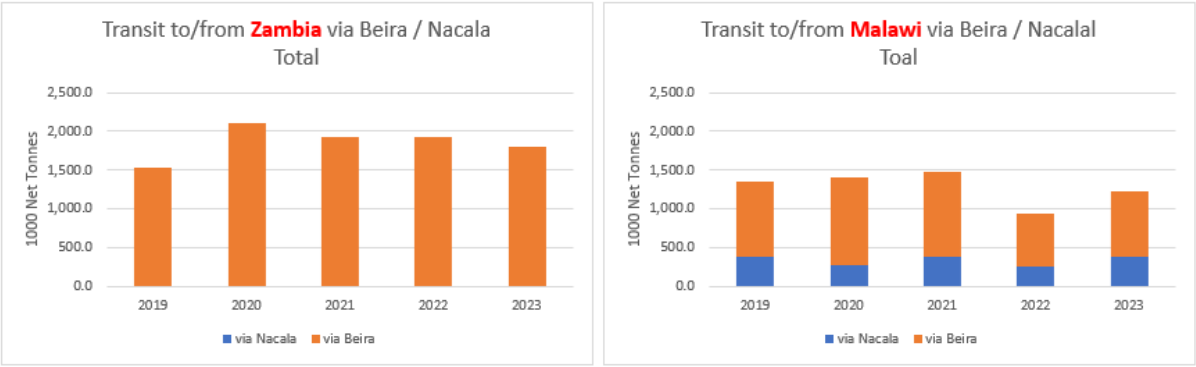
Comparing cargo via Beira Port and Nacala Port reveals an increasing ratio of cargo via Nacala Port relative to Beira Port (Exports: 12%-13% from 2020-2022, rising to 21% in 2023, Imports: 20%-30% from 2019 to 2021 but reached approximately 50% from 2022 to 2023). Furthermore, for liquid bulk transit cargo from Malawi (imports: fuels like diesel oil and gasoline), while the volume via Nacala Port is smaller than that via Beira Port, the volume handled has begun to increase since 2021 (it is expected to increase further considering that fuel transport by rail from Nacala Port resumed in July 2024 for the first time in 21 years). Items transported more frequently via Port Nacala than via Port Beira include dry bulk and general cargo (such as fertilizers and wheat).

Table 1-14 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023)

1000 Net Tonnes

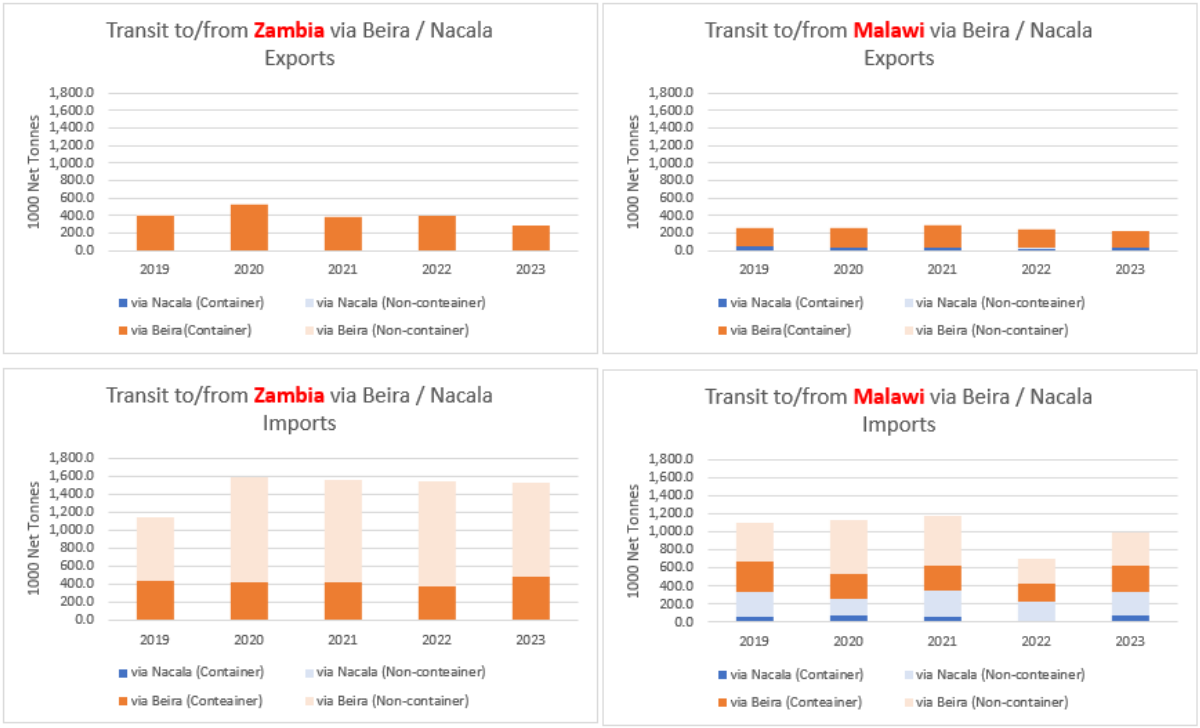
		Transit to/from Zambia via Beira Port / Nacala Port					Transit to/from Malawi via Beira Port / Nacala Port				
		2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Transit	via Beira	**1,539.8**	**2,112.5**	**1,933.0**	**1,931.9**	**1,808.2**	**975.0**	**1,126.8**	**1,105.3**	**687.0**	**849.2**
	via Nacala	-	-	-	-	-	**385.9**	**285.0**	**377.9**	**254.6**	**378.7**
Exportação / Exports	via Beira	**403.2**	**528.4**	**380.1**	**396.9**	**278.5**	**216.4**	**241.8**	**269.0**	**217.6**	**187.3**
	via Nacala	-	-	-	-	-	**50.2**	**32.1**	**32.9**	**25.6**	**40.1**
Importação / Imports	via Beira	**1,136.6**	**1,584.1**	**1,552.9**	**1,535.0**	**1,529.7**	**758.5**	**885.0**	**836.3**	**469.4**	**661.8**
	via Nacala	-	-	-	-	-	**335.7**	**252.9**	**345.0**	**229.0**	**338.5**
Container (Exports)	via Beira	391.8	515.1	372.9	396.9	278.5	208.9	220.4	256.5	208.6	187.3
	via Nacala	-	-	-	-	-	50.2	32.1	32.9	24.1	40.1
Container (Imports)	via Beira	434.6	425.5	430.9	384.3	485.3	341.1	280.5	278.2	191.9	282.8
	via Nacala	-	-	-	-	-	61.7	69.7	61.7	17.0	68.0
Liquid Bulk (Exports)	via Beira	-	-	-	-	-	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Liquid Bulk (Imports)	via Beira	266.3	578.3	752.7	737.8	508.7	200.1	246.2	211.9	138.4	157.3
	via Nacala	-	-	-	-	-	4.6	0.0	0.0	10.5	17.3
Dry Bulk + General Cargo (Exports)	via Beira	11.4	13.3	7.2	0	0	7.5	21.4	12.4	9	0
	via Nacala	-	-	-	-	-	-	-	-	1.5	-
Dry Bulk + General Cargo (Imports)	via Beira	435.8	580.3	369.2	412.9	535.7	217.4	358.3	346.2	139.2	221.8
	via Nacala	-	-	-	-	-	269.3	183.2	283.2	201.6	253.3
Liquid Bulk (Exports) Gasóleo / Diesel	via Beira	200.0	410.9	509.2	474.9	300.4	104.3	130.4	106.0	54.4	62.7
	via Nacala	-	-	-	-	-	4.6	-	-	8.7	17.3
Liquid Bulk (Exports) Gasolina / Gasoline	via Beira	52.0	157.8	233.1	252.0	190.9	87.9	113.4	99.9	79.8	83.3
	via Nacala	-	-	-	-	-	-	-	-	1.8	-
Liquid Bulk (Exports) GPL / LPG	via Beira	0.1	1.8	2.9	0.4	0.1	0.2	0.2	1.2	-	0.5
	via Nacala	-	-	-	-	-	-	-	-	-	-
Liquid Bulk (Exports) Jet / Jet	via Beira	14.2	7.8	7.5	10.5	17.3	7.7	2.2	4.8	4.2	10.8
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Exports) Açúcar / Sugar	via Beira	11.4	-	-	-	-	7.5	21.4	10.4	9.0	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Exports) Feijão / Bean	via Beira	-	-	-	-	-	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	-	1.5	-
Dry Bulk + General Cargo (Exports) Níquel / Nickel	via Beira	-	13.3	7.2	-	-	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Exports) Soja / Soya	via Beira	-	-	-	-	-	-	-	2.0	-	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Imports) Arroz / Rice	via Beira	12.0	12.3	1.2	24.0	22.1	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Imports) Clinquer / Clinker	via Beira	-	-	-	-	-	-	16.5	-	-	-
	via Nacala	-	-	-	-	-	91.3	22.2	50.3	44.9	-
Dry Bulk + General Cargo (Imports) Enxofre / Sulfur	via Beira	1.8	113.8	-	59.3	48.9	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	-	-	-
Dry Bulk + General Cargo (Imports) Fertilizante / Fertilizers	via Beira	408.5	435.7	338.0	326.4	446.0	186.6	258.9	317.9	127.8	162.4
	via Nacala	-	-	-	-	-	120.4	140.6	164.2	126.3	170.6
Dry Bulk + General Cargo (Imports) Gesso / Plaster	via Beira	-	-	-	-	-	-	-	-	-	-
	via Nacala	-	-	-	-	-	-	-	10.0	7.7	33.0
Dry Bulk + General Cargo (Imports) Trigo / Wheat	via Beira	3.0	14.9	25.5	-	13.8	29.5	73.6	22.7	9.5	55.8
	via Nacala	-	-	-	-	-	57.6	20.4	56.5	22.7	49.7
Dry Bulk + General Cargo (Imports) Diversos / Other Products	via Beira	10.5	3.6	4.5	3.2	4.9	1.3	9.3	5.6	1.9	3.6
	via Nacala	-	-	-	-	-	-	-	2.2	-	-

Source: Compiled by JST based on CFM data



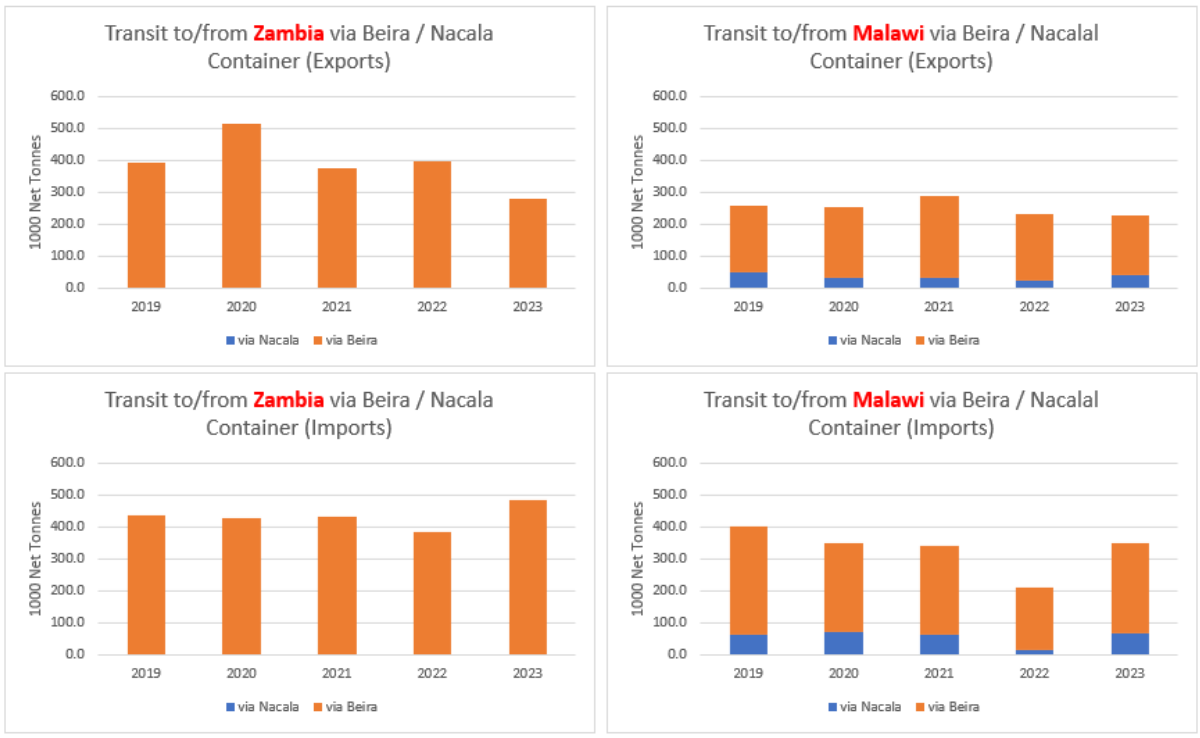
Source: Compiled by JST based on CFM data

Figure 1-10 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (Total)



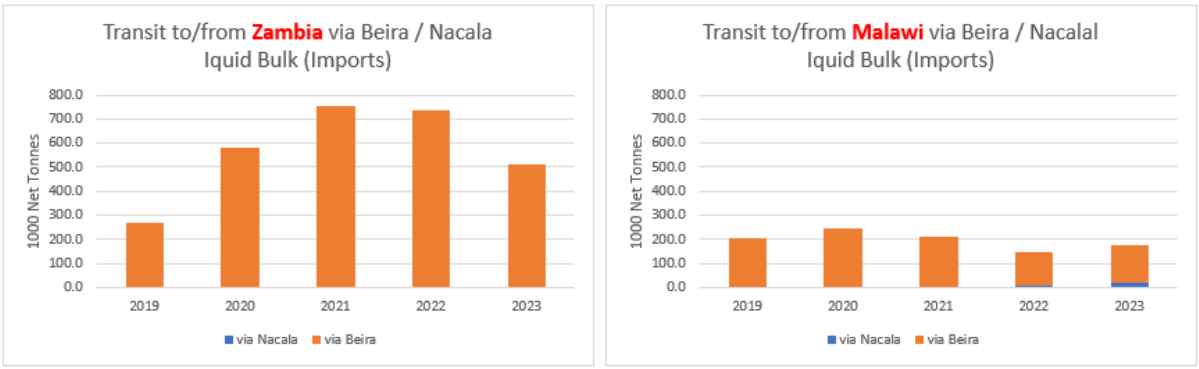
Source: Compiled by JST based on CFM data

Figure 1-11 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (By Import/Export, Container/Non-Container)



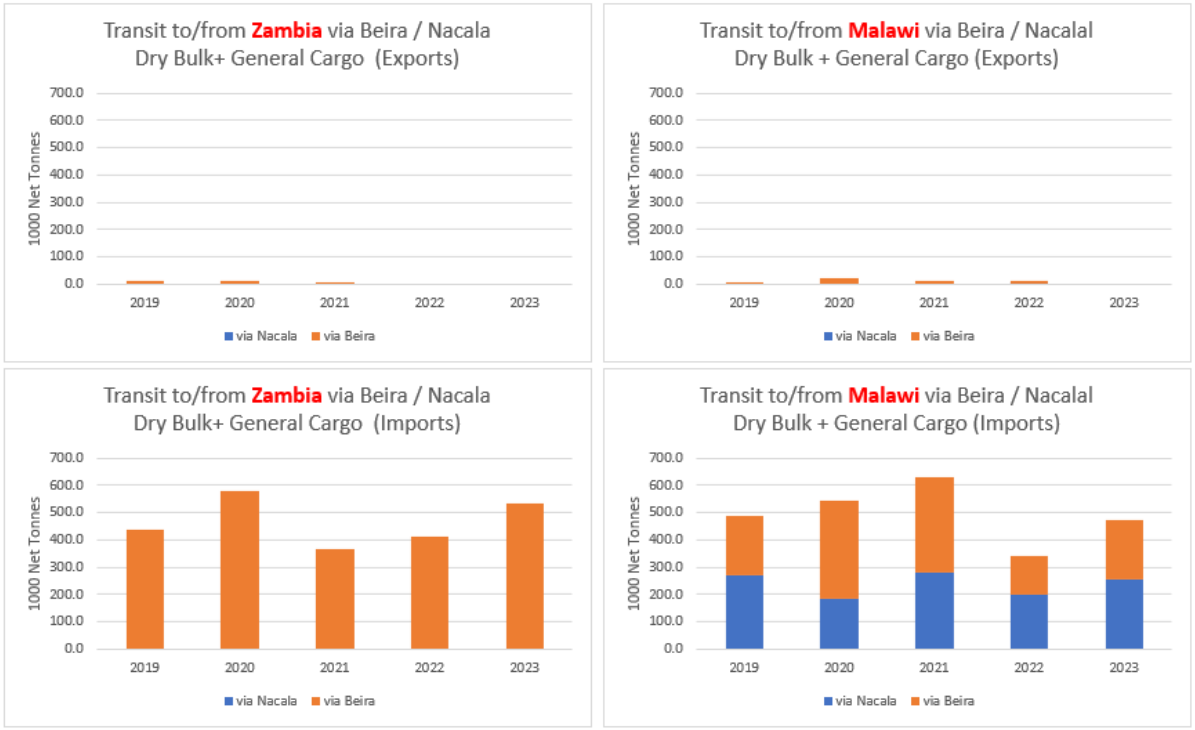
Source: Compiled by the JST based on CFM data

Figure 1-12 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (By Packaging Type and Import/Export – Containers)



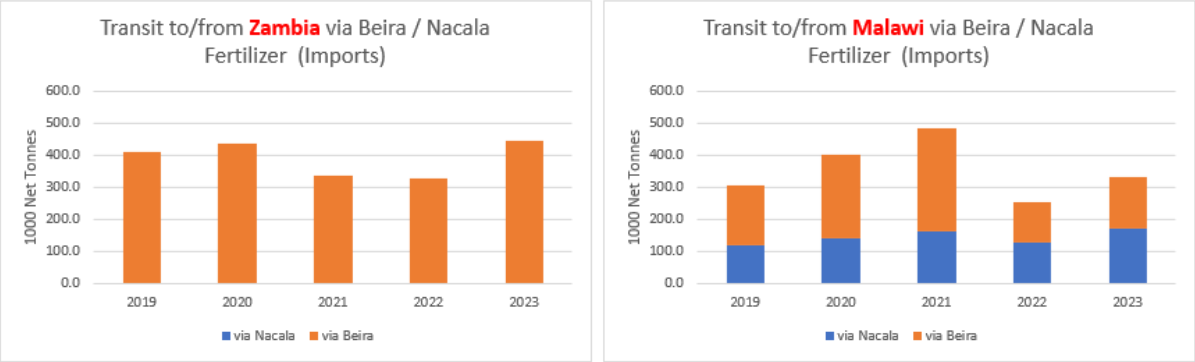
Source: Compiled by the JST based on CFM data
Only imports have actual handling records

Figure 1-13 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (By Cargo Type – Liquid Bulk)



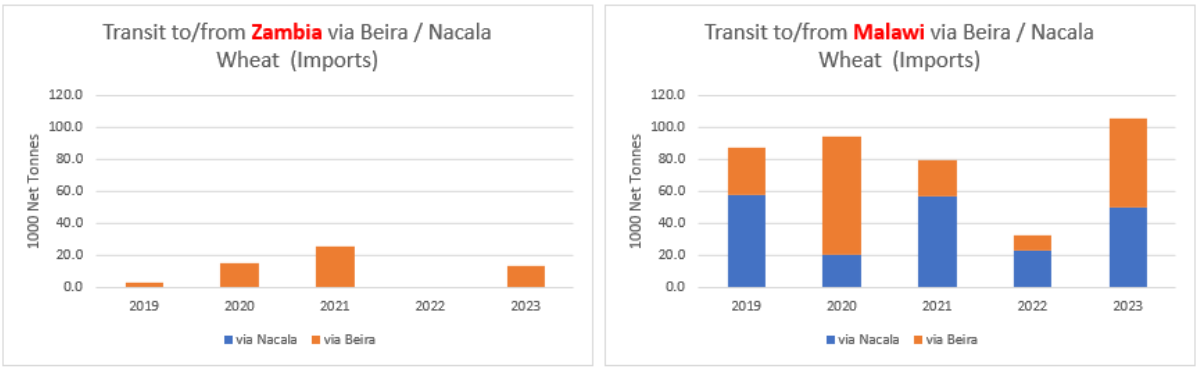
Source: Compiled by the JST based on CFM data

Figure 1-14 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (By Cargo Type and Import/Export – Dry Bulk/General Cargo)



Source: Compiled by the JST based on CFM data

Figure 1-15 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (Major Commodities – Fertilizer (Imports))



Source: Compiled by JST based on CFM data

Figure 1-16 Trends in Container Cargo Volume (Imports/Exports) for Zambia and Malawi Transit Freight at Mozambican Ports (2019–2023) (Major Commodities – Wheat (Imports))

1.5.3 Nacala Port Utilization Status (Routes, Commodities, etc.)

We collected and analyzed route information for vessels using Nacala Port by cargo type (containers, tankers, dry bulk) for 2024 and recent data from Nacala Port. We specifically examined the impact of the recent conflict in the Middle East separately and found no significant effect (analysis results are noted in Supplement [1-2]). The following presents the analysis results by cargo type.

(1) Container Routes

Based on the Container Route Database (MDS Transmodal, August 2024 edition), information provided by the CFM Nacala Office (Figure 1-17), and shipping company websites, we organized information on container routes serving Nacala Port.

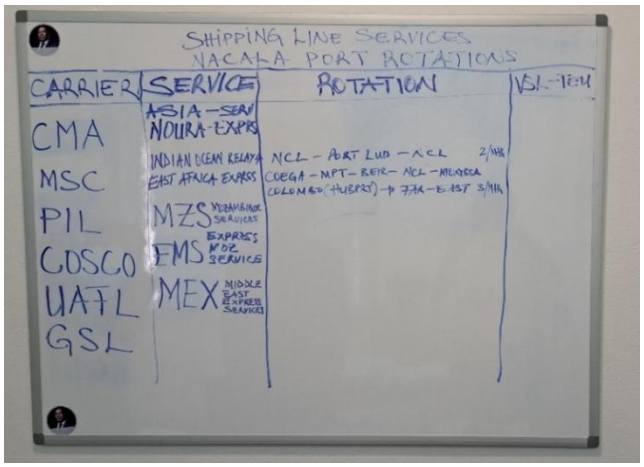


Photo by JST (March 6, 2025)

Figure 1-17 Container route information displayed at the CFM Nacala Office (whiteboard, bulletin board)

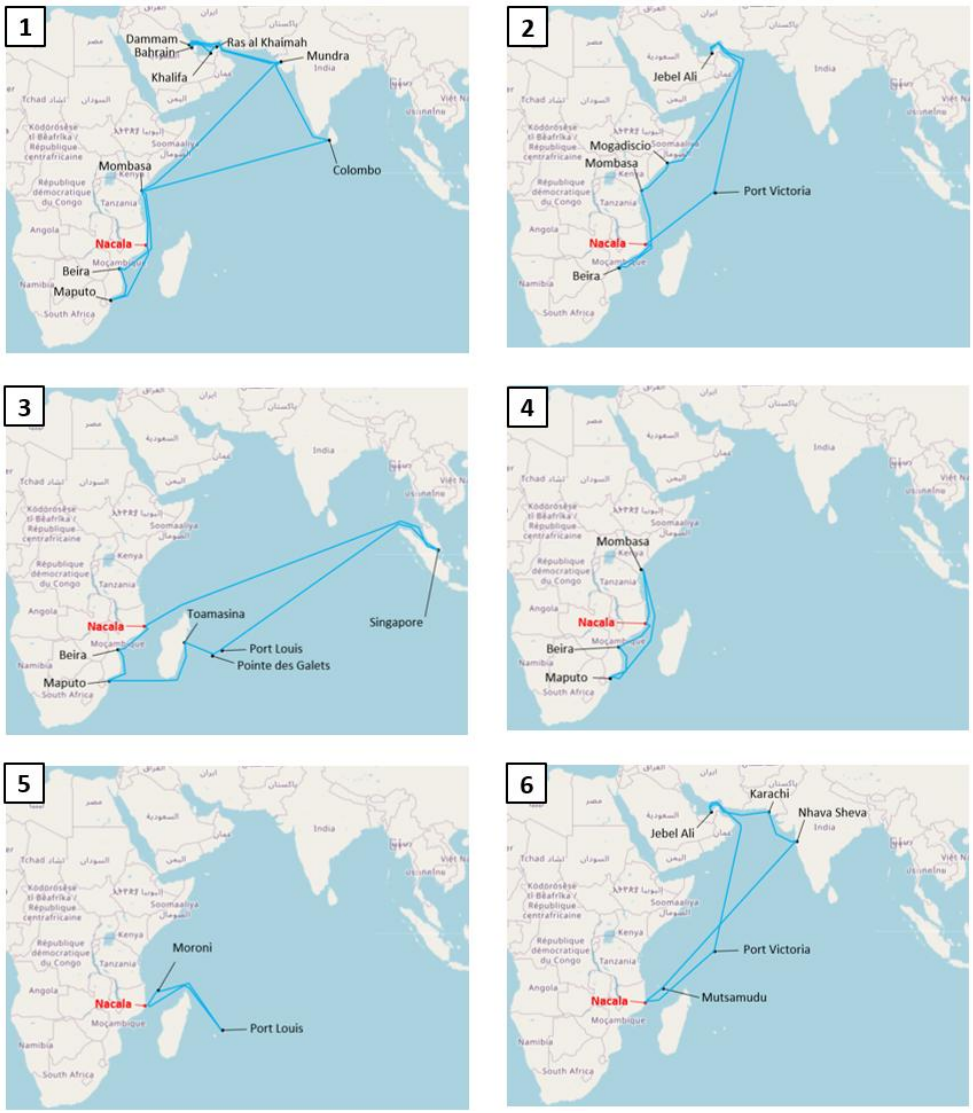
Table 1-15 shows the container shipping companies/service names using Nacala Port, the port call routes for each service, the vessel type, container capacity (in TEU), number of vessels used, and service frequency (= port call frequency). Looking at the frequency of operations, the routes calling weekly (MSC, CMA-CGM, and PIL) are the India-Middle East routes (via Mombasa and Maputo ports). Biweekly services connect to international container trunk routes via Mombasa, Maputo, and Port Louis.

Table 1-15 Container Shipping Routes Calling at Nacala Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency (Listed in order of most frequent port calls)
1	MSC (EAST AFRICA EXPRESS)	Khalifa – Ras al Khaimah – Bahrain – Mundra – Colombo – Mombasa – Beira – Maputo – **Nacala** – Mombasa – Mundra – Dammam – Khalifa	FC, 3300 to 4600 TEU × 5 vessels, **Weekly**
2	CMA-CGM (NOURA EXPRESS)	Jebel Ali – Mogadishu – Mombasa – Beira – **Nacala** – Port Victoria – Jebel Ali	FC, 1600 to 2300 TEU × 5 vessels, **Weekly**
3	PIL (MZS)	Singapore – Port Louis – Pointe des Galets – Toamasina – Maputo – Beira – **Nacala**	FC, 1800 to 2000 TEU × 5 vessels, **Weekly**
4	COSCO (EMS)	Mombasa – Maputo – Beira – **Nacala** – Mombasa	FC, 1100 to 1200 TEU × 2 vessels, **Once every 1 to 2 weeks**
5	MSC (IND OC 4)	Port Louis – **Nacala** – Moroni - Port Louis	FC, 900 TEU × 1 vessel, **Once every 2 weeks**
6	UAFL (MIDDLE EAST EXPRESS)	Nhava Sheva – Karachi – Jebel Ali – Port Victoria – **Nacala** – Mutsamudu – Nhava Sheva	FC/GC, 1800 to 1900 TEU × 2 vessels, **Once every 2 to 3 weeks**

Note: In the table, FC denotes full container ships and GC denotes general cargo ships.

Source: Prepared by the JST based on CFM Nacala Office, MDS Transmodal (Aug 2024), shipping company websites, and Lloyd's List Seasearcher



Note: The database used tracks and continuously updates information on over 6, 000 container vessels worldwide, including operating shipping companies, service names, port call sequences, and container carrying capacity.

Source: Prepared by the JST based on Lloyd's List Seasearcher and OpenStreetMap

Regarding port call routes, it is important to note that the ports called and their sequence often change per voyage; therefore, this represents only one example of port calls and their sequence. Table 1-15 The diagram below illustrates the approximate sea route positions between ports listed in the table[16]. Table 1-15 Among the six routes shown, two major points can be noted.

[16] Container shipping services once commonly featured route maps and standard transit times on carrier websites. However, in recent years, especially among major carriers, a "search service model" has become more prevalent. This model provides route and vessel schedule information when two points (point-to-point: origin and destination) are entered. This is considered part of an effort to enhance customer service by selectively providing shippers with the information they need (i.e., when and where to hand over the cargo they wish to ship and when it will arrive at its destination). The background to this shift is thought to include the following points.

- Shipping companies are flexibly changing the ports of call and their sequence based on current demand (such as shippers' preferences). This includes changes like shifting container ships from other routes to the target route.
- Consequently, discrepancies frequently arise between route maps/standard transit times and actual operational routes/schedules (i.e., discrepancies between the planning and execution phases of vessel operations).
- Consequently, providing information focused solely on the latest voyage schedule (i.e., the schedule at the implementation stage) offers benefits for both shipping companies and shippers by avoiding unnecessary confusion.

- **1 (Shipping Line: MSC), 2 (Shipping Line: CMA-CGM), 3 (Shipping Line: PIL), 6 (Carrier: UAFL)**: **These four routes** call at major ports such as Jebel Ali Port (UAE), Mundra Port (India), Navasheva Port (India), Colombo Port (Sri Lanka), and Singapore Port (Singapore). By transshipping containers from/to vessels on these trunk routes calling at these ports, containers can be transported to and from destinations worldwide. For container transport between Nacala Port and Japan, the most convenient route is considered to be transshipment via Port of Singapore, which has direct services to major Japanese ports.
- **Routes 4 (Carrier: COSCO) and 5 (Carrier: MSC)**: These are intra-regional routes calling at ports within limited areas of Eastern Africa. Compared to the four routes mentioned above, the vessels operating on these routes are smaller in size (in terms of the number of TEU containers they can carry) and offer less frequent service (fewer port calls).

(2) Container Cargo Items

The breakdown of items transported by container and the volume handled by item type were compiled based on information provided by the CFM Nacala Office (Table 1-16, Table 1-17). The characteristics are summarized below.

- Product**s and Export Destinations**: Table 1-16 lists the main container cargo items handled at Nacala Port: "Raw cashew nuts, peanuts, sesame seeds, soybeans, green mung beans, pigeon peas. "This table reveals that the main export destinations by commodity are Vietnam for cashew nuts, China for sesame seeds, and ports in India for the other commodities, indicating that agricultural products are transported by container to these destinations.
- **Handling Period (Peak Season)**: Table 1-17 shows the handling periods by item exported via container from Nacala Port. This table reveals the seasonality of agricultural products. It also shows that items not included in Table 1-16, such as shelled cashew kernels, cotton, toordhal, timber, tobacco, graphite, wheat bran, scrap, bananas, seafood, and tea, are also handled as container export items. Furthermore, it can be inferred from this that these items exhibit significant seasonality due to their agricultural nature.

Table 1-16 Agricultural products exported by container from Nacala Port

	CROP PRODUCT	TOTAL MARKET SIZE	EQUIPMENT PREFERENCIAL	CARGO WEIGHT STUFFED	MAIN DESTINATIONS
1	Raw cashew nuts	80,000 tons	70% 40ft, 30% 20ft	19tons/20ft, 27tons/40ft	70% Vietnam, 30% India (Cochin/ Tuticorin/Visakhapatnam/Mangalore)
2	Pea nuts/groundnuts	40,000 tons	98% 40ft	28tons/40ft	90% Indonesia main ports, 10% Vietnam
3	Sesame seems	100,000 tons	99% 20ft	24tons/20ft	95% China, 5% Japan
4	Soya beans	80,000 tons	99% 20ft	24tons/20ft	80% India (Nhava Sheva/Mundra), 15% Karachi, 5% Jebel Ali
5	Green mung beans	100,000 tons	99% 20ft	24tons/20ft	85% Indian ports (Nhava Sheva/Mundra), 15% Jebel Ali
6	Pigeon peas	350,000 tons	99% 20ft	26tons/20ft	99% Indian ports (Nhava Sheva/Mundra), 1% others

Source: CFM Nampula Office

Table 1-17 Handling periods by item for goods exported by container from Nacala Port

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Raw cashew	■	■										■
2	Pea nuts						■	■	■	■			
3	Sesame seeds							■	■	■	■	■	
4	Soya beans					■	■	■	■	■	■	■	
5	Green mung beans					■	■	■	■	■	■	■	
6	Pigeon peas							■	■	■	■	■	■
7	Cashew kernels	■	■	■	■	■	■	■	■	■	■	■	■
8	Cotton						■	■	■	■	■	■	■
9	Toordhal	■						■	■	■	■	■	■
10	Timber	■			■	■	■	■	■	■	■	■	■
11	Tobacco	■	■	■				■	■	■	■	■	■
12	Graphite/minerals	■	■	■	■	■	■	■	■	■	■	■	■
13	Wheat bran	■	■	■	■	■	■	■	■	■	■	■	■
14	Scrap	■	■	■	■	■	■	■	■	■	■	■	■
15	Banana	■	■	■	■	■	■	■	■	■	■	■	■
16	Sea food/fish	■	■	■	■	■	■	■	■	■	■	■	■
17	Tea	■	■	■	■	■	■	■	■	■	■	■	■

■ On season ▨ Off season

Source: CFM Nacala Office

Interviews with logistics operators using Nacala Port indicated that "coal transport is given top priority in rail transport connecting Nacala Port and its hinterland, and currently, the transport of non-coal cargo is constrained. "Figure 1-6, coal handling volumes at Nacala Port have surged in recent years. The railway connecting Nacala Port and Nacala Port to the hinterland regions along Nacala Corridor (the Nampula Line) has limited capacity for transporting goods other than coal. Therefore, during peak agricultural export seasons, it is thought that there are cases where, unable to use the railway as a means of transport from the hinterland to the Nacala Port, they have no choice but to use truck transport, which is relatively expensive.

(3) Tanker (Liquid Bulk) Routes

By cross-referencing 2023 AIS data (vessel position and time information: indicating where a tanker was located before and after using a berth at the Nacala Port Liquid Bulk Terminal) with port statistics and trade statistics, we estimated the movement and main commodities of cargo transported by the tanker. The results of this analysis are presented in Table 1-18[17] and Table 1-18 (Items No.1 to 4 in the table are listed in order of the highest annual handling frequency). Note that Item No.5 in the table represents movements between Nacala Port and domestic ports, while Item No.6 represents movements within Nacala Bay, likely involving fuel supply operations associated with the gas fields near Palma (details are provided in Notes 2 and 3 at the bottom of the table).

The table shows 2023 data (approximately 80 vessel calls annually: an average of 6-8 vessels per month), while the graph analyzes the latest monthly data up to May 2025. It shows that the number of monthly

[17] Table 1-17 For details on the process of estimating cargo movements and major items, refer to Supplement [1-3].

port calls has increased significantly since October 2024, exceeding 10 vessels per month (this can be attributed to the commencement of rail transport to Malawi).

Table 1-18 Estimated Cargo Movements Based on Tanker Routes (2023)

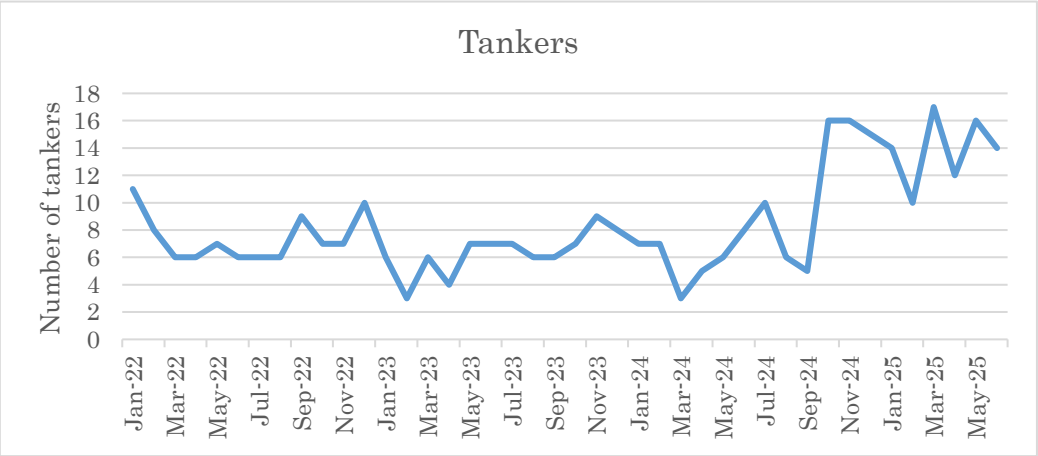
No.	Tanker Movement Route	Estimated Cargo Movement [Estimated Main Items]		Number of Times / Year
		Loading/Unloading[1]	Cargo Transport Details	
1	Primarily between the Middle East/India and the East Coast of Africa	Landing	Imports from overseas to Nacala Port [Petroleum Products]	40
2	Primarily movement between Southeast Asia and the east coast of Africa	Landing	Imports from overseas to Nacala Port [Palm Oil]	21
3	Movement between South America and the East Coast of Africa	Landing	Imports from overseas to Nacala Port [Soybean Oil]	4
4	Movement between Europe and the East Coast of Africa	Landing	Imports from overseas to Nacala Port [Various oils, petroleum products]	2
5	Transportation between Nacala Port and domestic ports	Shipment	Transfer from Nacala Port to Moma Port [1] [Petroleum Products]	17
6	Movement between the Nacala Port Liquid Bulk Terminal and the Anchorage within Nacala Bay	Loading	Fuel supply from the Nacala Port Liquid Bulk Terminal to vessels in Nampula Bay [3]	n.a.

Note 1: Estimated distinction based on whether liquid bulk cargo is more likely to be unloaded or loaded when using the berth at the Nacala Port Liquid Bulk Terminal

Note 2: Moma Port is located in southern Nampula Province. It is a dedicated port facility established for the maritime transport of minerals (ilmenite, zircon, rutile, etc.) mined by Kenmare Resources plc. (Headquarters: Ireland), which operates the Moma Titanium Minerals Mine. In port statistics compiled by CFM, it is listed as Topuito Port (Topuito Port's 2023 cargo throughput was 1, 046 thousand tons). This is estimated to include not only exported minerals but also all or part of the diesel transported by tanker from Nacala Port, (Table 1-12, Nacala Port statistics for domestic/ship loading (Cabotage, Load, 2023: 12.4 thousand tons)).

Note 3: Analysis of AIS data indicates that in 2023, five small tankers and tank barges (four of which are operated by CPG Bunkering Services, headquartered in Dubai, which conducts ship refueling operations at Nacala and Maputo ports) are estimated to have refueled vessels anchored within Nacala Bay (the refueled vessels may predominantly be coal carriers using the Nacala Port-A-Bela). AIS data indicates these five vessels made a total of 69 entries into and exits from waters near the wharves of Nacala Port. While 17 of these movements were confirmed to be related to transfers between Nacala Port and Moma Port, determining how many vessels were refueled during the remaining movements would require an enormous amount of analysis time and has not yet been completed.

Source: Prepared by the JST based on Lloyd's List Seasearcher, CFM port statistics, and World Integrated Trade Solution



Note: The increase in the number of vessels entering port since October 2024 represents a rise compared to the trend observed from 2022 to 2023. For detailed analysis of the impact of the Middle East situation () on the rerouting from the Red Sea/Suez Canal route to the Cape of Good Hope route in South Africa, refer to [Supplement 1-2].

Source: Compiled by the JST based on Lloyd's List Intelligence Seasearcher

Figure 1-18 Monthly trends in the number of tanker arrivals (Nacala Port, Nacala Port-a-Bela)

Furthermore, regarding the top liquid bulk items being unloaded identified in this analysis (petroleum products, palm oil), the above analysis data did not specify the import volumes or partner countries. Therefore, analysis was conducted using data from the World Integrated Trade Solution (WITS)[18]. While this data has limitations as it is country-level data rather than port-specific, it is considered useful for reference and is presented below.

1) Petroleum Products

Table 1-18 Taking into account the differences in product classification shown in the table, we used Mozambique's import statistics published in the World Integrated Trade Solution (WITS) to identify the top five countries for imports of "diesel oil, gasoline, jet fuel" (= "petroleum products"), which have the largest handling volumes among liquid bulk at Nacala Port, in order to estimate the main trading partners. The results are shown in Table 1-19. Regarding import sources, the UAE ranked first in import value, but quantity data was not registered. Bahrain and Saudi Arabia, both Middle Eastern countries, ranked second and third, with India in fourth place.

Table 1-19 Import Value and Quantity of Petroleum Products by Country (2023)

Imports (Country → Mozambique)		
Country	**Import Value (million USD)**	**Quantity (Thousand tons)**
UAE	755	n.a.
Bahrain	336	341
Saudi Arabia	192	188
India	150	154
Malaysia	53	48
Others	170	n.a.
Total	1,656	n.a.

Note: This shows the import value and quantity by country for items corresponding to [HS Code 271000] in Mozambique's import statistics.
Source: Compiled by JST based on data published in WITS

2) Vegetable Oil

Regarding imports of "Óleo / Oil" (≈ "vegetable oil"), which ranked high in volume among liquid bulk cargoes at Nacala Port following "Petroleum products = Diesel oil, Gasoline, Jet fuel, " the main partner countries (main exporting countries) for soybean oil (crude) and palm oil (crude) were identified using Mozambique's import statistics published on WITS. Table 1-20 and Table 1-21 show the results. For both products, only six countries were major trading partners. Argentina was the largest supplier of soybean oil, while Malaysia was the largest supplier of palm oil.

[18] A trade analysis tool developed by the World Bank in collaboration with international organizations such as the United Nations Conference on Trade and Development (UNCTAD).

Table 1-20 Import Value and Volume of Soybean Oil by Country (2023)

Imports (Country → Mozambique)		
Partner Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
Argentina	28	563
Brazil	6	4
South Africa	3	2
Belgium	2	2
Malaysia	2	1
Spain	2	2
Total	42	574

Note: This shows the import value and quantity by country for items corresponding to [HS Code 150710] in Mozambique's import statistics.

Source: Compiled by JST based on data published in WITS.

Table 1-21 Palm Oil Imports by Country (Value and Volume, 2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
Malaysia	142	113
UAE	48	21
Indonesia	44	44
Argentina	8	6
India	5	5
South Africa	2	2
Total	249	190

Note: This shows the import value and quantity by country for items corresponding to [HS Code 151110] in Mozambique's import statistics.

Source: Compiled by the JST based on data published in WITS

(4) Dry Bulk Carriers and General Cargo Ships Routes

Table 1-22 presents excerpted 2023 data for items estimated to be transported in dry bulk/general cargo form. This is based on cargo volume trends (2019–2023) at Maputo, Beira, and Nacala Port (refer to Table 1-14). However, since the purpose is to estimate the items transported by vessels calling at Nacala Port, the table focuses on items handled at Nacala Port in 2023. Therefore, Figure s for Maputo Port and Beira Port may exclude items like minerals that are actually handled but not included in this table. Table 1-22 The characteristics of items handled at Nacala Port (high-volume items) are as follows (2023 data):

- Clinker (imports: 339.8 thousand tons), Wheat (imports: 222.2 thousand tons, transit imports: 49.7 thousand tons), Fertilizer (imports: 5.3 thousand tons, transit imports: 170.6 thousand tons), Rice (imports: 116.1 thousand tons)

Table 1-22 Dry Bulk and General Cargo Handling Volumes at Maputo Port, Beira Port, and Nacala Port (2023)

1000 Toneladas Líquidas / 1000 Net Tonnes

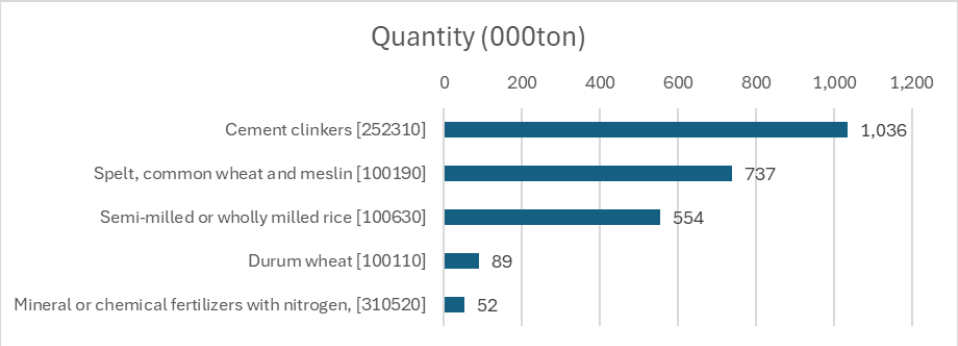
Designação / Designation	2023 Handling Volume		
	Maputo	Beira	Nacala
2. Internacional Moçambique / International Mozambique	**493.7**	**1,191.5**	**853.3**
Exportação / Exports	*0.0*	*0.0*	**52.1**
Feijão / Bean	*0.0*	*0.0*	52.1
Importação / Import	**493.7**	**1,191.5**	**801.2**
Ácido de sebo da palma destilado / Palm Fatty Acid Destillate	*0.0*	*0.0*	23.0
Arroz / Rice	185.3	123.2	116.1
Clinquer / Clinker	45.6	604.3	339.8
Fertilizante / Fertilizers	37.9	203.3	5.3
Milho / Maize	*0.0*	*0.0*	8.8
Peixe / Fish	*0.0*	*0.0*	2.0
Rolos de Zinco	*0.0*	*0.0*	17.7
RPS	*0.0*	*0.0*	5.5
Trigo / Wheat	224.9	260.7	222.2
Diversos / Other Products	*0.0*	*0.0*	2.7
Equipamento / Equipment	*0.0*	*0.0*	44.9
Milho / Maize	*0.0*	*0.0*	13.2
3. Transito / Transit	**3.3**	**1,201.2**	**253.3**
Importação / Imports	**3.3**	**1,201.2**	**253.3**
Fertilizante / Fertilizers	*0.0*	908.7	170.6
Gesso / Plaster	*0.0*	*0.0*	33.0
Trigo / Wheat	3.3	158.9	49.7
Arroz / Rice	*0.0*	133.6	*0.0*

Note: The above table focuses solely on items handled at Nacala Port in 2023. Therefore, Maputo Port and Beira Port handle items not included in the above table.

Source: Compiled by the JST based on CFM data

Table 1-21 data does not indicate the countries of origin for these major imported items. Therefore, we attempt to estimate the countries of origin using trade statistics from Mozambique and Malawi.

Quantities for each item corresponding to the HS codes of these major imports (equal to the total quantities by partner country) were extracted from Mozambique and Malawi's trade statistics published on WITS. Graphs showing the top five items are presented below Figure 1-19. It is evident that the volumes of clinker, wheat, and rice are overwhelmingly large.



Note: Table 1-22, most fertilizers are transit imports. These transit fertilizer imports are Malawi's imports. The latest trade statistics for Malawi available on WITS were for 2022. Therefore, the [HS Code 310520] in the above table reflects 2022 Figure s. Other items show 2023 Figure s.

Source: Compiled by the JST based on WITS data

Figure 1-19 Major Dry Bulk and General Cargo Items at Nacala Port

For the top three items—clinker (HS Code 252310), wheat (HS Code 100190), and rice (HS Code 100630)—import values and quantities by country (based on WITS data; port-specific analysis is not possible) are summarized in the following tables: Table 1-23 ~ Table 1-25 Given that Saudi Arabia is the primary trading partner for clinker, Russia for wheat, and India for rice, it is highly probable that these countries are the main sources of goods imported through Nacala Port.

Table 1-23 Value and Quantity of Clinker Imports by Originating Country (2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
Saudi Arabia	25	462
Singapore	11	210
UAE	9	140
Hong Kong	10	104
Egypt	3	50
Others	4	70
Total	63	1,036

Note: This shows the import value and quantity by country for items corresponding to "HS Code 252310" in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

Table 1-24 Value and Quantity of Wheat Imports by Originating Country (2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
Russia	77	229
Canada	51	119
Lithuania	30	93
Latvia	12	82
Poland	22	70
Others	63	144
Total	255	737

Note: This shows the import value and quantity by country for items corresponding to [HS Code 100190] in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

Table 1-25 Import Value and Quantity by Country of Origin in the U.S. (2023)

Imports (Country → Mozambique)		
Country	**Trade Value (Million USD)**	**Quantity (Thousand tons)**
India	128	220
Thailand	99	163
Vietnam	57	81
China	28	39
Pakistan	17	26
Others	19	14
Total	347	554

Note: This shows the import value and quantity by country for items corresponding to [HS Code 100630] in Mozambique's import statistics.

Source: Compiled by JST based on data published in WITS

(5) Frequency of Passenger Ship Calls at Nacala Port

Passenger ship calls at Nacala Port were investigated using a database (Lloyd's List Intelligence Seasearcher) that utilizes dynamic and static vessel information (position, IMO number, etc.) transmitted by the Automatic Identification System (AIS) over the past five years (June 2020 to June 2025). (AIS: Automatic Identification System) for the past five years (June 2020 to June 2025). The data source is a database (Lloyd's List Intelligence's Seasearcher) utilizing dynamic and static vessel information (position, IMO number, etc.) transmitted by AIS. The investigation revealed only one ship docked for approximately 5 hours[19]. The number of passengers embarking or disembarking is unknown in this data. The port call records are listed below.

Table 1-26 Passenger Ship Port Calls at Nacala Port (Data: June 2020 - June 2025)

Dockage Period	Ship Name	IMO Number	Gross Tonnage	Operating Shipping Company
December 17, 2024, 6:41 AM - 11:36 AM	Riviera	9438078	66,172 GT	Oceania Cruises

Source: JST based on Lloyd's List Intelligence Seasearcher

1.5.4 Current Status and Challenges of Port Facilities at Nacala Port

This section outlines the current status and challenges of port facilities at Nacala Port and identifies potential approaches for addressing them. These challenges were identified during this survey through site inspections and guidance provided by CFM staff at Nacala Port, as well as through discussions between staff and JST's experts. While some of these challenges are already being addressed by CFM and others, others remain unaddressed. Specifically, the following six items (challenges) are addressed: Each section details the specific challenges (based on field survey results), the status of countermeasure implementation efforts, and proposed countermeasures.

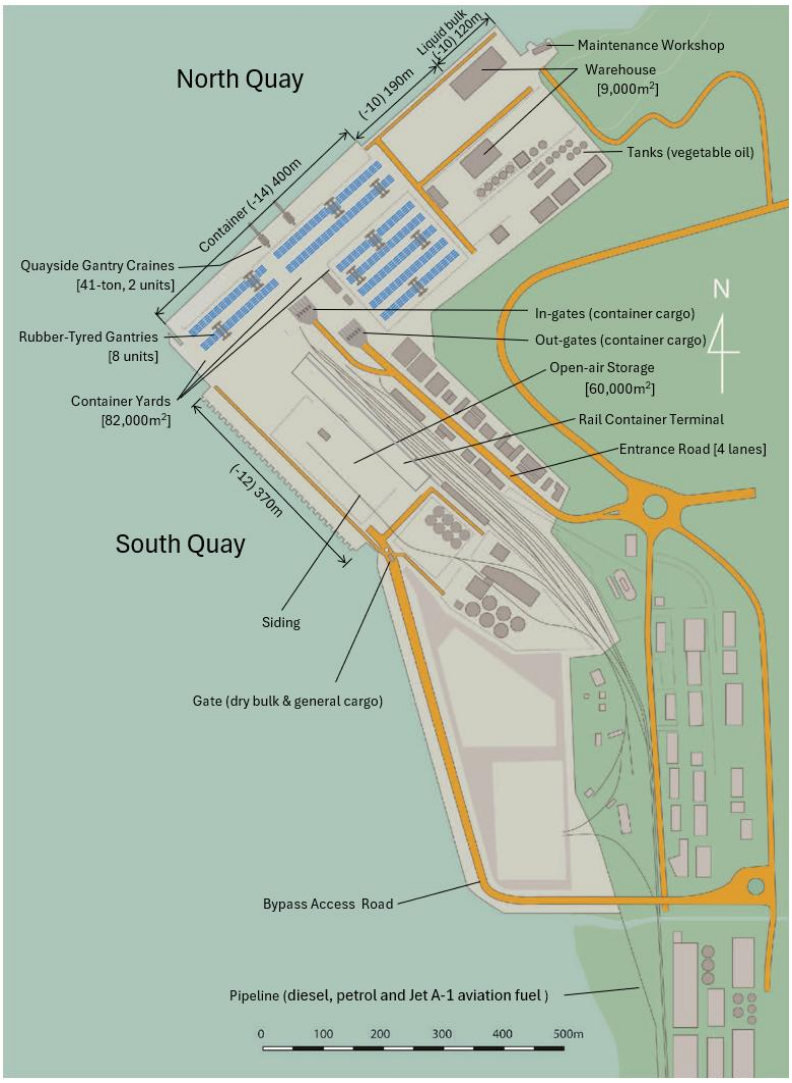
- **Container Terminal**: (ⅰ) Stagnation of container trailers at and near the gate, (ⅱ) Securing storage facilities (sheds, warehouses), (ⅲ) Continuous improvement of container terminal operations
- **Maintenance and management of road pavement near Nacala Port**
- **Influx of sediment from streams within Nampula city into the Nacala Port site during heavy rains**: Partially addressed through ongoing grant aid
- **Liquid Bulk Terminal**
- **South Pier Structures**

[19] The database used records the time a vessel crosses the boundary of a specified polygonal area (polygon) on Earth, or the time a change occurs in the vessel's movement (course, speed), along with AIS position data (latitude/longitude). From the vast accumulated information on vessel movements, etc., we extracted the time data when vessels entered and exited the area of interest (in this case, the area surrounding the berths at Nakara Port). One point of caution identified during the actual extraction process was the potential for double-counting vessel movements that are typically counted as a single port call in port statistics (e.g., a vessel moving to a different berth within the port between arrival and departure). Failure to properly handle this could lead to the mistaken belief that more entries occurred than the number recorded in port statistics. While further scrutiny is needed to achieve complete consistency with port statistics, especially in developing countries where compiling and publishing statistical data often takes considerable time, we believe using AIS information to track berthing counts and entry vessel numbers is beneficial.

- **Cargo handling efficiency at South Pier**

To explain these issues, an understanding of the location of port facilities at Nacala Port is necessary. Therefore, an overview of the facilities is provided at Figure 1-20.

Berths for mooring vessels are located at two points: North Pier and South Pier. North Pier consists of a container berth (water depth -14m, length 400m) located on the southwest side, a liquid bulk berth (water depth -10m, length 120m) on the northeast side, and a multi-purpose berth (water depth -10m, length 190m) for general cargo and containers located between them. The container terminal at the North Pier was developed as part of the aforementioned yen loan project. The South Pier features a multi-purpose berth (water depth -12m, length 370m) for dry bulk cargo and general cargo. Details of each facility are provided in Supplementary Notes [1-4]. Furthermore, the yen loan project included reclamation for the Bypass Access Road section and construction of a new access road, resulting in changes to the layout of facilities within the port.



Source: Prepared by JST based on the NACALA PORT HANDBOOK & DIRECTORY

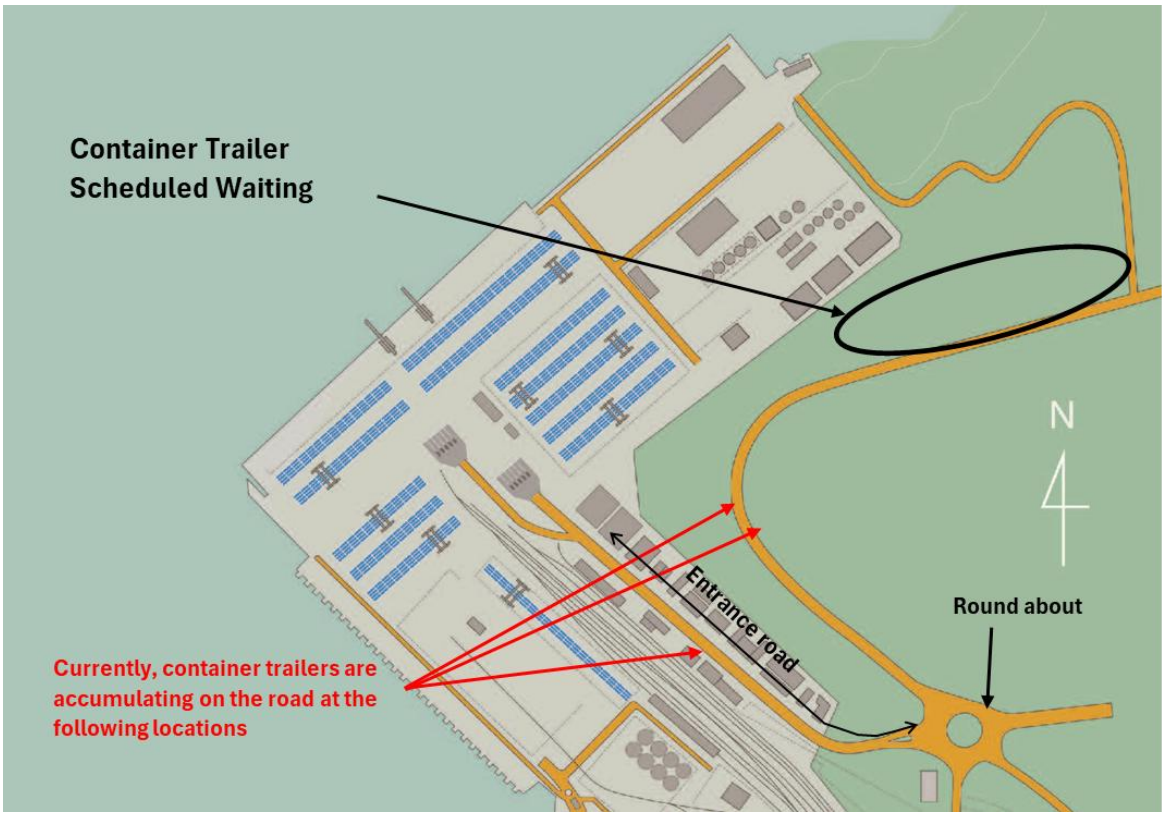
Figure 1-20 Major Port Facilities and their Spatial Relationship in Nacala Port

(1) Challenges and Countermeasures for the Container Terminal

This section details challenges and countermeasures regarding the utilization of container terminal facilities. Discussions with CFM identified three current challenges: (ⅰ) congestion of container trailers at and near the gate, (ⅱ) securing storage facilities (sheds, warehouses), and (ⅲ) continuous improvement of container terminal operations. Based on an understanding of these current conditions, countermeasure proposals are outlined below.

Delays of container trailers at the gate and on nearby roads

On days when container ships arrive, it has been confirmed that delays occur for external container transport trailers in front of the container gate. The locations where delays were observed during the field survey are shown in Figure 1-21 at, and the delay conditions are shown in Figure 1-21 at Figure 1-22[20].



Source: Prepared by JST based on the NACALA PORT HANDBOOK & DIRECTORY

Figure 1-21 Location of container trailer congestion points and planned waiting areas

[20] Due to the impact of Cyclone Jude (Tropical Cyclone Jude) that struck Nacala from the night of March 9 to March 10, 2025, large amounts of sediment washed down from streams on the slopes near Nacala Port accumulated within the port premises, including on the entrance road. Removal of this sediment was still ongoing on March 12, 2025. Figure 1-23 The container trailers visible in the photo may have been stranded on the nearby road, (the road connecting to the roundabout from the northwest side, as shown in Figure 1-21) due to the sediment removal work being conducted on the entrance road on March 12. However, according to information gathered from the CFM Nacala office, "up to 50 container trailers can sometimes be stranded on each side of this road. "Figure 1-23 may show a situation similar to this stranding.

Photo by JST (March 17, 2025)

Figure 1-22 Situation of container trailer congestion on the entrance road to Nacala Port

Photo by JST (March 12, 2025)

Figure 1-23 Situation of container trailer congestion on roads near Nacala Port

The CFM Nampula office gathered information on the following operations conducted at the gate, which are considered potential causes of container trailer congestion occurring at the gate entrance.

- Delays in gate verification procedures: When container terminal staff verify documents submitted by container trailer drivers, processing takes time (or cannot be completed) due to issues such as incomplete documentation.
- Delays in Port Entry Instructions to Container Drivers: Instructions from container terminal staff to container trailer drivers regarding their destination within the port (within the container yard) are processed manually due to the lack of a terminal operation system, resulting in time consumption.

According to the CFM Nacala office, the following measures are currently being implemented to address these issues. In particular, improving waiting areas and the prompt introduction of a terminal operation system by CFM are seen as key points to appeal to shippers using the Nacala Port. As noted in the footnote, the urgent implementation of a system that incorporates the views of the "port operators" who will actually use it, along with the efficient and effective operation of port facilities, is highly desirable.

- **Preparation of container trailer holding areas**: Figure 1-21 It appears that the areas indicated in Figure 1-21 are being secured as holding areas near the port. The plan is to use the parking time at these holding areas to perform pre-processing tasks, such as checking for missing documentation (CFM Nacala Office refers to this pre-processing work as "pre-inspection").

- **Terminal Operation System Implementation:** According to interviews, they are currently working on the final stages of implementation, and its prompt introduction and operational start are anticipated[21].

Shortage of Storage Facilities (Sheds, Warehouses) and Countermeasures

The process of packing cargo into containers (stuffing) or unloading imported cargo from containers (unstuffing) is preferably conducted under roofed storage facilities to protect individual cargo items from wind and rain. Additionally, storage facilities for consolidating less-than-container load (LCL) cargo into a single container, or performing the reverse operation, are called Container Freight Stations (CFS). These are crucial facilities for freight forwarders, providing flexible services to meet a wide range of transportation needs, including consolidated services for small shippers.

During the development of the container terminal at the North Pier of Nacala Port under the Grant Aid "Nacala Port Development Project I & II" (completed in 2023), four of the six storage facilities (warehouses) that had stood behind the quay wall were demolished to secure space for the container yard. Conversely, interviews with logistics operators during field surveys revealed that the availability of covered storage space is a critical factor in sales activities targeting shippers. The removal of these storage facilities and the current shortage represent a significant challenge[22]. Therefore, developing and securing covered storage facilities (warehouses) is crucial for enhancing Nacala Port's appeal and attracting shippers.

Currently, according to the CFM Nampula office, procedures are underway to select private sector entities interested in investing in and operating logistics facilities, including warehouses, on the reclaimed land (area: approx. 7 ha) enclosed by the bypass access road connecting the South Pier, developed under the ODA "Nacala Port Development Project I & II, " to the main road south of the port (as of March 2025)[23]. The realization of this private investment in warehouse development is expected to enhance covered storage facilities and strengthen the competitiveness of Nacala Port.

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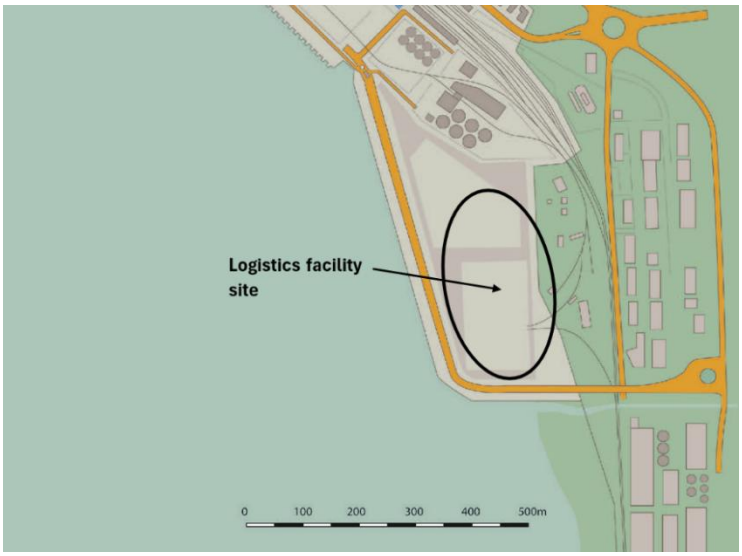
[21] According to an article in the "Port of Nacala Handbook & Directory" published by CFM, "NAVIS, one of the globally widely used products, is currently operational as the terminal operation system. Currently, this functionality is being expanded to build a Port Community System (PCS) funded by CFM. The PCS will connect all port stakeholders (shipping companies, customs, freight forwarders, etc.), enabling operational efficiency and real-time information sharing." Building the PCS requires collaboration not only from CFM but also from the counterparties connecting to the PCS, making the establishment of this collaborative framework crucial.
Furthermore, the JICA technical assistance project "Support for Formulating the Nacala Port Management Plan [Fee-Based Technical Assistance], " implemented from January 2021 to October 2022, envisioned a port management structure where a private terminal operator would manage Nacala Port under a concession agreement with the Mozambican government. It was anticipated that this private terminal operator would select and implement the terminal operation system most suitable for its own operations. Subsequently, the anticipated selection process for a private terminal operator for the concession has not commenced. Port of Nacala continues to be operated by CFM, and the introduction of the terminal operation system is being led by CFM and advanced using its own national budget.

[22] For commodities like cotton, which experience high peak cargo volumes, the current practice involves transporting them overland to Nacala Port in break bulk form rather than containerized shipments from inland areas. Storing such cargo in open storage yards (such as the South Pier yard), where it risks exposure to rain, is undesirable. Opinions indicate that storage in covered sheds or warehouses is necessary.

[23] Proposals for logistics facility development from private operators include the provision of warehouses, railway sidings, roads, electricity, and water supply.



Source: Prepared by JST based on the NACALA PORT HANDBOOK & DIRECTORY

Figure 1-24 Areas Targeted for Development of Logistics Facilities on Reclaimed Land Developed under the Yen Loan Project

Challenges and Countermeasures in Container Terminal Operations

The Overseas Economic Cooperation Fund (OECF) projects "Nacala Port Development Project I & II" (completed in 2023) provided cargo-handling machinery and facilities enabling highly efficient operations. However, to fully leverage their capabilities, continuous operational improvements based on actual cargo handling conditions are essential. Interviews with logistics operators during the field survey identified the following challenges:

- **Challenges at the Rail Freight Transfer Yard**: Private operators pointed out that handling transit import containers involves double handling. Specifically, they noted that containers unloaded at the South Pier container berths are placed in the South Pier container yard, and then transported to the rail transfer yard as a separate operation. The CFM Nacala office stated that containers are transported to designated storage areas sorted by destination during unloading operations, and that this process is not problematic.

Photo by JST (March 6, 2025)

Figure 1-25 Rail Freight Transfer Yard and Siding (Container Yard on left side of photo)

Based on these interviews, it appears that while a system exists to sort containers by destination and transport them to storage areas during unloading, it is not consistently implemented. Particularly, to achieve a bonded rail transport system via container freight rail not only to Mozambique but also to landlocked countries like Malawi and Zambia, continuous improvement in operational efficiency is considered a crucial initiative not only for service recipients but also for service providers. Furthermore, efforts and negotiations are progressing towards establishing dedicated ICDs for each landlocked country by providing land near ports, such as at Dar es Salaam Port. Operations at container terminals will become a critical challenge going forward.

Port service providers, represented by CFM (and future selected port operators), must utilize feedback from port users (shippers and rail operators) as insights for efficiency improvements and continuously strive to further enhance service standards. Possible measures include ongoing technical assistance cooperation from JICA and continued participation in issue-specific training programs. Furthermore, it is important for stakeholders to gather in a forum for mutual coordination regarding the progress of ICD development by landlocked countries and the associated operationalization of rail freight transport. This helps prevent duplication and inefficiency in individual facility development.

(2) Challenges and Countermeasures for Road Paving Near Nacala Port

For the development of Nacala Port, internal discussions regarding port facilities alone are insufficient. Coordination and cooperation with the public roads connecting to Nacala Port and the areas they pass through (Nacala City) are crucial. Considering the current situation, the pavement at the roundabout located where the entrance road from Nacala Port exits into Nacala City is severely damaged. This has resulted in an ongoing situation where container trailers and other vehicles cannot pass smoothly. The damage observed to the pavement around the entrance/exit area (roundabout) of Nacala Port during the field survey is shown in Figure 1-26.

Photo by JST (March 12, 2025)

Figure 1-26 Damage to road pavement at the roundabout near Nacala Port

It is generally understood that the following factors affect pavement damage near ports: To resolve problems stemming from such stakeholder structures, it is necessary to promote communication among stakeholders and establish new mechanisms acceptable to all parties.

- **Frequent heavy vehicle traffic**: Roads around ports are more prone to damage than general urban roads due to the high frequency of heavy vehicles with large axle loads, such as container trailers.
- **Communication between road maintenance managers**: Often, "roads maintained by port authorities are only those within the port premises, "while" roads outside the port premises are maintained by municipal, local government, or central government road departments."
- **Insufficient Road Maintenance Funds for Municipalities (Nacala City)**: Municipal, local government, and central government road departments must maintain an extremely long total road length. In many cases, funding for maintenance is insufficient, leaving numerous road sections in need of repair. They must address sections in order of priority. In doing so, they cannot prioritize maintenance solely for road sections surrounding the port.
- **Limitations of the Port Authority's Response**: As the port authority, roads outside the port premises fall under the jurisdiction of the road department. Therefore, even if the road is damaged and hinders the smooth operation of port-related vehicles, the port authority often feels it has no choice but to request repairs from the road department.

In the case of the Nacala Port roundabout pavement, it is presumed that the primary cause of the pavement damage is the passage of numerous port-related vehicles with high axle loads. If this presumption is correct, then based on the polluter pays principle, proposing a new mechanism where "the parties responsible for the damage, namely the operators of the heavy port-related vehicles, bear the cost of the pavement damage countermeasures" could be a promising solution. To ensure fairness, an ideal approach would be a method allowing costs to be apportioned according to both vehicle weight and cargo weight over the period the countermeasures remain effective. Whether this should be achieved

by revising the current port fee structure or by establishing a new fee collection item should be determined by selecting the method that minimizes perceived unfairness, considering the balance of the estimated amounts for each cost item and fee item.

Regarding engineering countermeasures and the implementation framework, two alternative approaches are proposed for each. From the alternatives discussed above, an optimal combination should be developed considering the realities of stakeholders like port authorities, port users, and road departments. This will establish a new mechanism acceptable to all parties.

- **Engineering Countermeasure Option 1 (Concrete Pavement)**: Adopt a pavement structure like concrete pavement, which has high initial costs but excellent durability. However, since concrete pavement makes post-construction excavation difficult, buried utilities must be organized before construction begins.
- **Engineering Solution 2 (Asphalt Pavement)**: Repair using asphalt pavement materials similar to the current road surface (an option is to use higher-quality, more durable pavement materials). Compared to concrete pavement, regular maintenance will be required, making securing the necessary budget a critical challenge.
- **Implementation Structure Proposal 1 (Delegated Management by Port Authority)**: For road sections where port-related vehicle traffic is high and considered the primary cause of road damage, the port authority will be delegated by the currently responsible road department to perform maintenance and upkeep (achieved by concluding a road maintenance agreement between the road department and the port authority and delegating based on that agreement).
- **Implementation Structure Proposal 2 (Cost Burden by Port Authority)**: For road sections where port-related vehicle traffic is heavy and considered the primary cause of road damage, the port authority will bear the maintenance costs. This ensures the road department thoroughly maintains these sections as high-priority areas.

(3) Challenges and Countermeasures Regarding Sediment Influx into Nacala Port Premises During Heavy Rain

In recent years, Nacala Port has frequently experienced situations where sediment washed down from streams in the Nacala city area, located on slopes, flows into and accumulates within the low-lying Nacala Port site during heavy rains. During the March 2025 field survey period, sediment deposition occurred at various locations within the Nacala Port site and throughout Nacala City due to Cyclone Jude (Tropical Cyclone Jude) that struck the city from the night of the 9th to the morning of the 10th. Figure 1-27 This is primarily attributed to increased areas of exposed ground, where trees were cleared from forests for housing development, making the land more susceptible to sediment runoff.

As a countermeasure, with JICA support, planning is underway for a grant aid project. This project involves installing embankments and other structures to dam sediment in the main runoff streams, and constructing drainage channels to divert rainwater from these areas to the sea. Implementation of this plan is expected to significantly reduce sediment flowing into the Nacala Port site.

However, this grant aid addresses sediment inflow only at the single existing entrance to Nacala Port. It does not cover source control measures (restricting land modifications that cause sediment runoff in the watershed or implementing measures to reduce runoff) nor measures concerning sediment runoff from other watersheds affecting Nacala Port and its access roads (public roads). The port authority believes it is necessary to establish a response system for fundamental source control measures and long-term, continuous countermeasures, in cooperation with the city of Nacala, surrounding municipalities, and residents.

Situation in Nacala City Two Days After the Cyclone Hit (Photographed around 16:00 on Wednesday, March 12, 2025)

Photo by JST (March 12, 2025)

Figure 1-27 Sediment generation status in Nacala City two days after the cyclone

(4) Challenges and Countermeasures at the Liquid Bulk Terminal

To date, under the Grant Aid project "Nacala Port Emergency Rehabilitation Plan" (Grant Agreement signed: December 2012), rehabilitation of deteriorated sections at the liquid bulk terminal located at the northeast end of the North Pier was carried out, and cargo handling equipment (loading arms, etc.) was installed. The current status of the facilities and equipment, as well as the condition of the facilities photographed during the site survey, are described below.

Note that among the storage tanks located at the Liquid Bulk Terminal, only the tanks for edible oil are situated within the Nacala Port premises. Petroleum products (gasoline, diesel, jet fuel) are transported via pipeline from the Liquid Bulk Berth to storage tanks installed by three petroleum distribution companies within the CFM jurisdiction area, approximately 3.5 km south of Nacala Port.

Table 1-27 Specifications of Facilities and Equipment at the Liquid Bulk Terminal

Facilities and Cargo Handling Equipment	Specifications
Liquid Bulk Berth	Length 120m, Water Depth 120m
Tanks	For vegetable oil (located within the Nacala Port site). Petroleum product tanks are located outside the site.
Loading Arms	3 units
Firefighting Equipment	Seawater intake works, pump equipment works (pump house, fire pumps, proportioning equipment, foam monitors, outdoor fire hydrants)
Lighting tower	1 unit

Source: JST

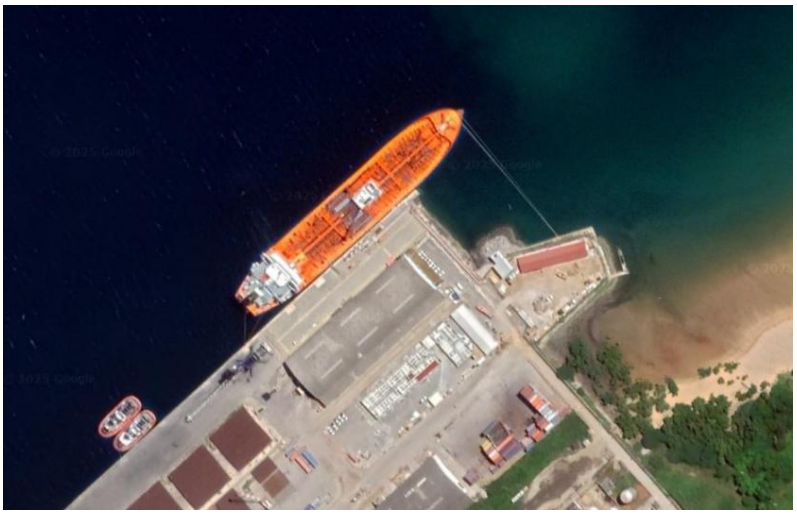
Photo by JST (March 6, 2025)

Figure 1-28 Liquid Bulk Berth, Loading Arms, and Fire Fighting Equipment

During liquid bulk terminal operations, vessels larger than the berth length may moor. Examples exist where vessels are moored by securing mooring lines to bollards positioned outside the berth apron. On-site surveys and satellite imagery confirmed that bollards installed on the reclaimed land seawall adjacent to the North Pier are used on the northeast side of the berth.

Photo by JST (March 5, 2025)

Figure 1-29 Vessel moored at liquid bulk berth



Source: Google Earth (Historical Imagery, April 1, 2019)

Figure 1-30 Position of mooring lines for vessels moored at the liquid bulk berth

Furthermore, a site survey revealed that the revetment on the northeast reclaimed land of the berth where the mooring bollards are located, constructed using steel sheet piles, faces the issue of advanced corrosion of the steel sheet piles. Concerns exist that if holes form due to corrosion of the steel sheet piles, the reclaimed soil could be sucked out, potentially causing subsidence behind the revetment. Furthermore, if the stability of the mooring bollards is compromised, it could lead to restrictions on vessel mooring at the liquid bulk berth. This could negatively impact the operation of Nacala Port, particularly given the anticipated increase in port calls starting October 2024 as mentioned earlier.

Photo by JST (March 6, 2025)

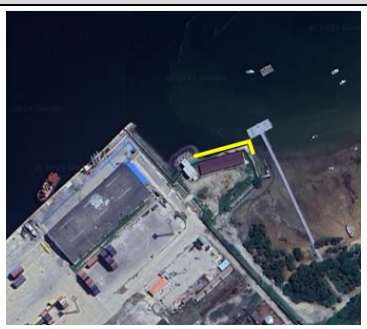
Figure 1-31 Corrosion condition of revetment steel sheet piles (installation location of mooring bollards northeast of the liquid bulk berth)

Three potential approaches exist to address this issue. While details depend on further investigation and budgetary constraints, it is advisable to promptly initiate countermeasure planning alongside assessing the extent of corrosion. The following outlines each approach.

- [Proposed Measure 1] Seawall Renovation: To prevent seawall subsidence and reduced bollard stability caused by soil erosion from damaged steel sheet piles, install new steel sheet piles covering the seaward side of the existing piles to form a new seawall structure. This is a cost-effective, rapid remedial measure.

- [Proposed Measure 2] Land Reclamation: To address the current liquid bulk berth's insufficient length and the need for warehouse expansion at the North Pier (responding to user feedback that Nacala Port currently lacks sufficient warehouses and sheds), the liquid bulk berth could be extended northeastward. The area behind the quay wall could then be reclaimed to create land for warehouses and sheds. In this case, incorporating the facilities within the reclaimed land eliminates the need to repair the corroded steel sheet pile revetment. While costs would be incurred, this development project would not require new hinterland or mooring bollards.
- [Proposed Measure 3] Installation of dolphins + repair of corroded steel sheet piles: To address the current lack of extension of the liquid bulk berth, this measure involves installing dolphins (pile structures placed above the sea surface to support mooring bollards and fenders) instead of the land reclamation described in Proposed Measure 2 above. In this case, the mooring bollards immediately adjacent to the corroded steel sheet piles would become unnecessary, and structural reinforcement to support the pulling force from ships acting on the mooring bollards would not be required. For the existing steel sheet piles, only measures to prevent further corrosion (and repair any damaged areas) would be necessary.

Table 1-28 Measures to prevent corrosion of steel sheet piles at mooring bollard locations

[Proposed Measure 1] Seawall Renovation	[Proposed Measure 2] Landfill	[Proposed Measure 3] Installation of dolphins + repair of corroded steel sheet piles
		
• Measures to prevent suction of landfill soil • Structural reinforcement measures only	• Measures to address insufficient berth extension • Also contributes to countermeasures for warehouse shortage	• Measures to address insufficient berth length • Measures to prevent corrosion progression only
Low cost Proposal as a stopgap measure for current issues; does not contribute to expansions like 2, 3.	High cost Combined with new port facility development. Requires coordination with current maritime usage, etc.	Medium cost As an intermediate between 1 and 2, wharf wall improvements do not require ensuring strength as mooring bollards.

Source: Prepared by the JST (conceptual diagrams created using Google Earth)

Additionally, as an issue separate from the mooring bollards, interviews with CFM revealed that at this berth, puddles frequently form during rainfall near the tanks installed within the Nacala Port site where vegetable oil is stored. (Figure 1-32)

Photo by JST (March 5, 2025)

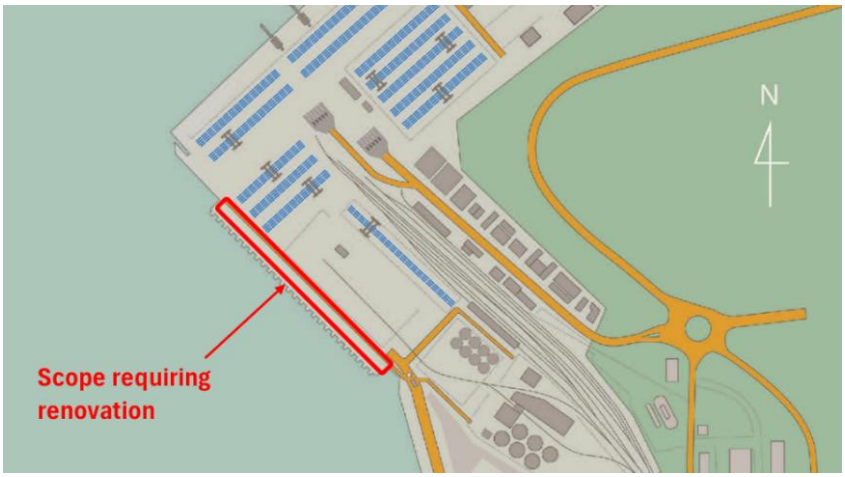
Figure 1-32 Water pooling near the vegetable oil tank

For unpaved areas, paving them to create a cross-section with a drainage slope that allows rainwater to naturally flow off the ground surface during rainfall is considered a promising measure to eliminate puddles.

(5) Issues with South Pier Structures (Pile Corrosion and Deterioration)

The South Pier was constructed in 1974 and is now significantly deteriorated (Figure 1-33). Figure 1-34 shows photographs taken during a field survey, depicting the deterioration of the piles in the South Pier's quay wall structure. It is evident that the concrete has spalled off the top of all reinforced concrete piles, exposing the reinforcing bars, which are rusted. The reinforced concrete piles within the red-lined area are considered to be in this "vulnerable stable state. " Furthermore, the vulnerability is expected to gradually increase as chloride ions accelerate the deterioration of the concrete rear wall and anchor wall. Therefore, the renovation of the South Pier is an issue that must be resolved in the near future.

When undertaking the renovation, it is crucial to minimize disruption to port operations as much as possible. To achieve this, it is desirable to renovate the quay in stages, ensuring the availability of operational facilities at all times, starting before the port's cargo volume increases. Two renovation methods are feasible: removing the existing quay and constructing a new one, or filling in the area without removing the pile foundations.



Source: Prepared by JST based on the NACALA PORT HANDBOOK & DIRECTORY

Figure 1-33 Areas requiring renovation at the South Wharf

Photo by JST (March 6, 2025)

Figure 1-34 Progress of deterioration in the South Pier quay structure

(6) Challenges and Countermeasures for Cargo Handling Efficiency at South Pier

Currently, imported wheat handled at South Pier is loaded using a method where wheat is grabbed from the cargo ship's hold using a grab, dropped into a bulk hopper, loaded onto the truck beds positioned beneath the hopper, and then transported by truck to nearby storage facilities (silos). This method is inefficient.

In response to this inefficient situation, a grain handling operator is currently investing in the construction of a new silo (Figure 1-35) on adjacent land at South Pier. This facility plans to transport grain between the South Pier quay and the silo using a conveyor belt. During the site survey, JST confirmed that the support structure for the conveyor belt had already been installed[24]. The operator's plan also appears to include installing a ship-to-quay cargo handling crane on the quay to improve cargo handling efficiency.

Source: Photo by JST (March 6, 2025)

Figure 1-35 New Silos Developed by Private Investment, Including Development on Land Adjacent to the South Pier

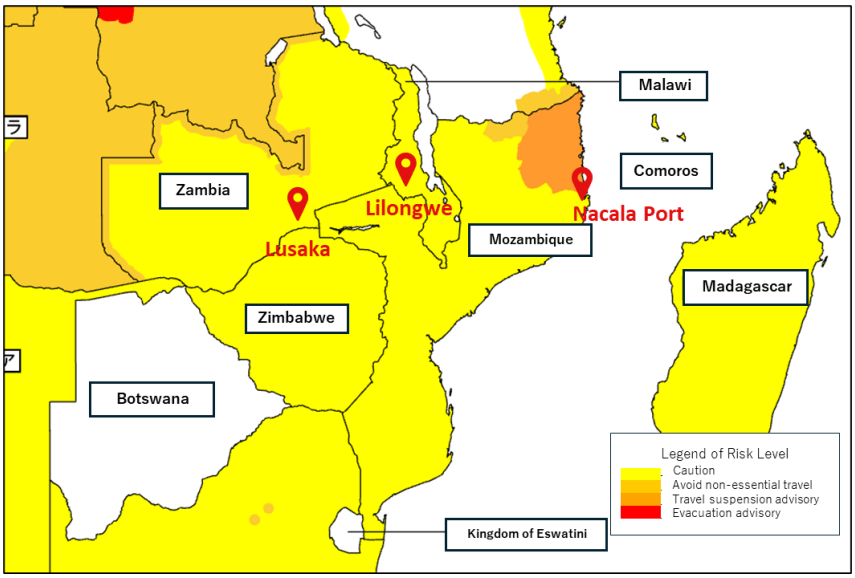
1.6 Security Situation in the Area

Information on the security situation in the Nacala Corridor was gathered from country overviews (Ministry of Foreign Affairs information) and interviews at the border.

The general security situation in each country is as described on the Ministry of Foreign Affairs website[25] (Figure 1-36). Similarly, interviews with local stakeholders revealed multiple opinions expressing concern about security in northern Mozambique near Nacala Port. Indeed, in the vicinity of Mocímboa da Praia District in the adjacent Cabo Delgado Province (approximately 600 km north of Nacala Port), activities by armed groups believed to be Islamic extremist organizations have occurred as recently as 2025.

[24] As shown in the photo (bottom left), the bridge-like structure crossing the gate in an L-shape is the support frame for the belt conveyor connecting the South Pier quay to the new silo.

[25] Overseas Safety Homepage, Ministry of Foreign Affairs (https://www.anzen.mofa.go.jp/riskmap/) (accessed December 25, 2024)



Source: Prepared by the JST based on Ministry of Foreign Affairs materials

Figure 1-36 Country/Region-Specific Risk Level Information: Southern Africa (as of August 2025)

During the first field survey, our team traveled by car from Lusaka, Zambia, through the Mwami/Mchinji border crossing to Lilongwe, Malawi, and then to the Chiponde/Mandimba border crossing. We also drove from Lilongwe through Blantyre to the Dedza/Calomue border crossing and the Zobue/Mwanza border crossing. During the second field survey, the team drove from Lilongwe, Malawi, through the Chiponde/Mandimba border into Mozambique, traveled along National Highway 13 through Nampula City, and reached Nacala Port. No areas posing security risks were identified. Furthermore, according to Alistiar (a U.S. -capitalized trucking company originating in Tanzania, with investment from Mitsui O.S.K. Lines), which handles truck transport of mineral resources from the Copperbelt region in southern Africa, logistics companies choose the more economical corridor based on safety and supply-demand balance. They noted that while the probability of incidents or accidents is similar across all corridors, attacks in South Africa tend to be more organized and involve armed assailants (hence convoys arrange armed escorts).

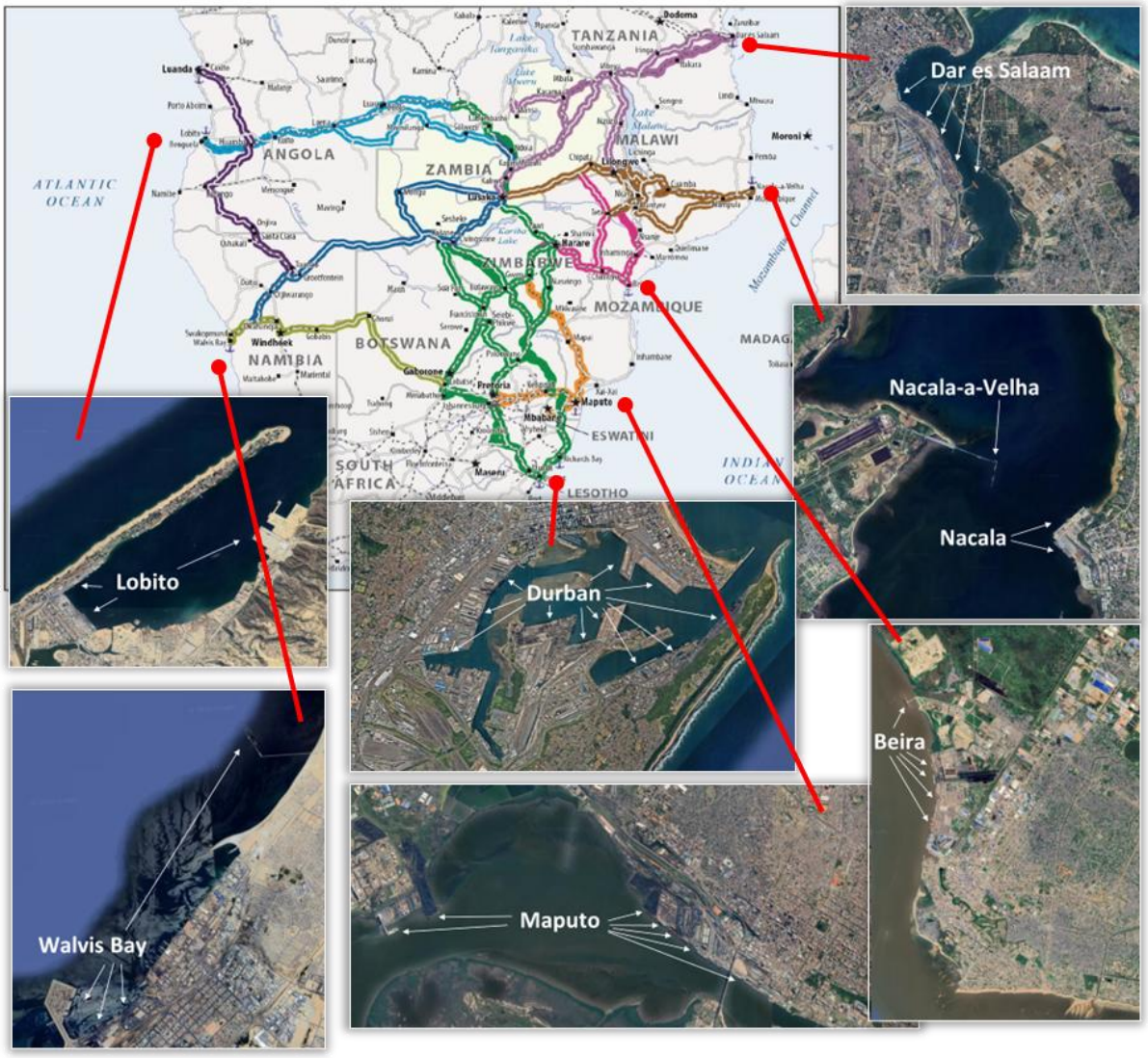
Therefore, the security situation along the Nacala Corridor is considered to be at the general risk level typical for Africa. Compared to the security challenges faced when transporting critical minerals through South Africa, security concerns are relatively lower. Furthermore, utilizing the rail freight transport system, which differs from road transport in having a lower risk of hijacking, is considered to offer a high level of transport safety.

1.7 Comparative Analysis of Neighboring International Ports and International Corridors with Potential for Competition or Collaboration

Through quantitative comparisons using statistical data and qualitative information gathered from local interviews, we identified the characteristics and potential of Nacala Port and the Corridor.

Satellite imagery data showing the locations of neighboring international ports competing with the Nacala Corridor in Southern Africa and an overview of each port's berthing facilities can be found at

Figure 1-37. Furthermore, we attempted to analyze the "cargo handled" and "container routes" as quantitative indicators for comparing the operational status of each port's facilities, while also comparing and organizing the "berthing facilities" of each port.



Source: Project Appraisal Document (PAD) for Transport Corridors for Economic Resilience (TRACER) (P180801), ANNEX 7 Maps, 2024. 1,
Google Earth (satellite images of ports in the Figure are nearly the same scale)

Figure 1-37 Location and Facility Overview of Nacala Port and Nearby Ports

(1) Comparison of Port Facilities (Mooring Facilities)

Table 1-29 compares the berthing facility lengths by cargo type handled at each port. Durban Port stands out significantly, possessing berthing facility lengths for containers, liquid bulk, and multipurpose cargo that are 2 to 3 times greater than the second-ranked port. Conversely, Maputo Port has longer berthing facilities for dry bulk and RoRo cargo. Although the total length of mooring facilities at Nacala Port is about one-tenth that of the Port of Durban, when comparing by water depth, mooring facilities with a depth of 14 meters or more account for about 40% of the total mooring facilities at Nacala Port (over 50% if Nacala Port-A-Bela is included), making it a port with deep water.

Table 1-29 Comparison of berthing facility length (including dolphins) by cargo type

(Unit: m)

	Container	Dry Bulk	Liquid Bulk	RoRo	Multi-purpose	Total
Nacala	400	0	120	0	560	1, 080
Nacala-a-Velha	0	435	0	0	0	435
Total	400	435	120	0	560	1, 515
Dar es Salaam	1, 273	0	318	325	787	2, 703
Beira	645	165	264	0	686	1, 760
Maputo	308	2, 423	260	766	759	4, 516
Durban	4, 117	1, 614	2, 029	691	3, 827	12, 278
Walvis Bay	600	0	827	0	1, 420	2, 847
Lobito	414	340	240	0	1, 120	2, 114

Note 1: For quays, the length of the quay was used as the mooring facility length; for dolphins, the distance between the dolphins located at both ends was used as the mooring facility length.

Note 2: The length by cargo type was determined based on the facility's operational status (installation of dedicated cargo handling equipment, yard usage directly behind the quay, apron usage, etc.) as read from the latest satellite images (Google Earth). For example, even facilities called Multipurpose Terminals were classified as Container if the yard behind the quay was occupied by containers.

Note 3: Facilities that do not handle cargo (such as cruise ship terminals and ship repair piers) are not included.

Source: Prepared by the JST based on S&P Maritime Portal

Table 1-30 Comparison of mooring facility length (including dolphins) by water depth

(Unit: m)

	Less than 10m	10m or more Less than 14m	14m or more	Total
Nacala	0	680	400	1, 080
Nacala-a-Velha	0	0	435	435
Total	0	680	835	1, 515
Dar es Salaam	1, 770	208	725	2, 703
Beira	0	1, 760	0	1, 760
Maputo	776	2, 459	1, 281	4, 516
Durban	503	9, 326	2, 449	12, 278
Walvis Bay	0	1, 109	1, 738	2, 847
Lobito	570	790	754	2, 114

Note 1: For mooring facilities with unknown quay water depth, depth was estimated based on information regarding the maximum size of vessels entering the port.

Note 2: Facilities not handling cargo (e.g., cruise ship terminals, ship repair piers) are excluded.

Source: Prepared by JST based on S&P Maritime Portal

(2) Comparison of Cargo Handled

Cargo Handling Volume (by Container and General Cargo)

Table 1-31 compares cargo volumes by cargo type using 2023 data (Robito Port uses 2022 data only). Port of Durban stands out significantly, handling 2 to 3 times more containers (TEU) and liquid bulk than the second-ranked port. This aligns with the comparison results for berthing facility length by cargo type in Table 1-29. Conversely, as of 2023, Nacala Port handles only about 1/20 of Durban's container (TEU) volume and 1/10 of its total cargo volume (tonnage). Meanwhile, Nacala Port's dry bulk cargo

volume is over 80% of Durban Port's dry bulk volume. Considering that Nacala Port's dry bulk berthing facility length is less than 30% of Durban Port's, this highlights the high cargo handling efficiency per berthing facility length at Nacala Port.

Table 1-31 Comparison of Cargo Handling Volumes (by Cargo Type)

	Container	Break-bulk	Dry Bulk	Liquid Bulk	Uncategorized	Total	Container	Vehicle
unit	1, 000 tons						TEUs	units
Nacala	1,294	1,049		736	-	**3,083**	**97,988**	n.a.
Nacala-a-Velha	-	-	13,730		-	**13,730**	**-**	-
Total	1,294	14,779		736	-	**16,813**	**97,988**	-
Dar es Salaam	9,226	2,880	3,531	7,259	80	**22,977**	**710,161**	202,524
Beira	5,012	5,565		3,310	-	**13,887**	**327,333**	n.a.
Maputo	1,822	27,894		1,621	-	**31,337**	**130,125**	n.a.
Durban	n.a.	3,900	16,341	23,743	-	**43,984**	**1,998,071**	579,559
Walvis Bay	2,101	1,930		1,481	-	**5,512**	**166,545**	n.a.
Lobito	n.a.	n.a.	n.a.	n.a.	n.a.	**1,566**	**22,736**	n.a.

Note 1: Cargo volume (ton-based, TEU-based, unit-based) is for 2023, except for Walvis Bay and Lobito Port (Walvis Bay data is for April 2021 to March 2022; Lobito data is for 2022).

Note 2: Published port statistics for Durban only list container throughput in TEU. Therefore, the "Container (ton basis)" column for Durban in the table above is marked as n.a.

Note 3: Durban's cargo volume (ton-based) Figure s exclude Vehicles. Nacala, Beira, Maputo, and Walvis Bay's cargo volume (ton-based) Figure s include Vehicles. It is unclear whether Dar es Salaam's cargo volume (ton-based) Figure s include Vehicles.

Note 4: The publicly available port statistics for Nacala, Beira, Maputo, and Walvis Bay do not include Figure s for vehicles on a unit basis. Therefore, the unit-based column for vehicles in the above table for Nacala, Beira, Maputo, and Walvis Bay is marked as n.a.

Note 5: The publicly available port statistics for Nacala, Beira, and Maputo do not include Figure s broken down by cargo type. However, they do include Figure s broken down by commodity. Therefore, cargo types were estimated and aggregated by commodity and are shown in the table above.

Note 6: The publicly available port statistics for Lobito do not include a breakdown by cargo type for the cargo volume handled (ton basis). Therefore, the column for the breakdown by cargo type for Lobito's cargo volume handled (ton basis) in the table above is marked as n.a.

Note 7: Nacala-a-Velha is a coal-only port and does not handle Containers, Break-bulk, Liquid Bulk, or Vehicles.

Note 8: Dar es Salaam's port statistics include transhipment (ship-to-ship transfers for transshipment) and restow (reloading for error correction, etc.) volumes within the total cargo volume handled, separate from the cargo type-specific Figure s. Therefore, an "Uncategorized" column was created. For Dar es Salaam, the transhipment and restow Figure s are listed; for other ports, a "-" is indicated.

Source: Prepared by JST based on each port's statistical data

Transit Cargo Handling Volume at Each Port

Table 1-32 shows the volume of transit cargo (imports and exports) handled via each port for landlocked and neighboring countries, broken down by the landlocked importing/exporting country (Analysis was not possible for Durban Port because its published port statistics did not include aggregated transit cargo Figures). The analysis results can be understood as follows:

- **Maputo Port (1st)**: Excluding Durban Port, whose data is not published, Maputo Port's total transit cargo volume is approximately three times that of Dar es Salaam Port (2nd), standing out significantly. Nearly all (95%) of this transit cargo volume at Maputo Port consists of imports and exports from the Republic of South Africa.

- The main destinations for transit cargo at the ports ranked 2nd to 4th are as follows:
- **Port of Dar es Salaam (2nd)**: The Democratic Republic of the Congo accounts for about 40% of total transit cargo volume, followed by Zambia and Rwanda.
- **Beira Port (3rd)**: Zimbabwe accounts for about 60% of total transit cargo volume, followed by Zambia and Malawi.
- **Walvis Bay Port (4th)**: South Africa accounts for about 50% of total transit cargo volume, followed by Zambia and the Democratic Republic of the Congo.

Note that Nacala Port's total transit cargo volume (2023) is statistically only about 1% of Maputo Port's volume, with the entire amount attributed to Malawi. Furthermore, Lobito Port's total transit cargo volume is even smaller, about one-tenth of Nacala Port's, with the entire amount attributed to the Democratic Republic of the Congo.

According to CFM's explanation, the method for recording these data involves distinguishing between transit cargo (imports and exports of landlocked countries and neighboring countries) and imports and exports of the country itself (Mozambique), based on information submitted to CFM by customs brokers. Therefore, it should be noted that some cargo declared to Mozambique Customs as imported into Mozambique and re-exported to Zambia may not be recorded as transit cargo in the port statistics for Mozambique compiled by CFM. The comparison table for transit cargo mentioned above is provided below.

Table 1-32 Comparison of Transit Cargo Volumes (by Importing/Exporting Country)

(1,000 tons)

	Total *% of handling volume*	**Malawi**	**Zambia**	**Zimbabwe**	**D.R. Congo**	**Others**	**Breakdown of Others**
Nacala	379 (2%)	379	-	-	-	-	-
Dar es Salaam	8,879 (39%)	582	2,311	n.a.	3,727	2,259	Rwanda: 1,683, Burundi: 388, Uganda: 114, others: 74
Beira	8,447 (61%)	849	1,808	4,833	957	0	Botswana: 0.1
Maputo	26,172 (84%)	8	n.a.	194	n.a.	25,970	South Africa: 24,917, Eswatini: 115, others: 938
Durban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Walvis Bay	1,607 (24%)	11	364	98	243	891	South Africa: 772, Botswana: 91, Angola: 26, others: 2
Lobito	33 (2%)	-	-	-	33	-	-

Note 1: Cargo volume (ton basis) is for 2023, except for Walvis Bay and Lobito Port (Walvis Bay data covers April 2021 to March 2022; Lobito data is for 2022).

Source: Prepared by JST based on each port's statistical materials

Transit Cargo Handling Volume at Each Port from the Perspective of Four Landlocked Countries

Focusing on the four major landlocked countries of Southern Africa - Malawi, Zambia, Zimbabwe, and the Democratic Republic of the Congo - we organized the main transit cargo items by country of origin and destination for each port (Table 1-33). However, for containerized cargo, the specific contents of

the containers are often not aggregated within the port statistics. For cases where container contents information was obtained through interviews with CFM or separate surveys, the main items were noted in parentheses after the container quantity; otherwise, (n.a.) was recorded. Even for cases marked (n.a.), attempts were made to estimate the main container contents by cross-referencing trade statistics. However, due to the following data constraints, it was not possible to compile information with sufficient accuracy to supplement the data at Table 1-32.

- The trade statistics used do not include information on transshipment ports (as they are country-level data).
- The wide variety of items likely transported in containers. Furthermore, information on trading partner countries is only available at the detailed item level of the HS code (consisting of 6 digits) used for calculating tariff rates.
- Even if the main trading partners are known for each 6-digit HS code item, geographic proximity alone cannot determine the transshipment port (e.g., while cargo from India is likely to transit ports on the Indian Ocean side, port selection also depends on factors like container route call frequency and sea transport duration, and container ships from India may also call at ports like Nacala, Beira, or Maputo, making port-level identification difficult).

Despite these data constraints and limitations, Table 1-33 show the following inferences based on data regarding transit cargo imports and exports (by port) from the "four landlocked countries (Malawi, Zambia, Zimbabwe, Democratic Republic of the Congo)"[26].

- Each country utilizes specific ports for importing and exporting certain goods. Only Beira Port handles containers for all four target landlocked countries. Other ports (Nacala Port, Dar es Salaam Port, Walvis Bay Port) only handle containers for one to three of the target landlocked countries, depending on their geographical distance.
- Beyond containers, liquid bulk and fuel are handled as major imports for the landlocked countries among transit cargo at Dar es Salaam Port and Beira Port. Notably, fertilizers are handled as major imports for the landlocked countries among transit cargo at Beira Port and Nacala Port. Among transit cargo at Dar es Salaam Port and Walvis Bay Port, vehicles are handled as a major import item for the landlocked countries.
- Copper is handled as a major export item of the Democratic Republic of the Congo at the ports of Beira, Lobito, and Walvis Bay (at Walvis Bay, copper is handled in container form as a major export item of both the Democratic Republic of the Congo and Zambia. It is also known to be handled at the Port of Dar es Salaam, though it is not recorded in the statistics). Furthermore, it was found that chromium ore and granite are handled at Beira Port as Zimbabwe's major export items, while ferrochrome and sugar are handled at Maputo Port.

The above represents the transit cargo situation as seen in the statistical data.

[26] Port statistics for Dar es Salaam Port show handling volumes by major import dry bulk cargo items (2023: Wheat: 1, 514, 703 tons, Fertilizer: 788, 438 tons, Sulfur: 708, 438 tons). However, since the breakdown by destination (Tanzania, landlocked countries, etc.) is not shown, it cannot be reflected in Table 1-33).

Table 1-33 Major Transit Cargo Commodities (by Importing/Exporting Country - 4 Target Countries)

		Malawi	Zambia	Zimbabwe	D.R. Congo
Nacala	Ex	Con: 40, 100 tons (Agricultural products)	-	-	-
	Im	Con: 68,000 tons (n.a.) Fertilizer: 170,600 tons Wheat: 49,700 tons	-	-	-
Dar es Salaam	Ex	Con: 188 TEUs (n.a.)	Con: 17,486 TEUs (n.a.)	n.a.	Con: 68,022 TEUs (n.a.)
	Im	Con: 7,484 TEUs (n.a.) LB: 478,040 tons MV: 10,115 units	Con: 50,231 TEUs (n.a.) LB: 1,153,162 tons MV: 46,208 units	n.a.	Con: 78,744 TEUs (n.a.) LB: 1,019,516 tons MV: 32,949
Beira	Ex	Con: 187,300 tons (n.a.)	Con: 278,500 tons (n.a.)	Con: 1,152,100 tons (n.a.) Chrome Ore: 366,400 tons Granite: 140,200 tons	Con: 346,900 tons (n.a.) Copper: 44,600 tons
	Im	Con: 282,800 tons (n.a.) Fertilizer: 162,400 tons Fuel: 157,300 tons	Con: 485,300 tons (n.a.) Fuel: 508,700 tons Fertilizer: 446,000 tons	Con: 840,500 tons (n.a.) Fuel: 1,632,700 tons Fertilizer: 300,300 tons	Con: 28,300 tons (n.a.) Fuel: 297,000 tons Sulfur: 239,700 tons
Maputo	Ex	Sugar: 7,500 tons	n.a.	Ferrochrome: 124,700 tons Sugar: 48,300 tons	n.a.
	Im	-	n.a.	-	n.a.
Durban	Ex	n.a.	n.a.	n.a.	n.a.
	Im	n.a.	n.a.	n.a.	n.a.
Walvis Bay	Ex	-	Con: 182,424 tons (Charcoal, Copper)	Con: 264 tons	Con: 61,116 tons (Copper, Charcoal)
	Im	Con: 418 tons (Household & personal effects)	Con: 89,056 tons (Tires, Chemicals), Vehicles	Con: 11,374 tons (Frozen poultry), Vehicles	Con: 163,240 tons (Frozen poultry, Malt, Chemicals)
Lobito	Ex	-	-	-	Copper: 21,192 tons Manganese: 9,764 tons
	Im	-	-	-	-

Note 1: Abbreviations in the table are as follows (Ex: Export, Im: Import, Con: Container, LB: Liquid Bulk, MV: Vehicle)

Note 2: The notation in parentheses following container cargo volume Figure s indicates the primary commodity transported in containers. Where commodity information is unavailable, (n.a.) is indicated. Commodities not enclosed in parentheses are primary commodities transported in non-containerized cargo forms (dry bulk, break bulk, liquid bulk).

Note 3 Cargo volumes (ton-based, TEU-based, unit-based) are for 2023, except where noted (Walvis Bay data covers April 2021 to March 2022).

Source: Prepared by JST based on port statistical materials

(3) Comparison Based on Container Services Calling at Each Port

Table 1-34 organizes the results of counting the number of container shipping services calling at each port, categorized by frequency of port calls and by route (Americas, Europe, Africa, Middle East/South Asia, East Asia/Southeast Asia)[27].

Durban Port has the highest number of shipping routes, handling nearly twice as many routes as the second-ranked port, followed by Port of Dar es Salaam and Maputo Port. At these three ports, over 70% of container shipping routes operate weekly services. Following these three ports are Beira Port, Nacala

[27] Details on container ship routes for each port are provided in Supplement [1-5].

Port, and Walvis Bay Port, with Lobito Port currently having the least data available. Among these four ports, Beira Port has weekly service routes (more than Maputo Port) and these routes account for 70% of the port's container shipping routes.

The container route network shows that Durban Port has services on every route, functioning as a hub port directly connecting to destinations worldwide and linking within Africa. Geographically close to Durban, Maputo Port, while having only about half the total number of services, exhibits a route distribution pattern similar to Durban's. Despite being on the Indian Ocean side, Maputo Port also receives some services from the Americas and Europe that call at Durban Port (none of which are weekly). This proximity to Durban Port represents a geographical advantage for Maputo Port.

Ports on Africa's east coast - Dar es Salaam, Nacala, and Beira - handle over 40% of Middle East/South Asia routes but have virtually no Atlantic-side (Americas/Europe) routes, making them ports primarily serving eastbound shipping lanes. Dar es Salaam Port's sole European route is a service using RoRo vessels capable of carrying containers, originating from Genoa, Italy. It travels from the Mediterranean Sea via the Suez Canal to the east coast of Africa, calling at Port of Durban, and generally follows the reverse route back to Genoa. Among the ports compared, Dar es Salaam has the most services to East Asia and Southeast Asia, with the most easterly route distribution.

Walvis Bay Port and Lobito Port, both located on Africa's southwest coast, have almost no routes on the Indian Ocean side (Middle East/South Asia, East Asia/Southeast Asia), showing a westward route distribution. The sole East Asia/Southeast Asia route for Walvis Bay Port originates from Qingdao Port in China. It calls at ports in Singapore and Malaysia, diagonally crosses the Indian Ocean, rounds the Cape of Good Hope, calls at ports on the southwestern coast of Africa, and then generally follows the reverse route back to Qingdao Port.

Table 1-34 Comparison of Container Shipping Routes (by Call Frequency and Route)

	No. of services	Service frequency				Routes				
		Weekly	Biweekly	monthly	Others	AM	EU	AF	MESA	EA
Nacala	6	3	2	1	-	-	-	2	3	1
Dar es Salaam	10	8	-	2	-	-	1	-	5	5
Beira	7	5	2	-	-	-	-	2	3	2
Maputo	10	4	4	2	-	1	2	3	2	2
Durban	18	13	2	2	1	3	4.5	3	3	4.5
Walvis Bay	6	3	1	2	-	1	2	2	-	1
Lobito	4	2	1	1	-	1	1	2	-	-

Note 1: In this table, port call frequency is categorized as follows: weekly for once per week, biweekly for more than once per week but no more than twice per week, monthly for more than twice per week but no more than once per month, and others for more than once per month.

Note 2: Operating routes are classified by the region of the farthest port of call from the port in question. AM denotes the Americas, EU denotes Europe, AF denotes Africa, MESA denotes the Middle East and South Asia, and EA denotes East Asia and Southeast Asia. Since some routes calling at Durban spanned the United States and China, this table counts them as 0.5 each for AM and EA. Similarly, since some routes calling at Durban spanned Europe and Brazil, this table counts them as 0.5 each for AM and EU.

Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

(4) Comparison of Transport Time and Costs in the Nacala and Beira Corridors

The Nacala Development Corridor Management Committee (NDCMC) is currently developing Corridor Performance Indicators to measure and monitor the performance of the Nacala and Beira Corridors. This initiative is part of the Southern Africa Trade and Connectivity Project (Project Period: July 1, 2021, to July 30, 2027), funded by the World Bank.

Among these performance indicators, those enabling a comparison of cargo transport time and costs between the Nacala and Beira Corridors were published in July 2024. Additionally, although not a direct comparison between the two corridors, indicators were also published in July 2024 that compare the time required for port and border transit/import-export procedures for Malawian cargo across three Malawi-Mozambique border crossing points (Muloza/Milange, Mwanza/Zobue, and Dedza/Calomue).

These indicators are presented below.

1) Cargo Transport time

Table 1-35 Average Cargo Transport Time from Nacala Port / Beira Port to Blantyre (August 2022)

	Beira	Nacala
Travel time without delays (One-way)	1.5 days	1.3 days
Travel time with delays(One-way)	3.1 days	2.6 days

Note: "Travel time with delays" includes delays at borders and checkpoints.

Source: Interviews with transporters from the Road Transport Operators Association (RTOA) and clearing and forwarding agents from the Clearing and Forwarding Agents Association of Malawi (CAFAAM).

2) Cargo Transport Costs

Percentage of logistics costs for imported and exported goods transported by road/rail via the Nacala/Beira Corridor between Blantyre, relative to the invoiced price including insurance and freight (CIF for imports, FOB for exports).

Table1-36 Cargo Transport Costs between Nacala/Beira Port and Blantyre (2021)

	Logistics Cost per Container (USD)	Logistics Cost per Ton (USD)	Percentage of Invoiced Price
Inland transport cost of containerized imports from Nacala to Blantyre	5, 064	191	23%
Inland transport cost of containerized imports from Beira to Blantyre	5, 264	199	24%
Logistics cost of bulk imports by rail from Nacala to Blantyre	-	226	23%
Logistics cost of containerized exports by road from Blantyre to Beira	5, 075	192	26%
Logistics cost of containerized exports by rail from Blantyre to Nacala	3, 797	143	18%

Note: The invoiced price includes insurance and freight (CIF for imports, FOB for exports).

Source: Malawi Revenue Authority and clearing and forwarding agents from the Clearing and Forwarding Agents Association of Malawi (CAFAAM).

3) Time required for the procedures related to Malawi imports and exports

Table1-37 The average time required for the procedures related to Malawi imports and exports (May and June 2021)

	Muloza /Milange	Mwanza /Zobue	Dedza /Calomue
Average processing time for Malawi imports	6 days 0 hours 1minutes	5 days 4 hours 3 minutes	5 days 8 hours 6 minutes
Average processing time for Malawi exports	5 days 14hours 40 minutes	4 days 16 hours 32 minutes	4 days 16 hours 7 minutes

Note: The average processing time for Malawi imports includes the average time required to complete the following:
- Transit procedures at Mozambican ports and borders.
- Import customs clearance procedures within Malawi.

The average processing time for Malawi exports includes the average time required to complete the following:
- Export processing at the Blantyre Inland Container Depot (Inland Examination Station).
- Malawi border inspections.
- Transit procedures at Mozambican borders and ports.

Source: Malawi Revenue Authority and MCNET Single Window

4) Time required to pass the border of Malawi/Mozambique

The indicator is measured as the time required to complete the necessary procedures in both countries upon arrival at the first border, including waiting time and document processing time (in days, hours, and minutes).

Table1-38 Average time required to pass the border od Malawi/Mozambique (May and June 2021)

	Muloza /Milange	Mwanza /Zobue	Dedza /Calomue
Average time for border crossing procedures (Imports)	10 hours 45 minutes	1 hour 10 minutes	3 hours 44 minutes
Average time for border crossing procedures (Exports)	4 hours 55 minutes	2 hours 22 minutes	2 hours 12 minuets

Note: The average time for border crossing procedures (Imports/Exports) is the time required to complete the necessary procedures in both countries upon arrival at the border, including waiting time and document processing time.

Source: Malawi Revenue Authority and MCNET Single Window

(5) Comparison Based on Information Obtained from On-Site Interviews

Interviews with local government agencies and private companies revealed the following facts and local circumstances regarding how each country perceives the Nacala Corridor and other international corridors under comparison:

- **Corridors used for importing and exporting goods from Zambia**: Primarily the Dar es Salaam Corridor, Beira Corridor, and North-South Corridor are utilized. However, as noted in 1.1.1, Zambia monitors all corridors and selects the appropriate one based on the conditions of each corridor. Currently, the Nacala Corridor (the route from the Great East Road to Malawi) is characterized by the fact that it is increasingly being used for imports, particularly fertilizers. This shift began due to challenges related to tariffs on fuel imports via Zimbabwe in recent years. Mineral resource shipments, the primary base cargo for exports from Zambia, have shifted entirely from rail to road transport. The Nacala Corridor, which faces challenges for road transport, is currently not used for exports. Exports via the Nacala Corridor are limited to land

transport of daily necessities and cement produced in Zambia to Malawi. Additionally, Zambia Cargo & Logistics Limited (ZamCargo) (originally a subsidiary of ZCCM (Zambia Consolidated Copper Mines), a Tanzanian forwarding company until the early 2000s, and now a State-owned Enterprise under the Ministry of Transport and Logistics) operates transshipment facilities at Dar es Salaam Port handling cargo destined for Zambia and also holds the operating rights for the Dryport at Walvis Bay. In October 2023, there was also information that the Tanzanian government provided 20 hectares of land for a dry port at Kwala, 200 km inland from Dar es Salaam Port.

- **Corridors used for importing and exporting cargo from Malawi**: Historically, Malawi relied on routes via South Africa and Zimbabwe or through the ports of Beira and Nacala. However, during the Mozambican Civil War in the 1980s, the Beira-Nacala corridor closed. In response, as a national policy, the Government of Malawi secured land from the Government of Tanzania to establish cargo centers near the Port of Dar es Salaam and near the Malawi border along the Tazara Railway (Mbeya) near the TAZARA railway's Malawi border (dry bulk warehouses, fuel tanks). Although goods were also transported to Zimbabwe and Zambia via this route at the time, operational challenges led to its temporary suspension. However, Malawi Cargo Centre Limited continues to operate primarily using truck transport. The Beira Corridor in Malawi currently operates solely via road transport because the railway tracks on the Sena Railway within Malawi remain severed (currently being rehabilitated based on an improvement plan from a previous JICA survey, in collaboration with Nacala Logistics;). The North-South Corridor via Durban Port is also one of the long-established transport routes.
- **Other Corridors around:** Regarding the North-South Corridor (particularly the route to Port of Durban) and the corridor utilizing Port of Walvis Bay, the following points were noted.
  The route to Durban Port faces significant security concerns, necessitating the use of armed escort vehicles traveling in convoy to protect transport trucks carrying high-value cargo. This results in high transportation costs and safety risks.

  The route via Walvis Bay Port was frequently used during the COVID-19 pandemic. This was because empty containers were accumulating at Walvis Bay Port, prompting shipping companies to run campaigns encouraging their use (offering low shipping rates for cargo exports from Africa). Currently, this route is not utilized as extensively as it was then.

In addition to these countries' views on other international corridors, the following outlines the background of the Nacala Corridor and expectations for its future development.

- **The Nacala Corridor** was established through the "Moatize Coal Mine Project and Nacala Corridor Railway and Port Infrastructure Project" with Valle, in which Mitsui & Co. decided to participate financially on September 30, 2016, and commenced operations in March 2017. This project completed the rehabilitation of the railway for coal freight transport. As mentioned earlier, it is currently operated by Nacala Logistics. (Mitsui transferred all its equity and associated financing to Valle in 2021; Valle subsequently sold it to the current investors of Nacala Logistics).

Nacala Logistics, which also encompasses other rail operators besides coal freight transport—CEAR (Malawi) and CDN (Mozambique)—has utilized the improved assets from this rehabilitation. It has also supported upgrades on other sections, resuming general freight and passenger transport. Starting July 23, 2024, Nacala Logistics resumed fuel transport by rail from Nacala Port to Lilongwe for the first time in 21 years (an agreement with Malawi's National Oil Company, NOCMA, calls for transporting 15 million liters per month; fuel transport by rail to Blantyre had already commenced earlier). This development may also reduce fuel shipments from Dar es Salaam Port, which currently rely heavily on road transport and are considered costly.

- **Nacala Logistics**, as part of its support for the Malawi government's railway rehabilitation project, has secured an agreement for unified operations covering the repair of the non-operational railway section within Malawi to Zambia and the resumption of operations within Zambia to Chipata. The company aims to restart integrated rail transport from Nacala Port to Chipata, Zambia.

(6) Characteristics and Potential of the Nacala

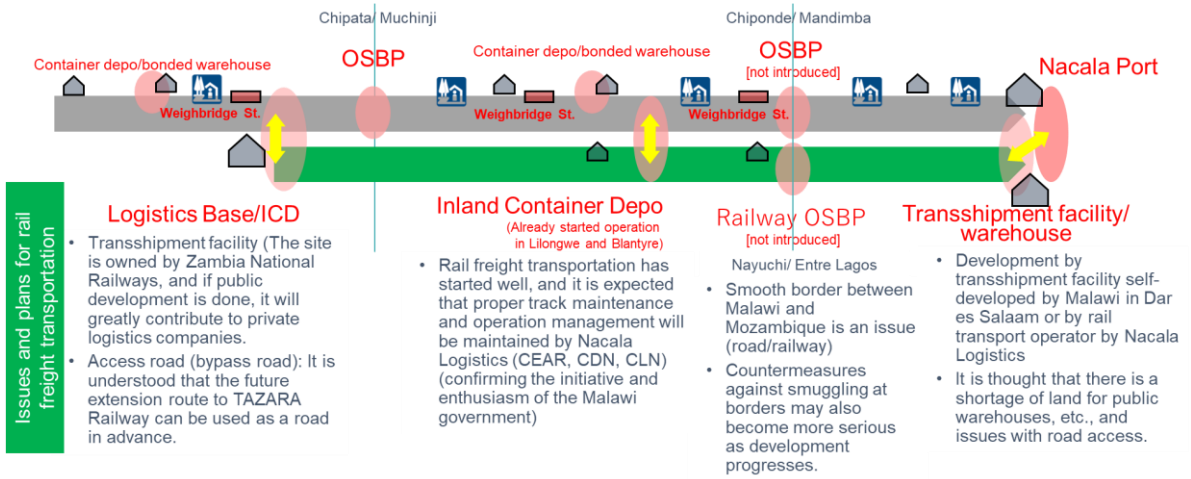
- Based on the statistical data presented above and qualitative, current, and fluid information gathered through on-site interviews, the current characteristics and potential of the Nacala Corridor relative to adjacent corridors are considered as follows.
- Compared to other corridors, the Nacala Corridor possesses a comparative advantage in its ability to provide direct rail freight transport from the port to Malawi and Zambia. For Malawi and Zambia, there is no other corridor capable of transporting goods from the port via rail freight systems to their territories[28]. Compared to land freight transport, rail offers significant advantages in reducing transportation costs and improving efficiency (transportation time), mitigating the impact on road pavement deterioration, and reducing GHG emissions compared to large freight trucks, particularly for long-distance freight transport.
- On the other hand, switching from existing transport methods and procedures on one corridor to another is not easy due to the relationships between shippers and transport operators (it is presumed that factors beyond just reducing transport costs and time are involved). Therefore, it is considered realistic to view the Nacala Corridor as handling the increase in freight transport demand driven by future economic growth in each country. (This understanding includes sharing the increased transport demand associated with economic development along the Nacala Corridor enabled by the realization of rail freight transport).

Regarding challenges for further activating rail freight transport in the Nacala Corridor, discussions with Nacala Logistics and logistics operators in each country revealed the following key points:

[28] The Tazara railway connects Dar es Salaam Port to Kapiri Mposhi in Zambia; however, there is currently no evidence that it is functioning effectively for rail freight transport. (Note: As of April 2025, CCECC [China Civil Engineering Construction Corporation] has announced a 30-year concession and a 1.4 billion USD rehabilitation project. Upon completion of these works, rail freight capacity toward Dar es Salaam Port is expected to improve, which may create competition for the Nacala Corridor). Therefore, this study considers the Nacala Corridor to be the only corridor where a functional rail freight system is currently operational.

- Ensuring smooth transshipment from rail and warehouse (customs clearance) facilities at Nacala Port
- Smooth border crossings for rail transport
- Establishing unloading points in each country (customs facilities required for bonded transport, container storage yards, warehouses)
- Ensuring safety at railroad-road intersections (maintaining tracks through ensuring safety of parallel road networks)
- We also consider it important to ensure sufficient road improvements and enhancements, as well as rest facilities, within the parallel road network to serve as transportation means after loading/unloading.

Figure 1-38 illustrates the current status and potential of the Nacala Corridor as a transport corridor, presented as a schematic diagram of international and regional flows within the Nacala Corridor.



Source: JST

Figure 1-38 Current Status and Potential of the Nacala Corridor as a Transport Corridor

(7) Potential for Linkage with the Lobito Corridor

Regarding the utilization of ports on both the Indian Ocean and Atlantic sides[29], interviews were conducted with relevant stakeholders. The following opinions were obtained from stakeholders in Malawi and Zambia.

- **Malawi**: According to the Ministry of Energy, plans exist for a petroleum pipeline from Nacala Port to Liwonde in the east to ensure stable oil imports, and a plan to import oil from Angola via

[29] The land bridge effect in logistics generally refers to the reduction in transport time and cost achieved by using a land route between two points as a shortcut compared to sea transport between two ports. Even if a railway line were to connect Lobito Port and Nacala Port, the total length would exceed 3,500 km. Considering the transshipment from port to rail and the customs procedures across multiple countries involved, it is unlikely that this would offer significant time or cost savings compared to sea transport between the two ports. Furthermore, there are currently no concrete plans for laying tracks between Chipata and Serenje. The prospect of constructing such a long, costly new line in the short to medium term is not feasible at this time.

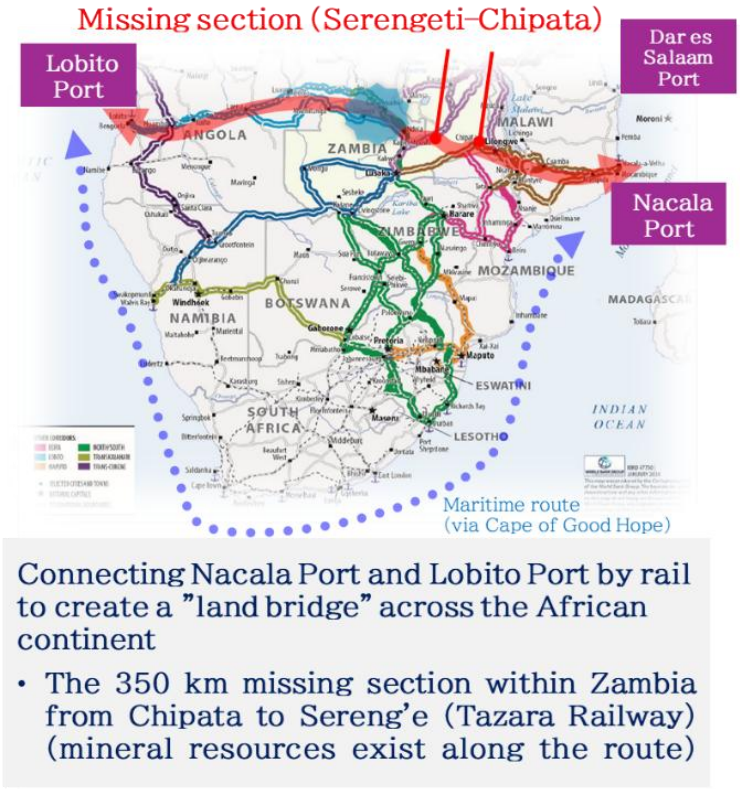
the Lobito Corridor in the west. Grain appears to be the anticipated export commodity using the Lobito Corridor.

- **Zambia**: Information was obtained indicating plans to lay an oil pipeline from Angola along the Lobito Railway (FURTHER AFRICA[30]). While positive views exist regarding ideas for value creation at the midpoint of the land bridge in Zambia (initiatives for SEZs as industrial parks with specific sectors and purposes have just begun), it was indicated that the impact of power shortages on industry is a current challenge.

These findings confirm that enhancing access to ports on both the Indian Ocean and Atlantic sides is crucial for the economic security of both Zambia and Malawi. Furthermore, connecting the two corridors is expected to raise the profile of the Nacala Corridor and Nacala Port, potentially attracting various industries to cluster along the Nacala Corridor.

For the physical connection of the railway transport systems between the Lobito Corridor and the Nacala Corridor, the Lobito Corridor side requires the construction of a new line (801 km) directly connecting from the Angolan border to Zambia's Copperbelt region. On the Nacala Corridor side, an extension to Chipata near Zambia's eastern border is foreseeable, and the construction of a new 350 km line from Chipata to Sereng'e on the Tazara Railway (for which China has already completed a feasibility study for the Zambian government in previous years). The following diagram shows the potential location of the land bridge as envisioned by Angola and Mozambique.

[30] FUTHER AFRICA, 2024/4/17, "Angola-Zambia oil pipeline construction work to kick off soon" (https://furtherafrica.com/2024/04/17/angola-zambia-oil-pipeline-construction-work-to-kick-off-soon/) (Accessed December 25, 2024)



Source: Prepared by JST

Figure 1-39 Land bridge effect achieved by connecting Nacala Port and Lobito Port

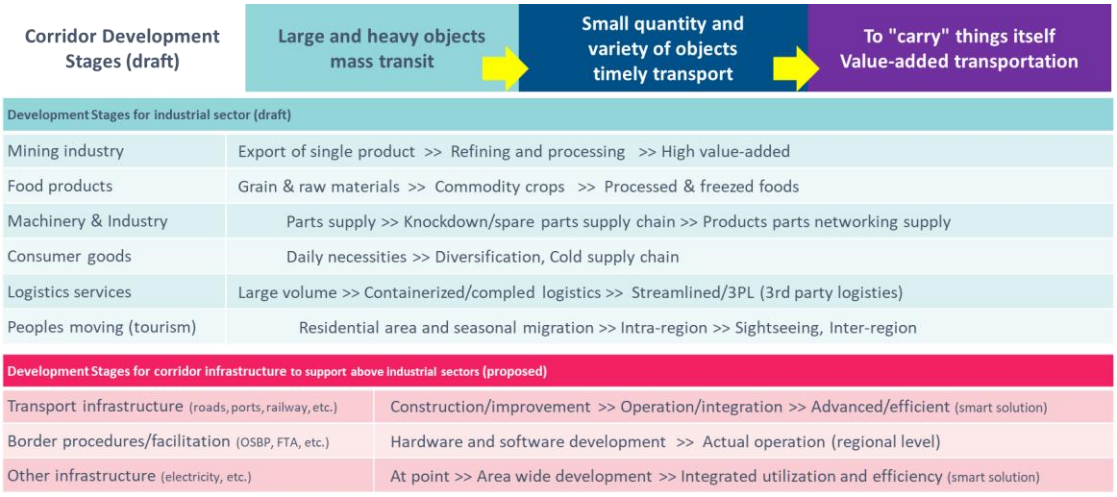
1.8 Policy for the Nacala Corridor Roadmap Based on the Corridor's Economic Development Stages

Corridor development requires consideration of development infrastructure based on a thorough understanding of the economic stage of the corridor region. We understand that there are the following stages:

- Initial Development Stage: A stage where development is supported by the bulk transport of large and heavy goods (e.g., mineral resources, raw materials (agricultural, forestry, and fishery products; construction materials), fuel). At this stage, it is crucial for regional economic development to leverage the corridor infrastructure built for goods movement and, in addition to goods, to invigorate the movement and exchange of people.
- **Mid-stage development**: Building upon the "corridor infrastructure" developed for initial transport needs, this stage involves responding to the diversification of consumption patterns accompanying economic development within the corridor region. It also sees the emergence of transport for higher-value-added, internationally competitive goods, leading to increased imports and exports as an international corridor (this stage presupposes the existence of corridor infrastructure capable of transporting small quantities of diverse goods cheaply and in large volumes).
- **Further Corridor Development Stage**: This stage occurs when the corridor region's economy has developed to a certain level, with significant flows of people and goods. It involves the

sustained development of "businesses" related to adding value to goods through new services and solutions for mobility and transportation itself, or through investment in more advanced transportation systems. This includes the utilization of DX/IoT, termed "Smart Corridors" (e.g., asset management of roads and other infrastructure, port operation efficiency, advanced transport tracking along the corridor, and the advancement and regional/multilateral harmonization of customs systems).

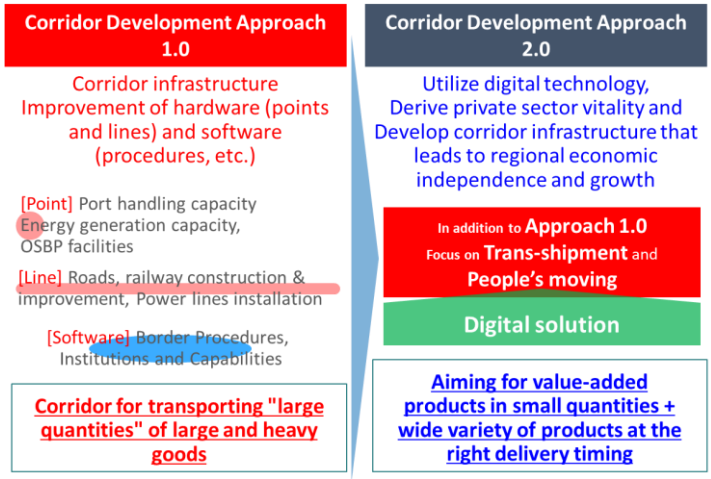
Figure 1-40 illustrates the types of corridor infrastructure development and deployment by industry/service at these developmental stages. Recent advances in DX/IoT technology and the proactive engagement of startups and other entities mean that areas like the smart corridor sector have high potential to leapfrog development, supporting corridor infrastructure even in the early stages of corridor development.



Source: JST

Figure 1-40 Corridor Economic Development Stages

The "Roadmap for Promoting Logistics in the Nacala Corridor" examined in this project is developed based on the current status of the Nacala Corridor understood through a series of surveys and its development stage. It also incorporates the fundamental concept of the "Corridor Approach 2.0" announced at TICAD 8 in 2022, which emphasizes "balanced development and adaptation to environmental changes and technological innovation." Therefore, in project formulation for this work, in addition to the previous approach of developing corridor infrastructure hardware and improving software, as shown in Figure 1-41, we aimed to form projects that contribute to ensuring the safety, efficiency, reliability, and fairness of transportation along the corridor by utilizing DX/IoT for the introduction of a Smart Corridor.



Source: JST

Figure 1-41 TICAD-8 "Corridor Development Approach 2.0": "Hypothesis" Regarding Cooperation Directions for Corridors

Furthermore, considering responses to environmental changes in line with international trends, the following points were also noted during deliberations. These will be utilized in subsequent chapters.

Response based on current understanding of resource exports (approach to railways within the Nacala Corridor rehabilitated by coal cargo)

- Response considering the rise and promotion of startups
- Response emphasizing collaboration with the private sector
- Response contributing to GX/Zero Carbon (modal shift, electrification, etc.)
- Response in coordination with movements by countries sharing common values (e.g., development of the Lobito Corridor)
- Response contributing to securing Japan's national interests and rights (base metals, rare metals, etc.)

Chapter 2 Support Status at Nacala Port and the International Corridor

2.1 Overview of Past Surveys and Implemented Projects Related to the Nacala Corridor

Numerous support projects have been implemented along the Nacala Corridor. The following are representative projects by international organizations and JICA. Table 2-1 organizes major projects, using the start and end of the formulation of PEDEC-Nacala (Cabinet Approval: 2016), which established a regional development strategy including areas along Mozambique's Nacala Corridor, as a dividing line.

Table 2-1 Status of Initiatives Related to the Nacala Corridor Region

Target Country	Before PEDEC-Nacala Formulation Start	PEDEC-Nacala Formulation (2012–2016) and After		
Zambia	• Approach to Road Improvement Projects under African Regional Grant Aid (Basic Research) • Southern Lusaka Integrated Economic Zone MP Road Improvement Plan for Ndola City and Kitwe City (Basic Design, Grant Aid) • Lusaka City Comprehensive Urban Development Plan Survey	• Study on Approaches to Pavement Construction Supervision/Management in Developing Countries (Basic Research) • Information Collection and Verification Survey on Urban Development and Urban Transportation in Lusaka City • Information Collection and Verification Survey on Supporting Women Entrepreneurs through Improved Access to Digital Services in Africa • Local Integration Support Project for Former Refugees (Digital Sector)	• Information Gathering and Verification Survey for the Nacala Corridor Integrated Development (Malawi/Zambia)	• **Research on Global Logistics Projects in the African Region** • Information Gathering and Verification Survey on Urban Transportation Improvement Utilizing Conventional Railways in the African Region
Malawi	• Central and Western Region Water Supply Plan (Grant) F/S Blantyre City Road Network Improvement (Basic Design/Grant)	• Republic of Malawi Lilongwe City Trunk Road Rehabilitation Project (Grant) • **[WB] Road Vulnerability Assessment for Malawi RESTORE Project** (In Progress)		
Mozambique	• Nampula–Cuamba Road F/S (Includes: Roadside Station Pilot Project) • Preparatory Survey for Cuamba-Mandimba and Mandimba-Lichinga Road Project (Including OSBP) • Nacala Port Emergency Rehabilitation (Grant) F/S • Preparatory Study for Nacala Port Development Project (Yen Loan) F/S • WB/JICA Research Institute/Nagoya University Corridor Study	• PEDEC-Nacala Formulation and Promotion Support (Cabinet Approval) • Nacala Corridor Roads (Yen Loan) F/S (Nacala Port Access, Nampula Bypass, Cuamba Bypass Roads: 3 routes) • **Support for Formulation of Port of Nacala Operation and Management Plan, Port of Nacala Operation Improvement Project / Support for Port of Nacala Operation Improvement** • Japan-Brazil-Mozambique Triangular Cooperation for Tropical Savanna Agricultural Development Cooperation (ProSAVANA) • SME Project Development (Enhancing Road Maintenance Management through Mobile Mapping) • Nacala Emergency Power Plant (Grant) F/S (In Progress) • Strengthening Soil Erosion Countermeasures in Nacala City (Grant) F/S (In Progress)		

Note: Project names in the table are abbreviations
Source: JST

In particular, the projects underlined in the table were considered essential as foundational information for advancing the study of the Nacala Corridor. Specifically, the overview of each project's implementation is organized into three categories: (ⅰ) Scrutiny of demand forecasts related to Nacala Port development and capacity development for port operations, (ⅱ) Comparison among international corridors, and (ⅲ) Projects currently under study in Zambia and Malawi.

2.1.1 Review of Demand Forecasts for Nacala Port Development and Capacity Development for Port Operations

The technical assistance project "Support for Formulating the Nampula Port Management Plan [Technical Assistance under the Grant Account] (January 2021 - October 2022)" conducted an analysis of the discrepancy between the demand forecast at the time of the "Preparatory Survey for the Nacala Port Development Project (June 2011)"—which was the development plan for the yen loan project—and the actual results, along with an analysis of the factors contributing to this discrepancy. It also revised the future demand forecast as of 2022. The results of this analysis are outlined below.

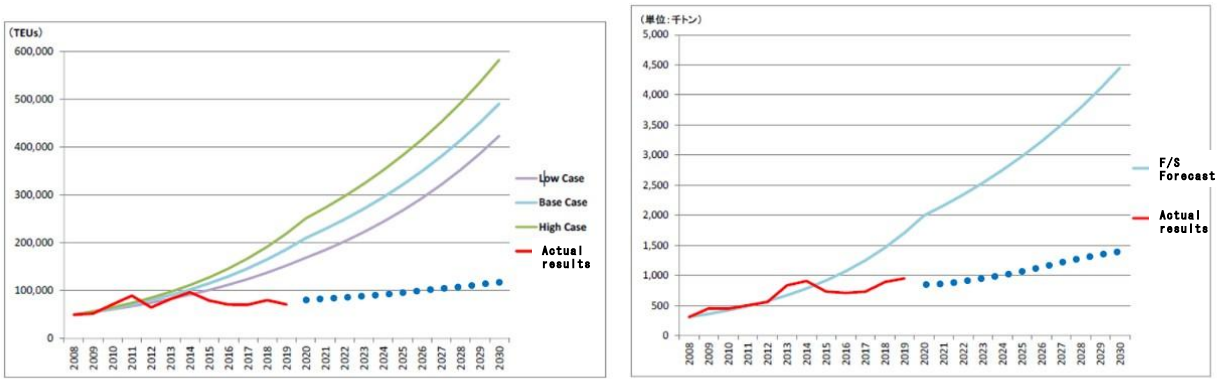
(1) Scrutiny of Future Demand Forecasts for Nacala Port

Cargo volume projections for Nacala Port were last conducted in the 2011 preparatory survey using statistical data up to 2008, which showed an increasing trend. Since then, no further projections have been made. Japan's grant and loan-based facility development at Nacala Port was planned and implemented based on the projections from this preparatory survey.

Figure 2-1 shows the revised future demand forecast (2020-2030) for container cargo and dry bulk (excluding coal) at Nacala Port, overlaid on the graph comparing the 2011 demand forecast values with the actual performance up to 2019, as part of the 2022 operational review.

The actual container cargo volume at Nacala Port (through 2019: red line) has shown a declining and stagnant trend since 2014, diverging from the projections made during the preparatory survey. Similarly, for dry bulk cargo (excluding coal), as shown by the actual Figure s up to 2019 (red line), growth has been minimal since 2015, indicating a divergence from the future demand forecast in the 2011 preparatory survey.

The revised future demand forecast for 2022 is added to the chart at and the graph at Figure 2-1 (blue dotted line). Specifically, the forecast values for 2030 are approximately 120,000 TEU (container cargo) and 1,400 thousand tons (dry bulk), representing a significant downward revision. The specific forecast values are shown in the table at and the graph at Table 2-1.



Note: Nacala Port Operation and Management Plan Formulation Support Project [Paid Account Technical Support] JST Addendum July 2022

Source: Nacala Port Operation Management Plan Formulation Support Project [Paid Technical Support] July 2022

Figure 2-1 Comparison of Feasibility Study Forecasts and Actual Container Handling Volumes at Nacala Port (Left Figure) and Comparison of F/S Forecasts and Actuals for Dry Bulk (excluding Coal) (Right Figure)

Table 2-2 Results of demand forecast revisions for 2022 operations (2022 onwards)

	Unit	2020	2023	2027	2032	2037	2042	2047	2052
Container	TEU	81,612	85,923	104,274	121,163	135,196	144,296	151,360	155,428
Dry Bulk	1,000 t	863	911	1,214	1,436	1,646	1,780	1,875	1,928

Source: Nacala Port Operation Management Plan Formulation Support Project [Paid Technical Support] July 2022

The demand forecast for the 2011 preparatory survey (hereafter abbreviated as F/S) was conducted using a methodology that combined macro forecasts based on GDP elasticity values with micro forecasts regarding industrial trends in the hinterland. The results of the new demand forecast (for FY2022 operations), which clarifies the factors causing the discrepancy between the F/S forecast and actual values in the macro forecast and incorporates corrections, are presented below. Furthermore, micro factors related to the discrepancy between the F/S forecast values and actual values are also described.

1) Macro Forecasting Using GDP Elasticity Values

Real GDP: Growth Slower Than Forecast

The 2011 F/S forecast calculated future cargo volumes by multiplying Mozambique's real GDP growth rate by elasticity values. Therefore, we first analyze real GDP. The F/S adopted the IMF's May 27, 2010 Country Report projections for real GDP growth through 2030 without modification. These IMF projections were based on actual data prior to 2009 and forecast a high, nearly flat growth rate of over 7% through 2030 (Table 2-3). However, examining the actual values in the same table from 2009 onward reveals a gradual decline since 2015, with growth remaining at a low level, never exceeding 4% since 2016. The primary causes for this are thought to be the slump in coal market prices and the economic downturn in Europe.

Table 2-3 Comparison of GDP Growth Rate Forecasts and Actual Values in the F/S

(%)

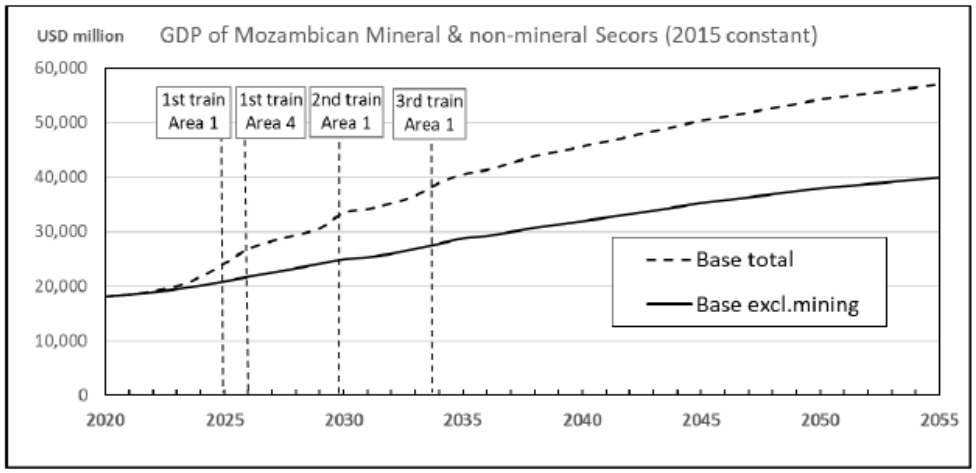
	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30
F/S Forecast Value	6.3	6.5	7.5	7.6	7.9	7.8	7.7	7.6	7.5	7.4	7.3	7.2	7.2	7.2	7.2	7.3	7.3	7.3	7.4	7.4	7.4	7.5
Actual Value	6.3	6.5	7.4	7.3	7.0	7.4	6.7	3.8	3.7	3.4	2.3	-0.5										

Note: Values in red represent forecast value, while values in black represent actual value.

Source: F/S forecast values are based on the F/S report. Actual values are based on the IMF "World Economic Outlook" (October 2020).

The GDP growth rate forecast for the 2022 business year was calculated considering the following three points. Malawi was also included as a country in the demand forecast. It was assumed that Mozambique's growth rate has a close impact on the volume of local cargo at Nacala Port, while Malawi's growth rate has a close impact on the volume of transit cargo.

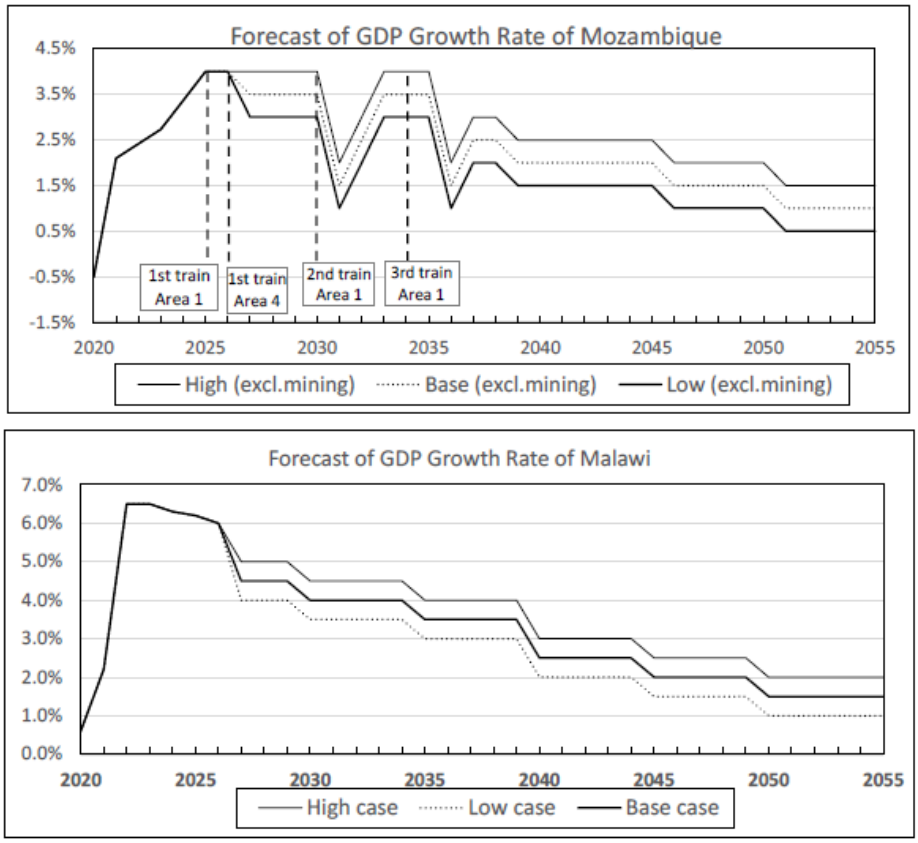
- Sources for GDP Growth Rate Forecast Values Used: For GDP growth rates through 2026, we used the forecast values from the IMF's "World Economic Outlook" published in May 2021, which incorporated the impact of COVID-19. For growth rates after 2027, we referred to the IMF's Article IV Consultation Reports (2019 for Mozambique, 2018 for Malawi) and adjusted the growth rates to gradually decline over time. Based on the degree of this decline, we considered three scenarios: High, Base, and Low.
- LNG Train Developments: The 2019 IMF Article IV Consultation Report projected a significant increase in Mozambique's GDP, particularly in the year new LNG trains commence production. This forecast takes into account the deterioration in conditions since the report, namely the terrorist attacks by Islamic militants in Palma in March 2021 and the prolonged slump in LNG market prices. It assumes that both the Area 1 and Area 4 LNG projects will be delayed by two years from the report's timeline. Specifically, the start-up years for the four trains are now projected as 2025, 2026, 2030, and 2034.
- Non-mining growth rate: Mozambique lacks the developed industrial linkages seen in developed nations or Asian countries. Consequently, the value added from LNG production and exports is expected to contribute little to the development of other industrial sectors. Therefore, the GDP growth rate used for the Nacala Port cargo volume forecast is the "non-mining growth rate" (IMF projections generally indicate 4% or below. Please refer to Figure 2-2).



Source: Support for Nacala Port Management Plan Development [Technical Assistance under Paid Account], July 2022

Figure 2-2 Mozambique's Real GDP Forecast by Mining/Non-Mining Sector (USD, 2015 Base, Base Case)

Based on the above three points, the projected GDP growth rates for Mozambique and Malawi are shown in Figure 2-3. Mozambique's GDP growth rate uses the non-mining sector growth rate, assuming a base case of 4% until 2034, followed by a gradual decline thereafter.



Source: Support for Nacala Port Management Plan Development [Technical Assistance under the Paid Account], July 2022

Figure 2-3 Assumed GDP Growth Rates for Mozambique (Top) and Malawi (Bottom) (2020-2055)

The dip in Mozambique's growth rate in 2031 and 2036 is based on the IMF Staff Reports from the 2017 to 2019 editions of the Article IV Consultation Reports. It assumes that immediately after the start of production for each train, the non-mining sector growth rate would also experience a slight reactionary effect from the previous year, resulting in a Figure below 4%. However, it is projected to return to the inherent non-mining growth rate two years later. The IMF Staff Reports project Mozambique's overall real GDP growth rate immediately after the start of production for each natural gas train to be quite low, anticipating a reaction to the high growth in the production start year (e.g., for the 2nd train, the national real growth rate is projected at 19.2% in the production start year, but only 1.9% the following year, lower than the non-mining sector growth rate of 4%).

GDP elasticity: Growth weaker than projected

The GDP elasticity of container throughput at Nacala Port from 2009 to 2019 is as shown in Table 2-4. The forecast container throughput values use the Base Case Figures. The actual elasticity of 0.998 is significantly lower than the F/S value of 1.732. The downward deviation in GDP elasticity for bulk cargo was not as large as that for containers.

Table 2-4 Comparison of GDP elasticity forecast and actual values in the F/S

		Annual average growth rate of container volume handled (2009–2019) (A)	Annual average growth rate of real GDP (2009–2019) (B)	GDP elasticity (A ÷ B)
container cargo	F/S estimation (Base Case)	12.769%	7.372%	1.732
	Actual figures	5.211%	5.221%	0,998
Bulk cargo (excluding coal)	F/S estimation (Base Case)	16.92%	7.37%	2.30
	Actual figures	8.62%	5.22%	1.65
	Note: Red text indicates forecast values, black text indicates actual values.			
	Source: F/S forecast values are from the F/S report, IMF "World Economic Outlook" (October 2020), CFM statistics			

For the 2022 operations, three types of GDP elasticity values were set: container, bulk local, and bulk transit in Malawi. The initial elasticity values were calculated from the ratio of the average annual cargo volume growth rate from 2009 to 2020 to the average annual real GDP growth rate. These initial elasticity values were assumed to apply until 2029, after which they would gradually decrease every 10 years. The elasticity values were common to all cases (High, Base, Low). The elasticity for containers was assumed to decrease by 20% every 10 years, while the elasticity for bulk cargo was assumed to decrease by 30%.

For this study forecasting the next 35 years, we determined that a conservative forecast of "reducing elasticity by 20% every decade" is necessary to avoid the aforementioned downside risks. Furthermore, while the downside deviation from FS projections was small for bulk cargo, considering that the support from construction materials seen until 2014 completely disappeared after 2015, it was deemed necessary to estimate future elasticity conservatively. Therefore, a more conservative assumption of "a 30% decrease every 10 years" was applied for bulk cargo, compared to the container cargo assumption. The elasticity values for each cargo type are as shown in Table 2-5.

Table 2-5 Assumed GDP elasticity values per decade

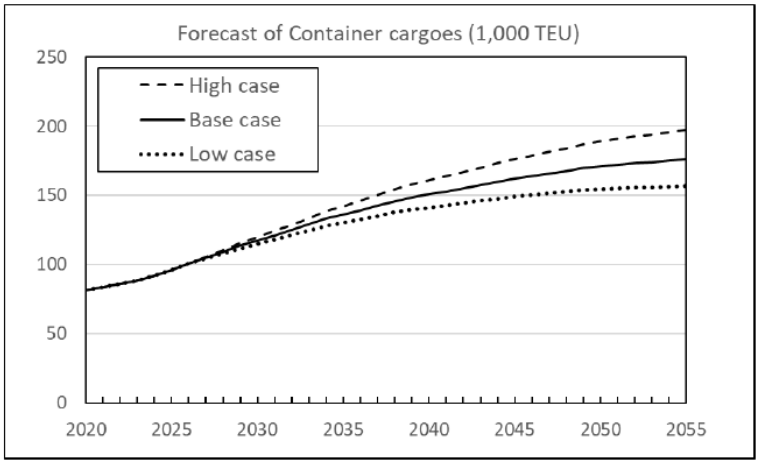
Cargo type		2020-2029	2030-2039	2040-2049	2050-2055
Containers		1.155	0.924	0.739	0.591
Bulk	Local	1.713	1.199	0.839	0.588
	Malawi transit	1.053	0.737	0.516	0.361

Source: Support for Nacala Port Operation and Management Plan Formulation [Paid Technical Support], July 2022

Container Cargo Volume Forecast for Nacala Port

Considering the impact of the sluggish growth in real GDP and GDP elasticity rates mentioned above, the 2022 project forecasted container cargo volume for Nacala Port. As shown in the Figure 2-4, Nacala Port Container Cargo Volume Forecast (2020-2055), the elasticity value applied was a single type calculated from the ratio of the total cargo volume growth rate to Mozambique's real GDP growth rate, without distinguishing between local and transit cargo. This is because transit cargo volume from Malawi constitutes only a few percent of the total, and the difference in real GDP growth rates between Mozambique and Malawi can be considered negligible.

Container cargo volume is projected to increase approximately 2.16-fold over the 35-year period to 2055, reaching 176,087 TEU in the base case scenario from the 2020 level (actual value) of 81,612 Teethe high case projects 197,637 TEU (2.42 times), and the low case projects 156,810 TEU (1.92 times). In all cases, the growth curve flattens as the future recedes, reflecting consideration for reducing downside risks.



Source: Nacala Port Operation Management Plan Formulation Support Project [Paid Technical Support] July 2022

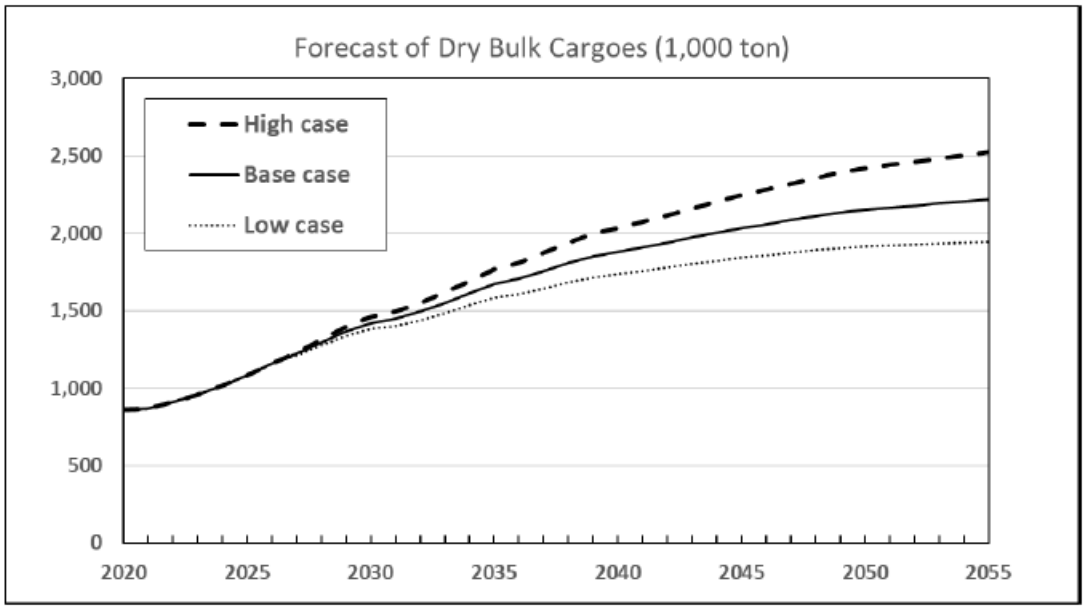
Figure 2-4 Container Cargo Volume Forecast for Nacala Port (2020-2055)

Nacala Port Bulk Cargo Volume Forecast

The bulk cargo volume forecast for 2022 operations was also calculated considering the impact of the sluggish growth in real GDP and GDP elasticity mentioned above. In doing so, Mozambique's GDP growth rate was applied separately to local cargo, and Malawi's GDP growth rate was applied separately to transit cargo. The elasticity values for local cargo are as shown in Table 2-5, calculated from actual cargo volumes excluding construction materials. Construction materials were imported

only during the limited construction period for projects like the Nacala Corridor railway and roads, Nacala Airport, and the Nacala Reservoir. For domestic shipping, transshipment, and rehandling cargo, the average proportion of the total cargo volume was added.

Bulk cargo volumes fluctuate significantly year-on-year and do not lend themselves to simple averaging. Therefore, the average growth rate was calculated using the Compound Annual Growth Rate (CAGR) from 2009 actuals to 2020 actuals. The bulk cargo volume projections for each case from 2020 to 2055 are shown in Figure 2-5. The bulk cargo volume in 2020 (actual value) is 863 thousand tons. This is projected to increase approximately 2.57 times to 2,216 thousand tons over the 35-year period to 2055 under the base case. The high case projects 2,524 thousand tons (2.92 times), and the low case projects 1,946 thousand tons (2.25 times). In all cases, the growth curve flattens as the future becomes more distant, reflecting consideration for reducing downside risk.



Source: Nacala Port Operation and Management Plan Formulation Support Project [Paid Technical Support] July 2022

Figure 2-5 Bulk Cargo Volume Forecast for Nacala Port (2020-2055)

Micro-level Factors for the Discrepancy Between the 2011 F/S Forecast and Actual Values

In addition to macro factors such as sluggish growth in real GDP and GDP elasticity, the following four micro factors are considered to have caused the discrepancy between the 2011 F/S forecast and actual results.

- **Delayed Industrial Agglomeration**: Chronic power shortages in the Nampula region have resulted in minimal industrial agglomeration progress since the F/S. Furthermore, existing factories produce goods primarily for the domestic market, contributing little to either imports or exports through Nacala Port.

- **Delayed Agricultural Development**: At the F/S stage, it was anticipated that new export-oriented cash crops would be cultivated along the Nacala Corridor and shipped from Nacala Port. However, such new agricultural exports[31] have not materialized since then.
- **Poor Transit Cargo Performance**: Malawi's economic growth pace has been slower compared to other landlocked countries like Zambia and Zimbabwe[32], and its insufficient foreign exchange reserves have hindered growth in import volumes. Furthermore, the F/S assumed a rail link between Zambia and the Nacala Corridor, but this has not been realized to date. The introduction of four gantry cranes at Beira Port and the subsequent improvement in cargo handling efficiency ahead of Nacala Port may have diverted more transit cargo from Malawi to Beira Port.
- **Transshipment Cargo Shortfall**: At the F/S stage, it was anticipated that Mozambique's tariff system would be relaxed sooner or later, and that Nacala Port, serving as a hub for north-south and east-west routes, would become a transshipment base. It was predicted that a portion of transshipment cargo from Durban Port in South Africa would shift to Nacala Port. However, in reality, the tariff system has yet to be relaxed, and the anticipated generation of transshipment cargo has not materialized.

(2) Capacity Development for Port Operations

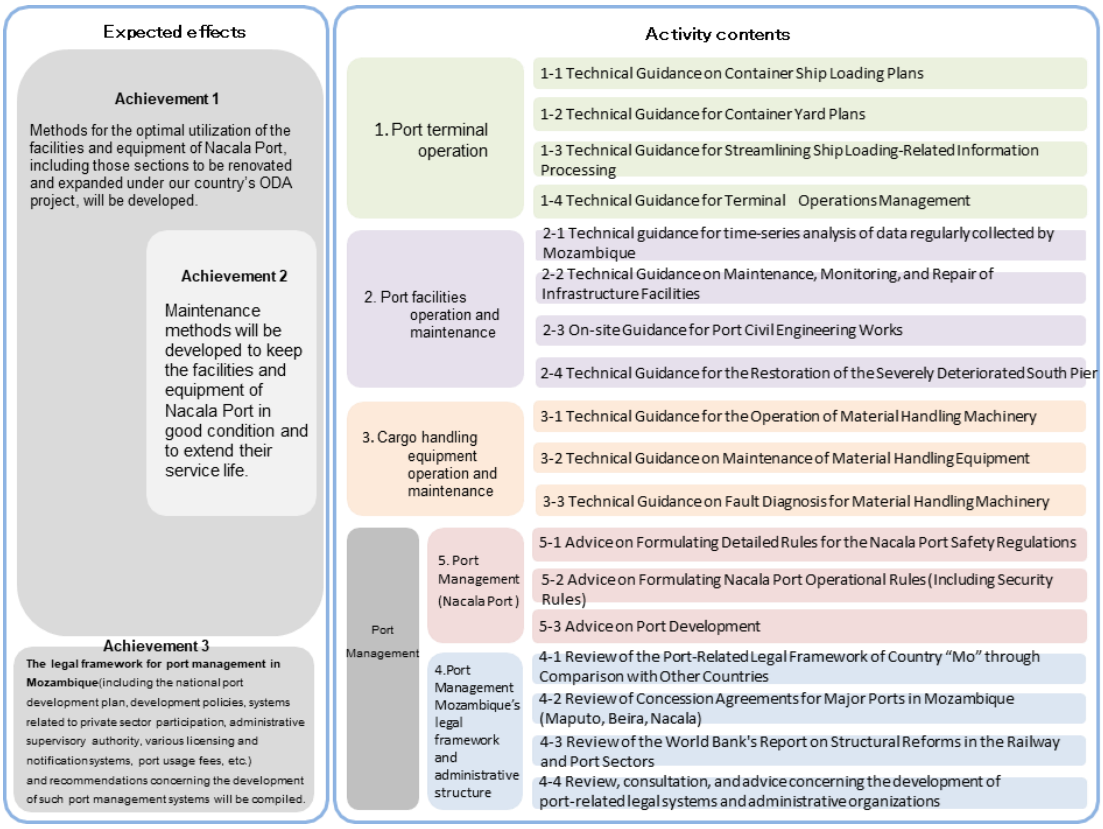
Regarding port operations at Nacala Port, capacity development was conducted through the technical cooperation project "Nacala Port of Operations Improvement Project/Support for Nacala Port Operations Improvement [Technical Assistance under the Grant Aid Account]" (February 2012 - March 2015/June 2015-December 2017) and the aforementioned technical assistance "Support for Formulating the Nacala Port Management Plan [Technical Assistance under the Grant Account] (January 2021-October 2022)". The overview of each support initiative is as follows.

- **Nacala Port Operations Improvement Project/Nacala Port Operations Improvement Support (Technical Cooperation Project)**: Activities were implemented through the dispatch of experts to improve the operations of Nacala Port.
- **Nacala Port Operation Management Plan Formulation Support Project**: Following the expiration of the Nacala Port concession contract in 2020 (15 years from 2005; concessionaire is CDN) and the transition to port management by CFM, technical support was requested for formulating a port management plan and selecting an operator for a new concession contract. The aforementioned review of cargo demand forecasts was conducted to assess the financial viability of port operations.

[31] The 2011 F/S projected new agricultural exports including 6 million tons of cassava, 400,000 tons of maize (corn), 180,000 tons of sorghum, and 150, 000 tons of soybeans.

[32] Analysis in the 2022 report identifies the Eurozone crisis and sluggish coal demand as the primary factors behind the slowdown in economic growth.

Figure 2-6 lists the outcomes set as targets to be achieved and the individual activities carried out during the five-year technical cooperation project implemented from 2012. Additionally, Figure 2-7 outlines the background and content of the discussions during the 2022 technical support.



Source: Nacala Port Operations Improvement Project / Nacala Port Operations Improvement Support

Figure 2-6 Activities and Outcomes of Nacala Port Operation Improvement Project / Nacala Port Operation Improvement Support (Technical Cooperation Project: 2012–2017)

Background of Technical Assistance

The Government of Mozambique enacted Law No. 15/2011, the basic law governing Public-Private Partnerships (PPP), and its implementing decree, No. 16/2012, in 2011. While these laws and decrees apply to the concession contract granting the operating rights for Nacala Port to a private operator, more detailed rules and regulations were needed for their application in the port sector.

The Ministry of Transport and Communications (MTC), as the ministry responsible for granting concessions for public services in the transport sector, was advancing the enactment of a decree to establish an organization to handle practical operations. This technical assistance was requested and implemented to support the formulation of future management and operation plans for the Nacala Port and the selection of an operator, with the existing concession agreement for the Nacala Port set to expire in 2020.

Technical Support Content

Following the expiration of the existing concession in 2020, the port management and operation system would transition from direct government control (CFM) to a new structure involving the establishment of a Port Authority. This transition would involve: (ⅰ) the role of granting and supervising terminal operation and management contracts to private companies based on the PPP Law, and (ⅱ) the implementation of public services as the port administrator (with a transition period assumed to be three years). This technical assistance provided support for the following items necessary for these transitions.

- Establishment of the new organization as the Port Authority
- Establishing rules and procedures for applying the PPP Law to ports
- Asset valuation and transfer of ownership for implementing new concessions
- Establishing JICA loan repayment methods

Direct operation model (interim operating period) Concession-based operating model

Source: Support for Nacala Port Operation and Management Plan Formulation (prepared by the expert of JST)

Figure 2-7 Overview of the Nacala Port Operation and Management Plan Formulation Support Project (2021-2022)

The concession contract is envisioned for a 30-year period starting in 2023. Port users will pay: (ⅰ) Container and dry bulk handling fees to the concessionaire (port terminal operator), and (ⅱ) Port entry fees to the Port Authority. The concessionaire will pay a concession fee to the Port Authority. The Port Authority is responsible for repaying the JICA loan and maintaining port infrastructure, while the concessionaire bears the operating costs, including the maintenance of facilities and cargo handling machinery.

According to the cargo handling charges used as the basis for the financial analysis (CFM Traffic Book: 2020), a high fee structure, as shown below, is set compared to other ports within Mozambique and ports in neighboring countries. This is cited as a reason for the port's lack of appeal to users.

- **Cargo handling charges for 20-foot containers (comparison within Mozambique)**: Nacala Port is approximately 2% to 6% higher than Beira Port (CdM Co.) and Maputo Port (DPW Co.) within Mozambique.
- **20-foot container cargo handling fees (comparison between neighboring ports and Mozambique national average)**: Compared to Tanzania's Port of Dar es Salaam (Hutchison), Kenya's Port of Mombasa (Kenya Ports Authority (KPA)), and South Africa's Port of Durban Pier 1 and Pier 2 (Transnet Port Terminal (TPA)), handling costs are 20-50% lower than Mozambique's rates.

2.1.2 Comparison of International Corridors

Project Study: "Formulation of a Grand Design for Global Logistics in the Indo-Pacific Region (Year 2) (2019–2020)" and "Formulation of a Grand Design for Global Logistics in the African Region, (2020–2023)" aim to quantitatively analyze logistics bottlenecks in African countries, formulate a logistics infrastructure strategy for Africa as a whole, and propose directions and possibilities for JICA cooperation in the post-COVID-19 society. The overview is as follows.

- **Identifying Logistics Infrastructure Bottlenecks**: Based on simulation results from logistics model analysis, logistics bottlenecks were identified from ports, roads (economic corridors), and the volume of originating/concentrated cargo and cross-border cargo. For ports, it was projected that by 2040, future cargo demand would exceed facility capacity at half of the top 14 ports in the African region. Specifically, the project study "Formulation of a Grand Design for Global Logistics in the Indo-Pacific Region (Year 2) (2019-2020)" projected that Nacala Port would also exceed its facility capacity, identifying it as one of the ports requiring priority development. Furthermore, at Dar es Salaam Port, future cargo handling demand was estimated to significantly exceed planned future cargo volumes. This also suggested the potential for cargo transport routes to shift to other competing ports and corridors, including Nacala Port. For road and rail, the West Africa Growth Ring handled the largest volume of transported cargo, followed by the Trans-Maghreb Corridor, the North-South Corridor, and the Northern Corridor. Significant cargo volumes are anticipated, particularly on sections connecting ports to major cities, necessitating steady development.
- **Formulation of a logistics infrastructure strategy (JICA's direction of cooperation and recommendations for possibilities)**: In order to respond to future demand growth and international climate change targets, it is necessary to promote a green transition by improving logistics infrastructure, promoting modal shift (from road to rail), and improving the efficiency of transport modes such as trucks and ships. At the same time, it is necessary to promote the reduction of environmental impact through the use of green energy such as solar and wind power in logistics infrastructure such as ports, roads, and railways, as well as in cross-border facilities, ships, transport vehicles, and logistics facilities. Furthermore, integrated corridor development, including cross-border facilities such as OSBPs, port development, and logistics hubs (ICDs, SEZs, etc.), can reduce transport time and costs, including for landlocked countries, benefit more people, and contribute to reducing disparities. To further develop the African economy, it is necessary to simultaneously support industrial development, such as creating a logistics environment where competitive principles operate and measures to increase the added value of agriculture, forestry, and fisheries. Furthermore, alongside the steady advancement of trunk transportation through integrated corridor development, there is scope to explore future-oriented initiatives such as establishing cold chains and utilizing new technologies like drones and autonomous vehicles for last-mile delivery.

2.1.3 Projects under consideration in Zambia and Malawi

Projects currently underway in both countries that contribute to the Nacala Corridor study include the "Lusaka Metropolitan Area Comprehensive Development Plan Formulation Project" and the "Road Vulnerability Assessment for Malawi RESTORE Project (May 2024-June 2025)".

Lusaka Metropolitan Area Integrated Development Plan Formulation Project

This project involves developing an urban development plan essential for industrial growth in Lusaka, Zambia's capital. It is understood as necessary for enhancing the Land Bridge effect when increasing transport volumes along the Nacala Corridor and strengthening Lusaka's role as a key node connecting the Nacala and Lobito Corridors. The project overview is as follows.

The City of Lusaka is located at the heart of Africa's economic corridors and is rapidly developing as an international logistics hub city. Its population surged from approximately 760,000 in 1990 to 1.08 million in 2000, reaching 1.45 million by 2007. According to the 2022 census, the population of Lusaka City alone exceeds 2.2 million. Urbanization has expanded beyond the city limits into four adjacent districts: Chibombo, Chilanga, Chongwe, and Kafue. Against this backdrop, the Greater Lusaka Area Plan (Project) aims to formulate a regional development plan to achieve sustainable growth within the Greater Lusaka Area, comprising Lusaka City and its surrounding regions. The technical approach is as follows:

- Examination of Sustainable Regional Structure and Development Axes: Understanding the distribution of existing urban areas, future growth patterns, housing development trends, etc., and based on these findings, promoting urban development integrated with transportation to form future development axes while considering sustainable urban development.
- Formation of development axes in the east and promotion of new urban development: Introducing public transport along arterial roads and advancing development along these corridors will form integrated urban development axes. Housing development is expected to intensify particularly in Chongwe in eastern Lusaka and northeast Kafue. Accordingly, new urban development in eastern Lusaka and the introduction of mass transit systems will be considered.
- Redevelopment of the Central Business District (CBD), the face of Lusaka: Measures under consideration include relocating the bus terminal, a major cause of CBD congestion, and introducing high-density residential functions through redevelopment projects.
- Revision and Continuation of Planning Concepts from the 2009 Master Plan: Proposals include creating urban parks based on a hierarchy of playgrounds, neighborhood parks, and district parks. Implementation strategies for creating green spaces and parks within shopping malls are being examined as a means to achieve this.

2.2 Status, Achievements, and Challenges of Other Donor Projects

2.2.1 Status of Other Donor Projects

The main projects and surveys currently underway in the Nacala Corridor are as follows. Donors such as the World Bank and the EU are providing support across a wide range of fields.

Table 2-6 Projects and Surveys Underway in Zambia

Sector	Existing Project Implementation Phase	Responsible Ministry/Donor	Overview
Road	Transport Corridors for Economic Resilience Project (Tracer)	NRFA/WB ※MIHUD, RDA	While focusing on improvements along the Dar es Salaam Corridor between Zambia and Tanzania, physical and organizational improvements along the Nacala Corridor and the Trans Caprivi/Walvis Bay–Ndola–Lubumbashi Corridor are also included. Improvements to rail transport will also be considered as future projects.
Road	North-South Corridor Transport Improvement Project	RDA/AfDB	A project to rehabilitate the Serengeti-Mpika Road, part of the Great North Road (T2). Its primary objective is to reduce transport time and costs along this priority corridor linking Dar es Salaam Port in Tanzania with the Copperbelt (southern Democratic Republic of the Congo and northern Zambia), connecting to ports in southern South Africa, particularly Durban Port.
Road	Great North Road (T2) Upgrade	RDA/EU	Upgrade of T2 between Mpika and Nakonde. Includes rehabilitation of feeder roads on the Chinsali-Nakonde section and provision of technical assistance.
Road	The Great East Road Rehabilitation Project	RDA/EU	This project (Luangwa-Muami Road Rehabilitation) aims to provide improved road transport infrastructure to Nacala Port for Zambia, Malawi, and Mozambique, and to enhance access to markets and social services for communities within the project's sphere of influence.
Road	Weighbridge Installation	RDA/AfDB	The RDA Strategic Plan (2022-2026) targets the construction of five axle load measurement stations. Two of these (Solwezi Axle Load Measurement Station on July 12, 2024, and Chongwe Axle Load Measurement Station on August 29, 2024) have been completed. Construction of two additional weigh stations in Muami and Katete, funded by the AfDB, is planned. Furthermore, construction is underway for the first weigh-in-motion station in Nakonde.
Railway	Chipata-Petauke-Serenjie Railway Pre-FS (MTL/China)	ZRL/China	Construction was scheduled to begin in 2017 but has been postponed. The prospects for resumption are unclear.
Logistics	Chipata Dry Port	ZRL (Landowner), Chipata City Council, Private Sector/EIB	Rail freight transport to Chipata is planned to commence after the completion of railway improvements between Lilongwe and Chipata, extending from Nacala Port. This project involves constructing a dry port at Chipata, the terminus of this railway. Details are elaborated in "3.1.1 Project Formulation Proposal for Zambia (Grant, etc.)".
Industry	Construction of 5 MFEZs and 3 Industry Parks	ZDA	Of the five existing MFEZs, the Lusaka East MFEZ is operated by the government, while the others are managed by private companies. Plans for new MFEZs are also progressing in areas such as Kafue and Jiangxi.
Agriculture	Farm Block Development Programme	MA	By providing basic agricultural infrastructure within farm blocks, it is expected to attract investors, promote the commercialization of agriculture, enhance food security, and revitalize rural areas.

Sector	Existing Project Implementation Phase	Responsible Ministry/Donor	Overview
Agriculture	Sustainable Agriculture Financing Facility	MA	By collaborating with financial institutions, government agencies, and agricultural experts to provide smallholder farmers with necessary financial access, the goal is to improve agricultural productivity and sustainability.
Three Countries	NDCMC	Target Country Governments	Ten sector cluster groups were established to promote cooperation among institutions. Activities are implemented by sector, and results and progress are shared and monitored at annual meetings hosted in rotation by each country.
Three Countries	SATCP (The Southern Africa Trade and Connectivity Project)	WB	The WB Group, a key partner in NDCMC activities, supports reducing trade costs, strengthening value chain development, and improving infrastructure along the Nacala Corridor as part of the Southern Africa Trade and Connectivity Project (SATCP). This aims to promote regional market access and economic growth.

Source: JST

Table 2-7 Projects and Studies Underway in Malawi

Sector	Existing Projects Implementation Phase	Responsible Ministry/Donor	Overview
Road	Nacala Road Corridor Development Project Phase IV-V	MTPI, MRA/AfDB	Phase IV and Phase V involve the rehabilitation (completion) of a 75 km road section along the Nacala Road Corridor connecting Liwonde and Mangochi in Malawi, and the establishment of OSBPs between Malawi and Mozambique, and between Malawi and Zambia. road section (55 km).
Road	Malawi Transport Asset Management and Traffic Safety Project	MTPI, MRA/WB	The project development objectives are to improve transportation infrastructure connectivity and strengthen safe and sustainable road maintenance management capabilities. It aims to construct safety facilities in major markets along the M1 and improve transportation routes for emergency vehicles responding to traffic accidents.
Road	Construction Works for the Rehabilitation and Widening of the M1 Road	MTPI, MRA/EU	M1 Road Rehabilitation Project. The identified sections are Kacheche-Chiweta (66 km), Jenda-Muzimba (47 km), Kasungu-Yenda (86 km), and Kamuzu International Airport (KIA)-Kasungu (102 km). The project includes two technical assistance components for implementation management.
Road	MCA Compact II	MTPI, MRA/MCC	Improvement of unpaved community access routes. The following four major corridor roads will be upgraded: Mukanda-Linga: 88.0 km Chileka–Rikuni: 53.2 km Chamulo–Muktumura: 79.0 km Chikwawa–Yutini: 67.0 km This project was scheduled to begin in May 2024 as the Second Five-Year Compact, with a total of $350 million in support planned from the U.S. Millennium Challenge Corporation (MCC). However, in January 2025, USAID issued a suspension order for all projects. Furthermore, MCC itself is moving towards downsizing and closure due to the U.S. government's budget reduction policy. Consequently, although no formal announcement has been made at this time, MCC has effectively terminated the contract for this project and halted funding. The 2025-26 U.S. national budget does not include Compact II-related projects, and reports indicate the Malawian government must seek new funding sources, making the project's continuation uncertain.
Road	M1 Dual Carriageway Project	MTPI, MRA/CHINA	A road improvement project comprising the Malawi Capital Airport M1 Highway Upgrade Project, the Lilongwe Dual

Sector	Existing Projects Implementation Phase	Responsible Ministry/Donor	Overview
			Carriageway Project, the M1 Road Project from Kanengo to the Mchinji Roundabout, and the dual carriageway project from Lilongwe city center to Kamuzu International Airport.
Road	Lilongwe City Trunk Road Improvement Plan	MTPI, MRA/JAPAN	Aims to alleviate traffic congestion within Lilongwe City by replacing bridges on National Highway 1 within the city limits of the Nacala Corridor.
Road	Road Vulnerability Assessment for Malawi RESTORE Project	MTPW, RA/WB	Survey to address vulnerabilities on roads along the Nacala Corridor. Focusing on the lower Shire River basin, which is crucial for international trade, agriculture, and tourism, this study examines future road development strategies to maximize resilience. It emphasizes improving climate-resilient transport networks and rehabilitating the M1 and feeder road (S152) within the region. Specific activities include flood modeling for risk assessment and inspection/evaluation of road structures.
Rail	Reconstruction of Railway Bridges between Lilongwe and Chipata	MTPW	Although completion was scheduled for the end of 2024, rail service has not yet resumed at this time.
Railway	Makhanga-Marka Railway Reconstruction	MTPW	It was scheduled for completion by the end of 2024, but remains unfinished at this time (according to reports, the project is delayed due to a shortage of foreign currency).
Railway	Northern Railway connecting to TAZARA FS	MTPW	Planned for implementation.
Border	Chiponde OSBP under construction	MFEA/WB, AfDB	Preliminary studies completed; construction scheduled to begin next year. The World Bank will support the Malawian side, while the African Development Bank will support the Mozambican side. The location will be approximately 1. 8 km inside Mozambique from the current border facility, with a planned building area of 20 hectares. Equipment support for the interior is not included in the package; I understand that support from the World Bank or the EU covers only the building. The 1.8 km stretch between the current border facility and the planned OSBP site is unpaved.
Logistics	Malawi Dry Port in Nacala	Malawi Cargo Centre	Plans are progressing to provide the Malawi government with a site near the Nacala Port (location undetermined) for constructing a Malawi Dry Port aimed at inland cargo distribution. Operation may be undertaken by Nacala Logistics.
Multi-Sector	Area 55 SEZ in Lilongwe FS completed Construction scheduled to begin next year	ARISE Integrated Industrial Platforms[33] /MoIT	This SEZ will also incorporate dry port functionality. It aims to stimulate industrial and commercial activity, providing logistics services to domestic Malawian enterprises. It will also promote the processing of raw materials into high-value-added finished goods, with a particular focus on agricultural products and agro-based goods. ARISE IIP will oversee the majority of the project and hold a 65% equity stake, while the remaining 35% will be shared between the Government of Malawi and local investors.
Multi-Sector	Central Malawi Corridor project (Agricultural, Residential, and Industrial Development	Private	This project concept, launched jointly by Small Farm Cities Africa (a startup social enterprise) and the Malawi National Planning Commission, aims to develop agriculture, forestry, and fisheries businesses along the Nacala Railway through its

[33] ARISE Integrated Industrial Platforms (ARISE IIP) is a company owned by the African Finance Corporation (AFC), the African Export-Import Bank (Afreximbank), and the African Transformation and Industrialization Fund (ATIF), which develops and operates world-class industrial ecosystems across Africa.(See ARISE website, https://www.ariseiip.com/arise-iip-signs-development-agreement-with-government-of-malawi-to-construct-sez-and-dry-port/ (accessed December 25, 2024)).

Sector	Existing Projects Implementation Phase	Responsible Ministry/Donor	Overview
	Along the Railway)		improvement. It seeks to provide technical support for sustainable agriculture and aquaculture, as well as opportunities for affordable home ownership.

Source: Research Team

Table 2-8 Projects and Surveys Underway in Mozambique

Sector	Existing Project Implementation Phase	Responsible Ministry/Donor	Overview
Road	Nacala Road Corridor Development Project	MTL/AfDB	Project to upgrade and improve approximately 350 km of the N13 highway from Nampula to Cuamba to asphalt pavement. Construction on the unfinished section of Lot-C, which had been suspended due to funding shortages, resumed in March 2025.
Road		MTL/ANE/JICA	A preparatory survey for cooperation in the construction of the Natete Bridge on National Highway 13 in Liboué District, Nampula Province, is currently underway.
Agriculture	Bulk Grain Terminal Construction	Mitrelli Group (Israeli company)	Construction is underway on a dedicated grain terminal by Mitrelli Group since August 2023, designed to accommodate vessels of up to 55,000 deadweight tons (DWT) and handle twice the previous grain throughput (initially scheduled for completion by early 2025).
Ports	Dry Port Development for Malawi	MTL	Planned for construction in the Nacala Port area (candidate site), but details including the location are currently under discussion with the Malawian government. However, based on local interviews, the private company Malawi Cargo Centres (MCC), which already has a track record in Tanzania (operating dry ports in Dar es Salaam and Mbeya, Tanzania, leased from the Tanzanian government), is considered a strong candidate as the operator.
Border	Project Fronteira Unica	WB	This is one component of the SATCP project, with $150 million allocated to Malawi and $230 million to Mozambique to support the promotion of OSBPs. In June 2025, a One Go-Border Post (OGBP) was established at the Dedza/Calomue border.
Energy	Energy Transmission Network (Chimuara (Zambezia Province) – Nacala) Development	IFC	Approximately $400 million transmission network development project. The plan involves developing a 460 km transmission line network from Chimuara to Nacala to facilitate renewable energy integration and industrial development in the north. IFC has entered into an agreement with Gridworks Development Partners LLP, a subsidiary of British International Investment Plc, regarding support for this project.

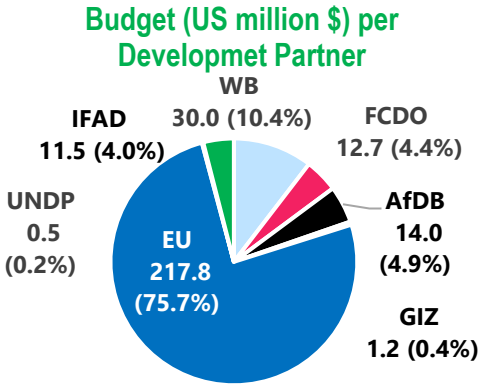
Source: JST

In Malawi, an organization called The Trade, Industry and Private Sector Development Partners (TIPDeP) is responsible for dialogue, coordination, and cooperation among donors involved in private sector development, and between these donors and the government (primarily the Ministry of Industry and the Ministry of Trade)[34]. Therefore, we have compiled information on donor support to the private sector that contributes to the revitalization of the Nacala Corridor.

[34] Established in 2016. TIPDeP members are bilateral and multilateral development donors supporting the implementation of the Trade, Industry, and Private Sector Development Program: the World Bank, the Foreign, Commonwealth & Development Office (FCDO), the African Development Bank (AfDB), the European Union (EU), GIZ, the United Nations Development Programme (UNDP), USAID, and the International Fund for Agricultural Development (IFAD).

According to TIPDeP, the donor support budget for 2023-2024 is US$287.7 million. As shown in Figure 2-8, the EU accounts for over 75% of the budget.

Additionally, by sector, as shown in Table 2-9, capacity building-related projects were the most numerous at 23, followed by interventions in E-Systems (supporting the digitization of financial services, etc.) and OSBP-related projects.



Source: TIPDeP

Figure 2-8 Donor Support for TIPDeP Projects Support Status (2023-2024)

Table 2-9 Donor Support Status by Sector for TIPDeP Projects

No	Focus Area (Intervention)	Number of Interventions								Total
		World Bank	FCDO	AfDB	EU	GIZ	UNDP	USAID	IFAD	
1	Ratification and alignment with WTO (Standards)	5			1	1				7
2	Legal Frameworks and Policies (Trade Procedures)	1		1		1				3
3	Transparency and Accountability Support	1								1
4	One-stop boarder and processes	9			2					11
5	Capacity Building of Agencies, Matching Grants and Financial Services		1	11		3	5	2	1	23
6	Taxation (Tax and Customs)	1								1
7	E-Systems	3		10		1				14
8	Transport and Trade Costs		3							3
9	Warehousing									0
Total		20	4	22	3	6	5	2	1	63

Source: TIPDeP

2.2.2 Achievements and Challenges of Other Donors' Projects

The projects currently being implemented in the Nacala Corridor are listed in Section 2.2. Regarding support for revitalizing the Nacala Corridor, it was found that the World Bank (WB) and the European Union (EU) are providing active support. The challenges of the support provided by the WB and EU are summarized below.

- **Results and Challenges of WB Support**: While the WB has a track record of supporting road infrastructure, including the TRACER project (Transport Corridors for Economic Resilience Project, Project ID: P180801), the revitalization of the Nacala Corridor is currently led by the NDCMC. Its activities are supported by the WB through the SATCP (Southern Africa Trade and Connectivity Project, Project ID: P16487).

  SATCP is a project aimed at strengthening regional trade coordination between Malawi and Mozambique and reducing trade costs and time. It consists primarily of projects contributing to

four areas: reducing trade costs, strengthening regional coordination, enhancing value chains, and improving infrastructure. These include projects such as strengthening ICT infrastructure for trade-related agencies, supporting NDCMC meetings, capacity building for small businesses, and upgrading key roads in the Nacala Corridor. A Project Implementation Unit (PIU) has been established within Malawi's Ministry of Transport and is actively engaged in its operations (Support Period: 2021-2027, Support Amount: 380 million USD).

However, progress on individual projects that should be implemented jointly by the three countries has been delayed due to a lack of alignment among them, including Mozambique's non-membership in COMESA and Zambia still being in the preparatory stage to receive support under SATCP. Accordingly, given the political and economic challenges faced by each country, sustained, long-term support is required.

- **EU Support Outcomes and Challenges**: As part of corridor support aligned with the New Global Gateway policy, the EU has implemented the following assistance for the Nacala Corridor. However, none of these activities have fully achieved their original objectives, necessitating continued support.
  - ✓ The construction of the dry port in Chipata is planned as a component of the European Investment Bank (EIB) loan project for road rehabilitation in the Nacala Corridor (Great East Road Rehabilitation Project: 2011 loan agreement). Using remaining loan funds and within the loan period, a redesign of the dry port (originally designed in 2013) and the start of construction are scheduled. However, it is unclear whether the timeframe and budget will be sufficient.
  - ✓ The Small-Scale Cross Border Trade Initiative (SSCBTI), implemented by the EU Development Fund (EDF) and COMESA to increase trade volumes by formalizing informal traders, has been underway. However, its six-year support period ends in December 2024, and the implementation of a follow-up project remains undecided.
  - ✓ In Malawi, the EU provided 3.8 million Euro in support, collaborating with UNDP-UNIDO to implement technical cooperation and assistance (2012-2016) for the Malawi Bureau of Standards (MBS) related to SQAM (Standardization, Quality Assurance, Accreditation, and Metrology) to promote exports. However, inspection equipment and facilities remain insufficient to meet demand. In Zambia, the EU is providing €21.6 million in support for the ongoing Tripartite Transport & Transit Facilitation Programme (TTTFP). This joint project with COMESA, SADC, and EAC aims to develop harmonized road transport policies, laws, regulations, and standards to enhance logistics efficiency in the East and Southern Africa (EA-SA) region, while also providing technical cooperation and support.

Furthermore, the World Food Programme (WFP) and Trade Mark Africa (TMA) are also expected to be involved in revitalizing the Nacala Corridor in the future in the following areas, with cooperation from JICA anticipated.

- WFP Zambia stores grain for emergency food assistance at FRA (Food Rights Alliance) depots throughout Zambia. If it can be confirmed which routes this grain currently uses and the advantages of utilizing the Nacala Corridor, which is beginning to gain an edge in rail freight transport, a collaborative project between WFP and JICA is anticipated.
- TMA has provided long-term support to customs authorities in the Eastern African region for over a decade, including assistance with OSBP facilities and technologies, and support for establishing a single window interface (consolidating all systems related to import/export and port procedures into a single point of contact) to reduce customs clearance times. It now plans to leverage these achievements to expand its support to the Southern African region. Similarly in Southern Africa, support for a Single Window Interface is being considered, along with preliminary support for digital infrastructure and digital skills development. However, as TMA has limited experience in Southern Africa, cooperation with JICA, which has a track record in the region, is anticipated.

2.3 Dashboard Creation

Although "Dashboard Creation" was described as follows in the proposal and work plan, following discussions with JICA, it was decided that this survey would not implement the actual dashboard creation. Instead, the task would be completed by sharing the data collected with JICA.

> Organize the project contents and progress status of JICA and other donors related to the Nacala Corridor Development into a "dashboard" format for easy reference. Additionally, propose a method for the NDCMC to continuously operate it. Currently, multiple databases and systems exist in the African region, such as the Virtual PIDA Information Center under PIDA-PAP1, the Interactive Virtual MAP under PIDA-PAP2, AfDB's Map Africa, and The World Bank Maps, which compile projects by various action plans and donors. This task will collect and organize information to enable the types and progress of projects related to the Nacala Corridor to be understood on a single screen.

2.4 Consideration of Offer-Based Cooperation

Through discussions with multiple Japanese companies implementing projects locally during this survey, the potential for developing several offer-based cooperation proposals was identified to promote the utilization of the Nacala Port and Corridor.

Offer-based cooperation uses ODA as a "catalyst" to engage public financial institutions like the Japan Bank for International Cooperation (JBIC), international organizations, civil society, and private companies, leveraging their respective strengths to enhance the diversity and sustainability of Japan's ODA support.

To widely publicize this Offer-Based Cooperation, a presentation titled "The Potential for Development of the Nacala Corridor" (hereinafter referred to as the JBCA Seminar) was delivered at an event organized by the JETRO Africa Business Council (JBCA) Investment Environment Improvement Working Group. This event was held in Yokohama in August 2025 as part of the 9th Tokyo International Conference on African Development (TICAD 9). Titled "Japanese Corporate Expansion Potential in

Southern Africa's International Corridors: Perspectives from Critical Mineral Supply Chain Development / Background and Current Status of Development Support for the Nacala Corridor, Contributing to Offer-Based Cooperation, " the seminar presented findings from METI's Global South Master Plan survey, along with progress reports and insights, to the general public. Attendees at the JBCA Seminar included companies from a wide range of industries interested in infrastructure development and business expansion in Africa (particularly the Nacala Corridor), such as general trading companies, construction firms, consultants, engineering companies, manufacturers, logistics/transportation, and telecommunications/IT. Additionally, public institutions such as government agencies, development support organizations, the Japan International Cooperation Agency (JICA), and diplomatic authorities were present.

The JBCA seminar served as a platform to share the Japanese government's future policy direction for the Nacala Corridor development (Offer-Based Cooperation), including its commitment to corridor development through collaboration with private companies, ongoing survey projects in the region, and the status of private sector initiatives. It also provided an opportunity for stakeholders to express their willingness to collaborate and network. The response from private companies was positive, with many appearing to be seeking opportunities to enter the local market. Furthermore, the seminar is considered to have contributed to raising private sector expectations for the Nacala Port and Corridor and enhancing the feasibility of offer-based cooperation. The program outline for the day was as follows

Program Outline

1. Positioning of the Nacala Corridor Development and Offer-Based Cooperation at TICAD 9
   (Kunihiko Azuma, Director, Division 3, Country Development Cooperation, International Cooperation Bureau, Ministry of Foreign Affairs)
2. International Corridors in Southern Africa
   - Ministry of Economy, Trade and Industry Global South Master Plan "Survey Project for Formulating a Master Plan in the Critical Mineral Supply Chain Sector, Focusing on the Copperbelt"
     (Masahiro Hashimoto, Section Chief, Africa Division, Middle East and Africa Department, Trade Policy Bureau, Ministry of Economy, Trade and Industry)
   - JICA Technical Assistance under the Grant Account "Project to Promote Utilization of Nacala Port and the International Corridor"
     (Yoji Matsui, Section Chief, Africa Division 3, Africa Department, JICA)
3. Possibilities for Japanese Corporate Expansion from the Perspective of Critical Mineral Supply Chain Development / Background and Current Status of Development Support for the Nacala Corridor
   (Yoshihisa Asada, Deputy Director, Planning Division, Oriental Consultants Global Co., Ltd. (OCG))
4. Current Status and Future Potential of the Nacala Corridor from a Private Sector Perspective
   - Mitsuru Fukushima, Representative for Southern Sub-Saharan Africa, Mitsui O.S.K. Lines, Ltd. (Alistair Ltd., Ms. Clementine James)
   - Makoto Goda, CEO, Nippon Bio Fuel (NBF)
   - Shogo Kawasaki, Ship & Ocean Division, Itochu Corporation (Itochu)
5. Agricultural Development Cooperation
   - “Reasons for establishing the Corridor Team and potential collaboration with Japanese companies”
     (Mr. Adam Gerstenmier, Chief of Partnerships and Strategic Initiatives, AGRA)
   - “Project introduction and potential collaboration with Japanese companies”
     (e-voucher Mr. Mauro Minetti, Cash and Voucher Assistance Specialist at FAO Mozambique, FAO)
6. Future Development of the Nacala Corridor (Panel Discussion)
   - Moderator: Deputy Director Asada (OCG)
   - Panelists (5): Director Higashi, Ministry of Foreign Affairs; Director Matsui, JICA; CEO Goda (NBF); Representative Fukushima (Mitsui O.S.K. Lines); Mr. Kawasaki (Itochu)

Chapter 3 Review of JICA Cooperation Policy Draft

3.1 Examination of the Feasibility of Formulating Potential Cooperation Projects (Grant Aid and Technical Cooperation, as well as Future Yen Loans)

To present JICA's draft cooperation policy for promoting the utilization of Nacala Port and the Corridor, the review proceeded according to the following steps. Chapter 3.1.1 and subsequent sections present the feasibility of potential cooperation projects that Zambia, Malawi, and Mozambique could implement, based on the results of this review and requests from local stakeholders.

- Establishing the potential (hypothesis) as an international corridor and gauging the views of local stakeholders
- Examination of a phased support scenario for the entire Nacala Corridor based on its potential
- Projected future freight demand for the Nacala Corridor as foundational data for reviewing potential cooperation projects

The support schemes for potential cooperative projects include not only grant aid projects but also technical cooperation projects and projects that may fall under yen loan projects, which are expected to resume in the future.

(1) Potential of the Nacala Corridor as an International Corridor

Based on the understanding of the "barriers" and "stages of economic development" faced by the Nacala Corridor region as discussed in previous chapters, hypotheses regarding the potential of the Nacala Corridor as an international corridor were established at the outset of this project. An overview of the five established potentials is presented in Table 3-1.

Table 3-1 Nacala Corridor Potential as an International Corridor (Draft): Hypotheses by JST

Potential (Hypothesis)	Corridor Concept and Required Infrastructure
Potential 1 Value Chain (Development of Agricultural Processing Industry): Downstream Transportation	Processing agricultural products produced throughout the corridor's entire route spanning three countries within the region and exporting them from Nacar Port. Rapid and cost-effective transportation and customs clearance systems to agricultural processing complexes (serving as processing and aggregation sites) and Nacar Port are essential. Potential applications include digital-enabled warehouse management and operations from rural areas to processing zones, as well as integrated operations linking container consolidation and shipping information with processing zones. Development of an agricultural processing zone by the AfDB is already underway in Kwanza, along the corridor.
Potential 2 Green Corridor/Climate Change Response (Biofuel for ships, jatropha cultivation, application to JCM/CDM)	Greening the corridor with useful crops to make Nacala Port a hub for supplying biofuel for ships on the east coast of Africa (jatropha cultivation and oil extraction). This will contribute to climate change measures by meeting the demand for biofuel for zero-emission ships aimed at reducing GHG emissions in international shipping (Japan's proposal for a feebate system) and by responding to carbon credits such as JCM/CDM. Furthermore, by utilizing biofuel oil extraction residues (biochar fertilizer) to improve soil quality and enhance productivity along the Nacala Corridor (including Zambia and Malawi) in a manner that contributes to climate change mitigation, the Nacala Corridor will become an advanced corridor for climate change countermeasures.

Potential (Hypothesis)	Corridor Concept and Required Infrastructure
Potential 3 Transport Corridor Supporting Economic Development in Zambia and Malawi: Upstream Exports	This involves bonded transport from Nacala Port to deliver imported consumer goods to residents within the corridor area, along with raw materials (such as fertilizers and construction materials) essential for developing manufacturing and agriculture within both countries. To accommodate increased volumes and the trend toward smaller, more diverse shipments driven by economic development, it is necessary to establish rail transport that is more attractive than other corridors or truck transport.
Potential 4 Mineral Transport Corridor for Copper, Cobalt, etc. : Downstream Transport	This initiative, achieved through cooperation among the three countries, aims to provide attractive "truck-rail intermodal transport" for the growing exports of mineral resources from Zambia, surpassing other corridors and truck transport handled by Beira Port. The key lies in containerization at inland ICDs.
Potential 5 Land Bridge (Integration of Corridors like Lobito)	Integration with the Lobito Corridor, a focus for the US and EU, will create a land bridge effect via the Nacala Corridor transport system from Nacala Port.

Source: JST

Regarding these potential proposals, interviews were conducted with government agencies and business representatives in Zambia and Malawi to confirm local intentions. Ultimately, while confirming and consulting with your organization's views, we will discuss projects and cooperation content that contribute to utilizing or supporting these potentials.

- **Potential 1: Value Chain (Development of Agricultural Processing Industries)** (Downstream Transport)

  Interviews with private agricultural companies in Zambia and Malawi and the government of Nampula Province in Mozambique confirmed the existence of this potential. It was also found that transportation by rail is progressing for these items. In addition, it was confirmed that there are issues regarding the safety and customs procedures along the corridor (road) for the transportation of agricultural products.

- **Potential 2: Green Corridor/Climate Change Response (Biofuel for Ships, Jatropha Cultivation, Application to JCM/CDM)**

  Malawi's climate change department showed interest in a composite concept consisting of fuel shortage solutions, regional promotion, and CDM. It was suggested that this would involve discussions across ministries. Zambia's government think tank (ZIPAR) also showed interest, and it was confirmed that a new climate change countermeasures department had been established in Zambia.

- **Potential 3: Transport Corridor Supporting Economic Development in Zambia and Malawi** (Upstream Transport)

  Through discussions with Nacala Logistics, the railway operator, and logistics stakeholders, as well as on-site surveys, we confirmed the status of the resumption and utilization of rail freight transport from Nacala Port to Malawi. We also identified a strong desire for further development, specifically efforts toward integrated rail freight transport extending to Zambia. Based on this, the significance of public infrastructure development for establishing an ICD (or Logistics Base level) in Chipata, Zambia, and for creating an OSBP at the border via rail was confirmed as essential for revitalizing this rail freight transport.

- **Potential 4: Mineral Transport Corridor for Copper, Cobalt, etc.** (Downstream Transport)
  The significance of this project was confirmed by Nacala Logistics, the railway operator, private logistics companies responsible for land transport of copper from the Copperbelt region, and multiple government organizations.
- **Potential 5: Land Bridge (Integration of the Lobito Corridor, etc.)**
  Understanding and interest were gained regarding the effects (concept) generated by the Land Bridge through connection with the Lobito Corridor (please refer to 1.7). Going forward, it is necessary to confirm the constraints and willingness regarding industrial development within Zambia, which is key for exporting to the opposite ocean via value creation within the corridor, one of the Land Bridge effects (e.g., power supply needed for SEZs and industrial development).

(2) Phased Support Scenario for Promoting Corridor Utilization

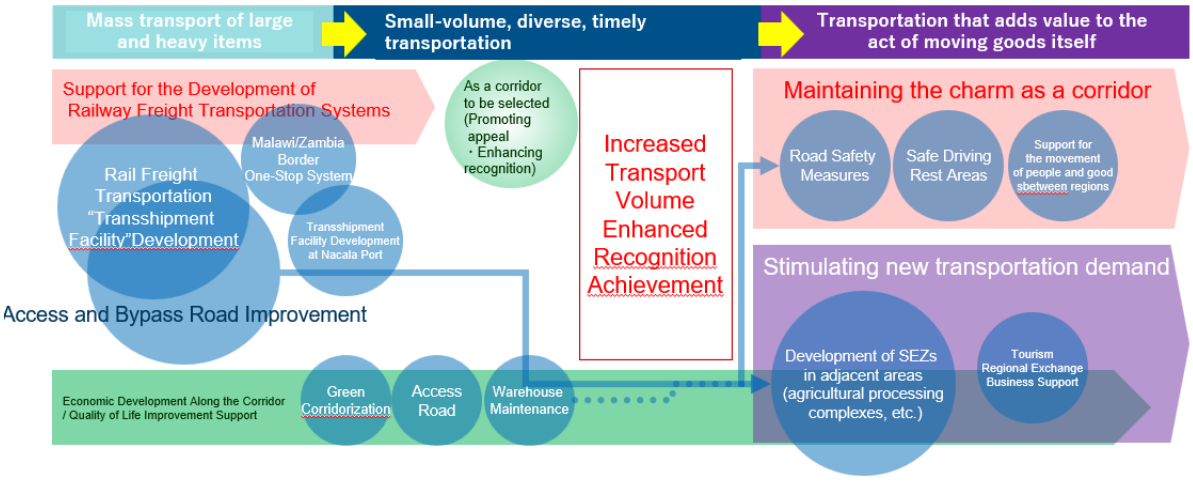
To leverage the five development potentials (proposals) outlined above, considering the current status and challenges of the Nacala Corridor summarized in previous chapters, the following phased support scenario is deemed effective. Specifically, the following stages are proposed (an example applying this support scenario to Malawi's situation is supplemented in [3-1]).

- **Support for Establishing a "Rail Freight Transport System**": The distinctive feature of the Nacala Corridor is its rail freight transport system connecting ports directly across the three countries. Given the current logistics realities in each country, it is reasonable to view this system not as competing for transport demand with other adjacent corridors, but rather as the well-developed Nacala Corridor handling the incremental international and intra-regional transport demand arising from each country's economic development. To promote corridor development, initial environmental improvements supporting this system's establishment are crucial. Specifically, as shown in Figure 3-1, these include the development of transshipment facilities in inland countries (between road and rail), the improvement of access roads to such facilities, the construction of bypass roads to avoid existing urban areas, and the development of transshipment facilities at the Nacala Port.
- **Recognition and Selection of the Nacala Corridor:** Through the above infrastructure development, it is crucial that the corridor is first selected and utilized as a transport route. To achieve this, effectively communicating the corridor's features and advantages to ensure its recognition as a corridor is vital. These efforts aim to increase freight volumes within the Nacala Corridor.
- **Maintaining the Corridor's Appeal**: As freight volumes increase on the selected Nacala Corridor, implementing various measures to maintain its appeal as a corridor is vital. Specifically, this requires continuous improvement of infrastructure (both hard and soft) to ensure safety on the corridor roads, provide rest facilities necessary for safe driving, and support the movement of people and goods between regions.
- **Stimulating New Transport Demand**: Alongside "Maintaining the Corridor's Appeal," it is necessary to implement public infrastructure development based on the movement of people and

goods generated along the selected corridor to ensure industrial investment opportunities are not missed. Specifically, fostering industry through the development of SEZs adjacent to rail freight stations and leveraging the road transport infrastructure developed as a transport corridor to connect to tourism, intra-regional exchange, and new business creation will further promote corridor development.

- **Support for Economic Development and QOL Improvement Along the Corridor**: Parallel to establishing the rail freight transport system described above, it is crucial to provide support for creating new industries and services with potential to generate value, thereby contributing to economic development along the corridor. Concurrently, continuous support to enhance the QOL of residents along the route must be maintained.

Figure 3-1 presents these initiatives as a phased support scenario based on a chronological sequence.



Source: JST

Figure 3-1 Phased Support Scenario (Draft) for Promoting Corridor Utilization

(3) Projected Future Freight Demand in the Nacala Corridor

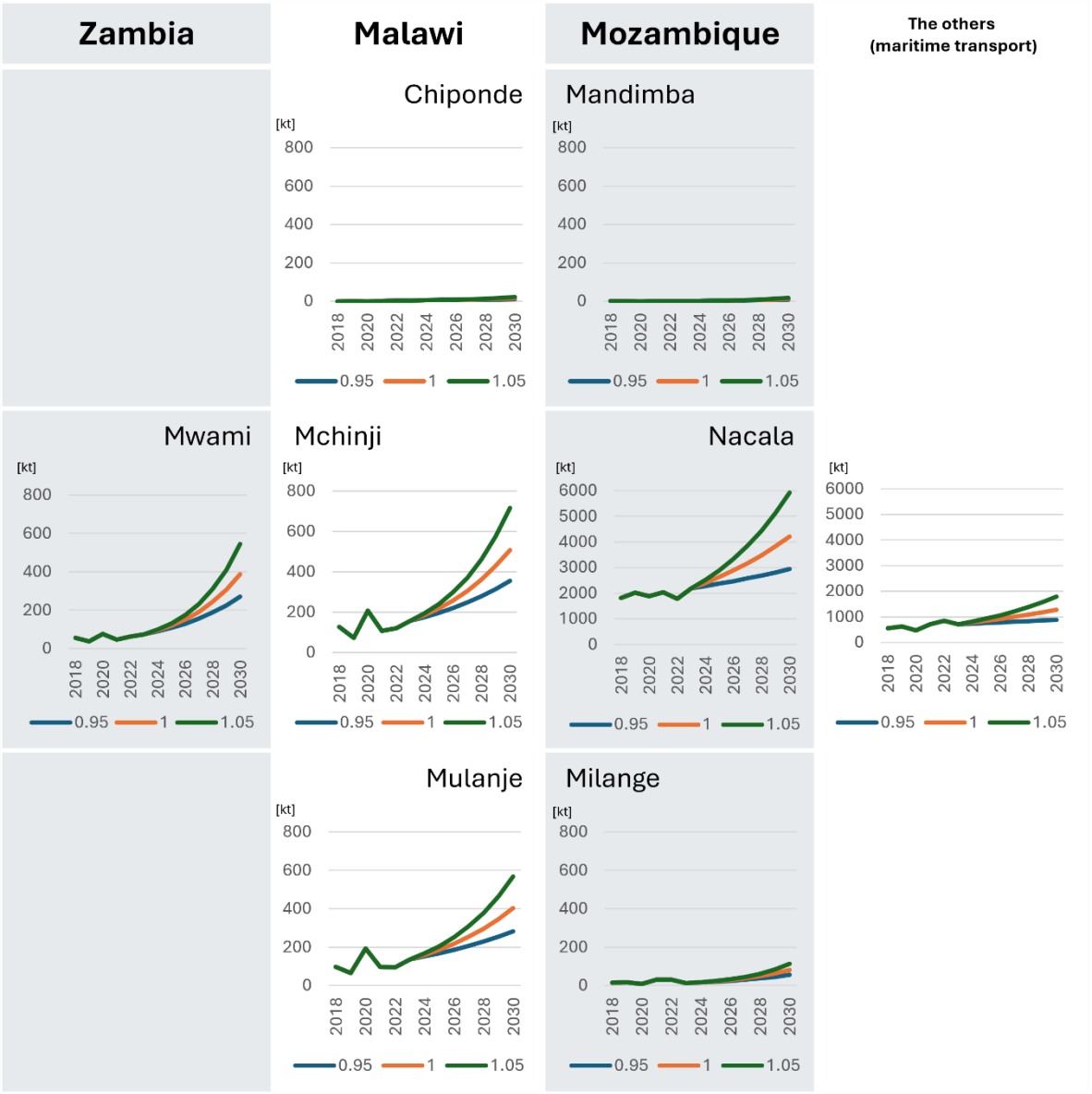
When considering support projects for countries along the corridor based on the above support scenario, it is necessary to consider the future demand for freight transport via the Nacala Corridor. Therefore, border crossing freight volumes by origin/destination were calculated using historical data on transport volume changes and economic indicators (nominal GDP) for cargo arrival destinations. The four target border crossings along the Nacala Corridor are as follows.

Source: JST

Figure 3-2 Borders and Ports of the Nacala Corridor

The nominal GDP (local currency) used as the economic indicator was referenced from the IMF International Monetary Fund, World Economic Outlook Database, April 2025. The results are shown in Figure 3-3. For export cargo, the average year-on-year cargo growth rate from 2018 to 2023 was applied to calculate Figure s for 2024 onwards. For import cargo, it was assumed to increase in line with changes in the nominal GDP (local currency) of the destination countries. The year-on-year GDP forecast values from 2024 to 2030 were multiplied by the previous year's cargo volume to calculate the Figure s.

Figure 3-3 The graph labels marked as 1 correspond to these. The 2030 forecast values are 15.1 kt for westbound freight and 12.8 kt for eastbound freight at the Chiponde/Mandimba border. Westbound cargo at the Mulanje/Milange border is 392.0 kt, eastbound is 80.9 kt; westbound cargo at the Mwami/Mchinji border is 388.0 kt, eastbound cargo volume is 508.6 kt; cargo unloaded at Nacala Port is 4,798.5 kt, and cargo loaded is 1,278.2 kt. Furthermore, since it is possible that the calculated rates of change may not persist after 2024, values adjusted by ±5% (labeled 0.95 and 1.05 on the graph) are also illustrated.



Note: The graph on the right side of the border shows eastbound cargo transport, while the graph on the left shows westbound cargo transport. Actual measurements are shown up to 2023, with estimates for 2024 onwards. For the Malawi-Mozambique border, cargo transiting through Malawi is not included. Only the Nacala graph uses a different scale.

Source: JST

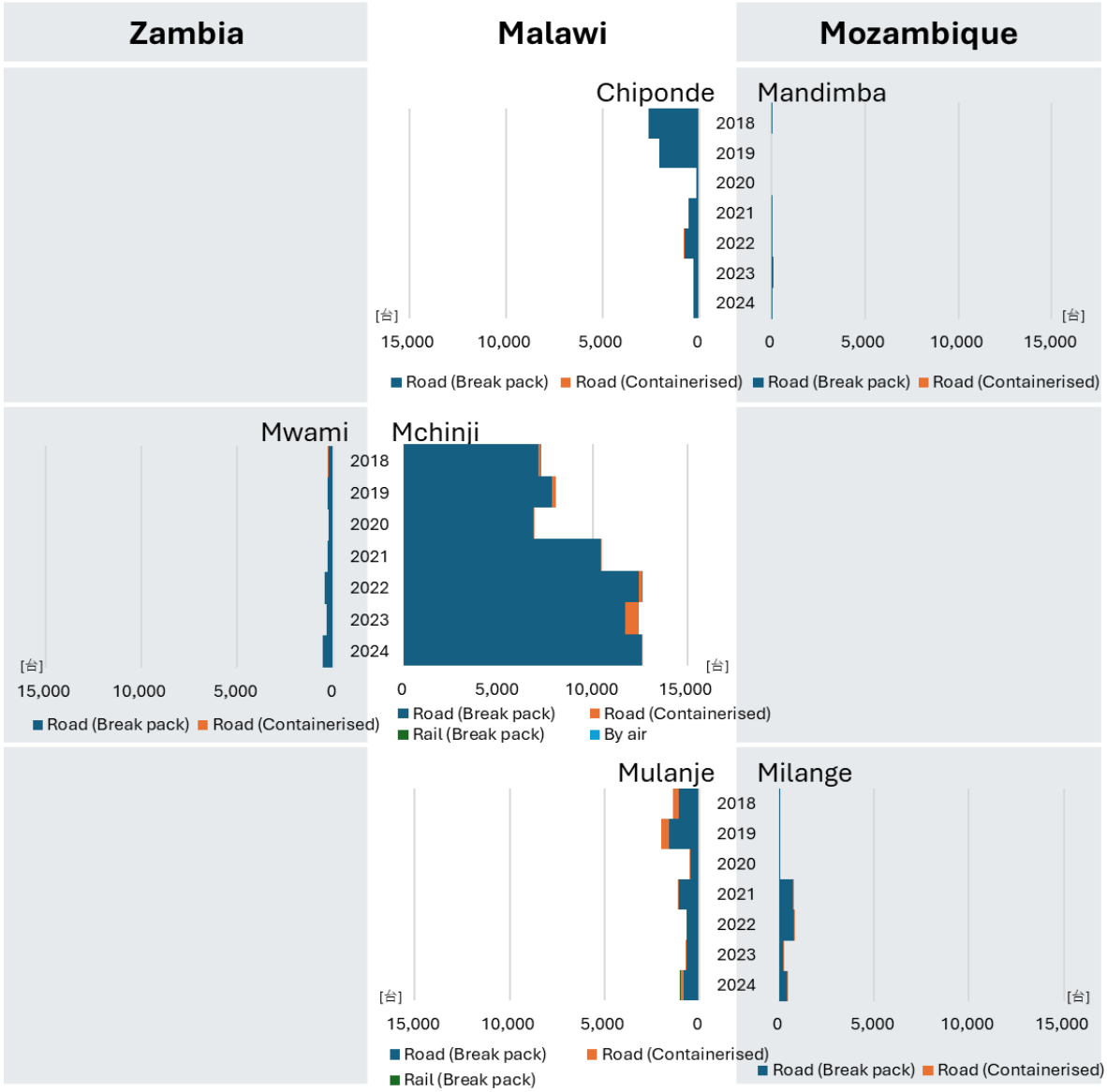
Figure 3-3 Cargo Volume Forecast at Each Border

To perform the above demand forecasts, we analyzed and organized the current situation, including the number of vehicles crossing the border, the types of goods transported, and the countries of origin and destination for exports. The analysis results are shown in the following sections 1) to 3).

1) Current Analysis 1: Number of Vehicles Crossing the Border

As part of the current analysis, we confirmed the types and numbers of trucks crossing the border. The number of trucks crossing borders along the Nacala Corridor each year from 2018 to 2024 is as shown in Figure 3-4. It is evident that more trucks enter Malawi than exit. Particularly at the Mwami/Mchinji border with Zambia, in 2024, 15 times more vehicles crossed into Malawi than exited, making it the border with the highest number of import trucks compared to any other border.

Furthermore, within the Nacala Corridor, Mozambique and Malawi share two border crossings: the northern Chiponde/Mandimba border and the southern Mulanje/Milanje border. Data shows the Mulanje/Milanje border is used 2.9 times more for imports and a staggering 28 times more for exports than the northern crossing. Finally, examining the cargo type of passing trucks reveals that break bulk (listed as Break pack) constitutes the vast majority at all border crossings, with container cargo being handled only minimally.



Note: The graph on the right side of the border shows eastbound truck traffic, while the graph on the left shows westbound truck traffic.

Source: JST

Figure 3-4 Number of vehicles crossing the border

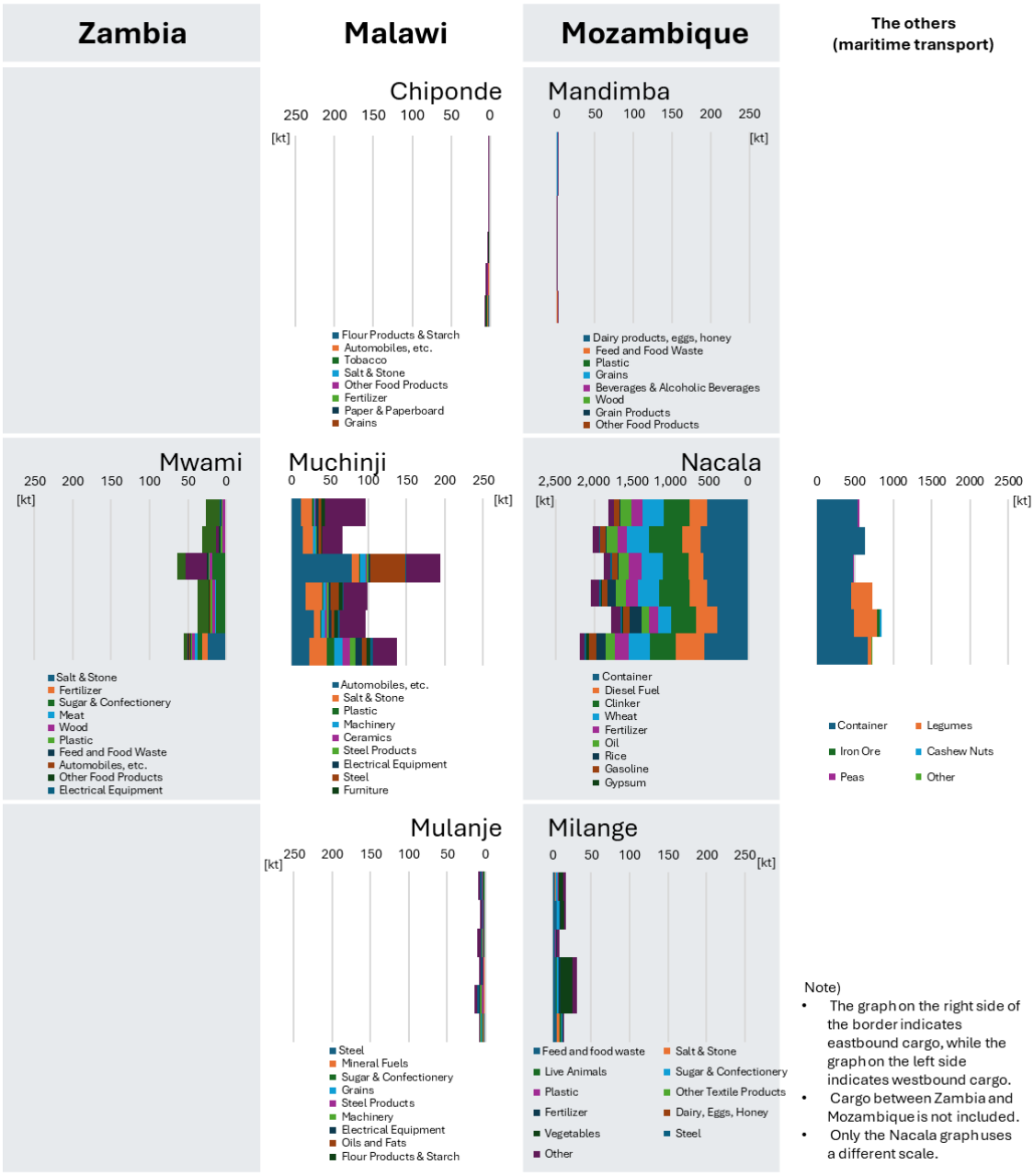
2) Current Situation Analysis 2: Transport Volume Crossing Borders (by Item)

The trends in transport volume and items crossing each border and Nacala Port from 2018 to 2023 are summarized in Figure 3-5. Data for border crossings was collected and compiled from Malawi Customs data, while port cargo data was sourced from the CFM reports of the Mozambique Railways

and Ports Authority. Customs data is classified by two-digit HS codes, while CFM data uses its own classification system. Fundamentally, the higher the number of vehicles crossing a border or in a particular direction (as shown in), the more cargo is being transported.

At the Chiponde/Mandimba border, there is a gradual increase, particularly in Malawi's imports, but compared to other borders, very little cargo passes through. Conversely, at the Mulanje/Milange border, also on the Malawi-Mozambique border, in 2023, approximately 1.6 times more cargo passed for Malawi's imports and approximately 6.2 times more for exports. In 2021 and 2022, the volume of goods passing through increased due to livestock exports, but this has stabilized in 2023. At the Mwami/Mchinji border, similar to the vehicle traffic graph, Malawi imports dominate. This peaked in 2020, driven by imports of vehicles and steel products into Malawi. Notably, both the Mulanje/Milange and Mwami/Mchinji borders do not show a monotonically increasing trend. The rate of change will be analyzed at the end of this chapter.

Finally, examining cargo handled at Nacala Port reveals that imported cargo is 3.1 times greater than exported cargo via sea transport. While container cargo was scarcely seen at the Malawi and Zambia borders, the port data indicates cargo is being unloaded in container form. In 2022, the volume of exported cargo via sea transport saw a slight increase, while imported cargo decreased slightly, showing a gradual overall increase in both exports and imports.



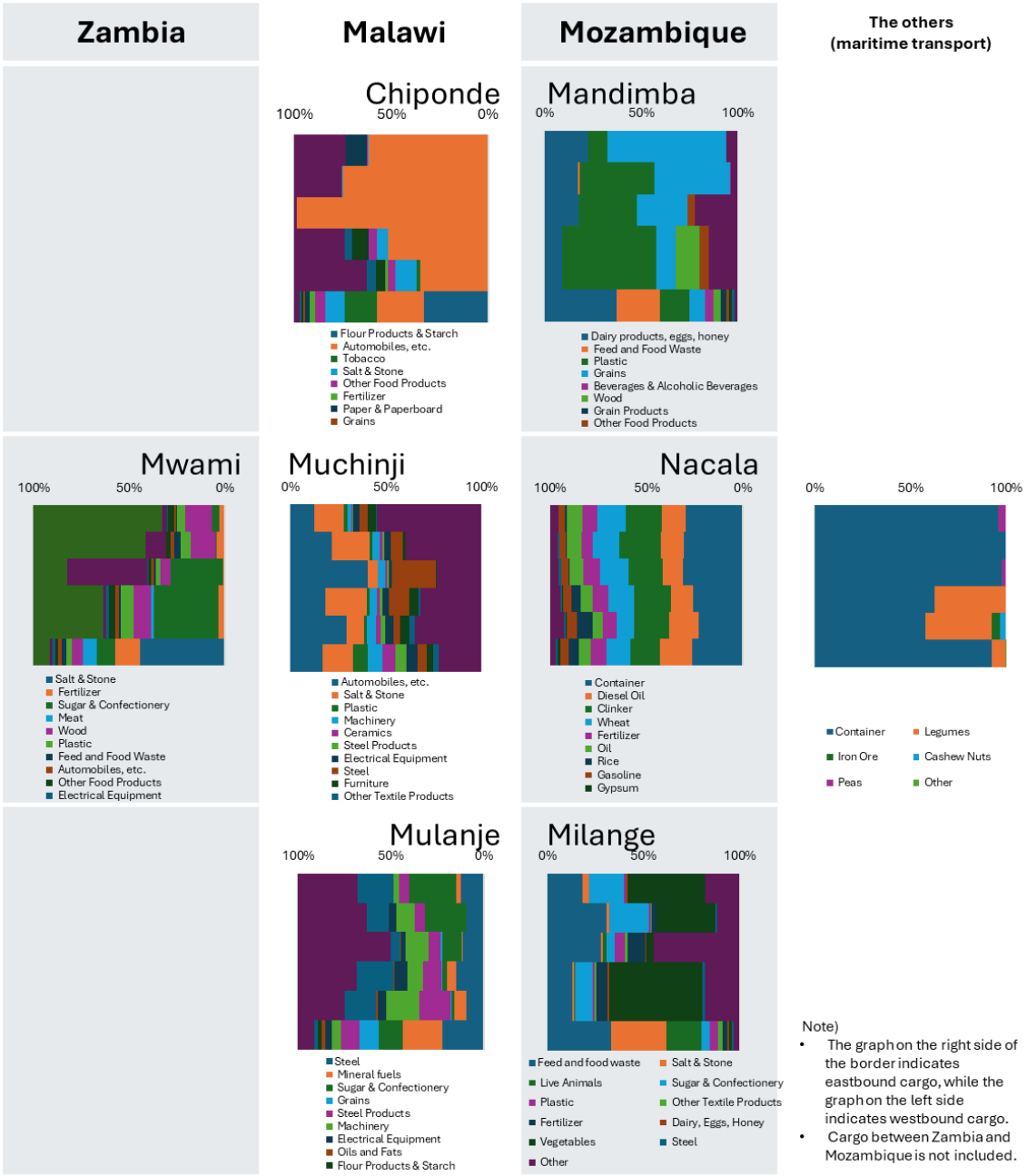
Note: The graph on the right side of the border shows eastbound cargo, while the graph on the left shows westbound cargo. For the Malawi-Mozambique border, cargo transiting through Malawi is not included. Only the Nacala graph uses a different scale.

Source: JST

Figure 3-5 Transported Cargo Volume Crossing the Border (by Item)

Figure 3-6 shows the percentage share of each transported item relative to total annual imports and exports (set at 100%). At the Chiponde/Mandimba border, dairy products, eggs, and honey (HS Code: 04) were transported most frequently eastward in 2023; this refers to poultry eggs. Feed and plastic products were also transported in significant quantities. Conversely, milled products were transported most frequently westward in 2023, though automobiles were also transported in large numbers. At the Mwami/Mchinji border, automobiles are steadily transported eastward. Meanwhile, westbound shipments of salt and stone materials surged in 2023; this stone is gypsum used in paint

raw materials and construction materials. Finally, at the Mulanje/Milange border, feed is transported eastward, while steel is shipped westward.



Note: The graph on the right side of the border shows eastbound cargo, while the graph on the left shows westbound cargo. For the Malawi-Mozambique border, cargo transiting through Malawi is not included.

Source: JST

Figure 3-6 Percentage of Goods Crossing the Border

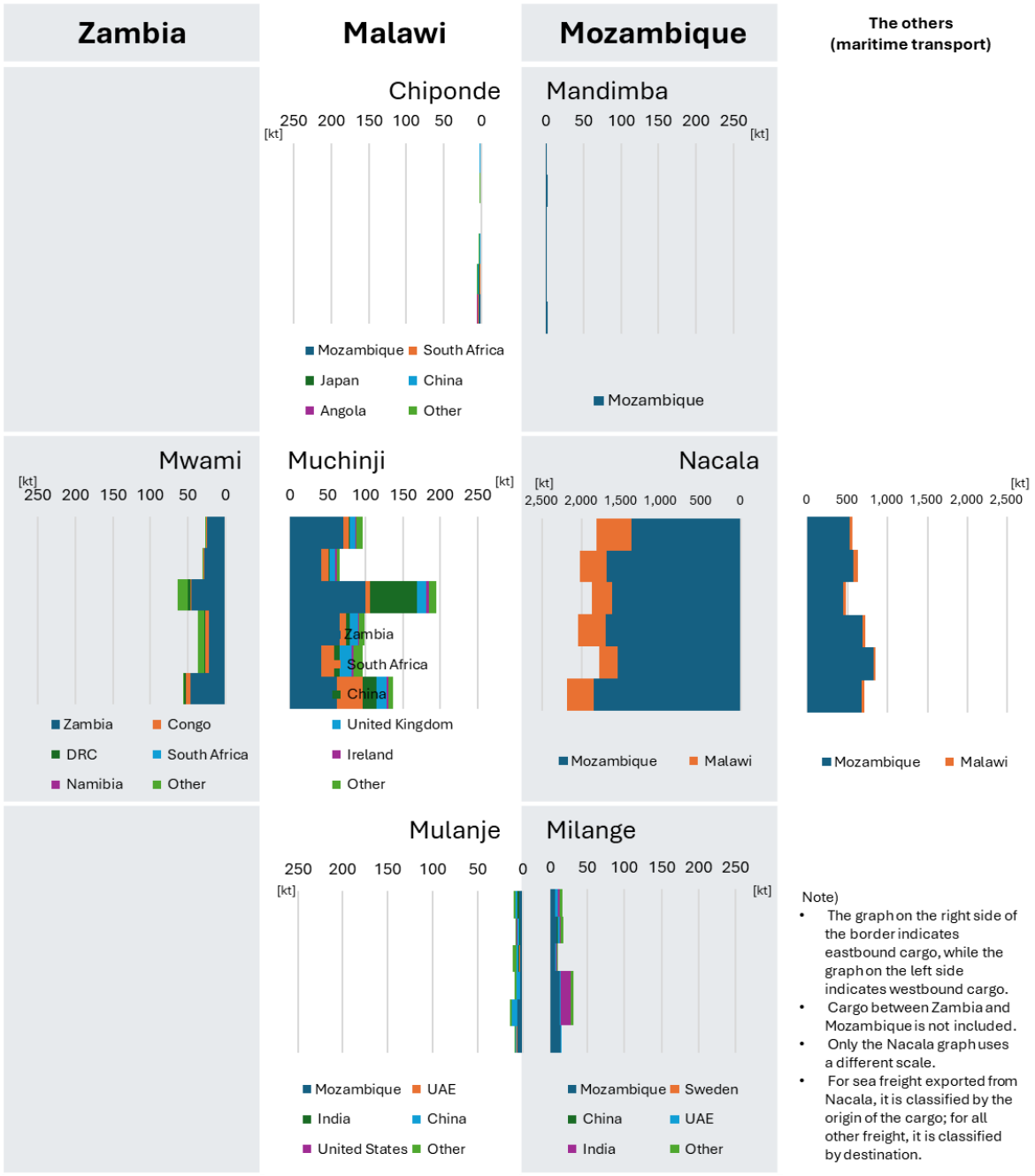
3) Current Situation Analysis 3: Volume of Freight Crossing Borders by Origin/Destination

Next, for the same cargo types as above, graphs summarizing data by final destination are shown at Figure 3-7. However, for maritime cargo departing from Nacala Port, data is only shown by cargo origin. Since this reflects final destinations, countries other than Zambia, Malawi, and Mozambique

are also included. Figure 3-8 shows the percentage share of cargo for each final origin/destination relative to total annual imports and exports (set at 100%).

The graph below shows that cargo crossing the Chiponde/Mandimba border is predominantly destined for or originating from Mozambique. For eastbound cargo, all shipments over the past six years have been transported to Mozambique. This indicates that while some goods may be imported into Mozambique, processed, and then exported from Nacala Port, there is no direct maritime cargo flow. Regarding cargo crossing the Mwami/Mchinji border, most cargo heading westbound is destined for Zambia, but a certain volume is also transported to the Republic of the Congo and the Democratic Republic of the Congo in the west. Regarding cargo transiting the Mulanje/Milange border, it is clear that it consists solely of cargo originating from or destined for Mozambique, or non-African cargo being transported to the port. Specifically for 2023, it is evident that cargo originating from or destined for Mozambique constitutes the vast majority of transit cargo.

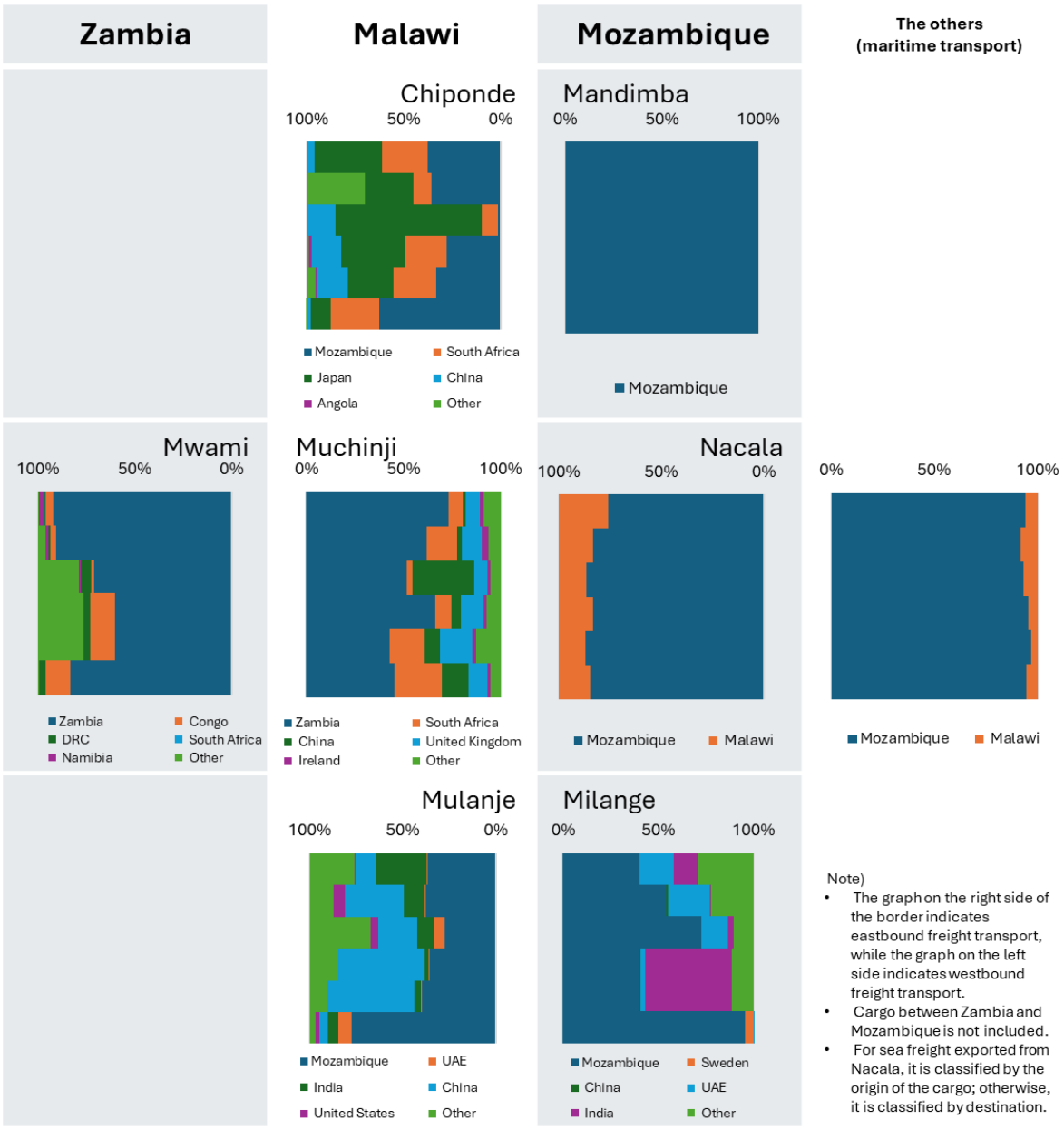
Regarding cargo transported directly from Nacala Port to Malawi, its volume is significantly larger than that at the Chiponde/Mandimba and Mulanje/Milange borders. This is due to the large volume of cargo transported by rail. Figure 3-9 shows the volume of general cargo handled by Nacala Logistics by origin/destination. While data for 2018 to 2023 is unavailable, the 2024 volumes for Malawi>Nacala and Nacala>Malawi nearly match this difference. This indicates Nacala Logistics is enhancing its rail transport services, leading to increased cargo volumes via rail.



Note: The graph on the right side of the border shows eastbound freight, while the graph on the left shows westbound freight. For the Malawi-Mozambique border, freight transiting through Malawi is not included. Only the Nacala graph uses a different scale. Sea freight exported from Nacala is classified by its origin port; all other freight is classified by its destination port.

Source: JST

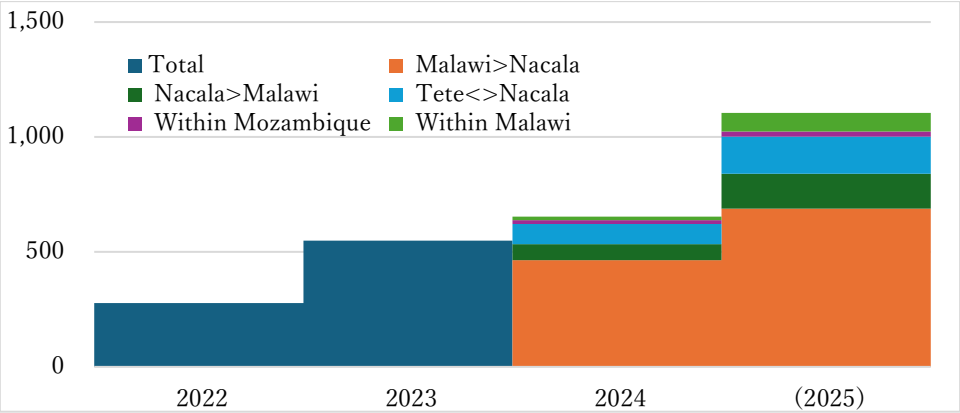
Figure 3-7 Cargo Volume Crossing Borders by Origin/Destination Country



Note: The graph on the right side of the border shows eastbound freight transport, while the graph on the left shows westbound freight transport. For the Malawi-Mozambique border, freight transiting through Malawi is not included. For maritime freight exported from Nacala, it is classified by the origin of the cargo; all other freight is classified by destination.

Source: JST

Figure 3-8 Ratio of Origin/Destination Countries for Goods Crossing Borders



Note: Only total values are shown for 2022 and 2023. 2025 values are projections based on 2024 data.

Source: JST

Figure 3-9 Rail Freight Volume by Origin/Destination [k-ton]

3.1.1 Proposal for Grant-Funded Projects in Zambia

(1) Grant Project Candidates and Their Locations by Sector in Zambia

Based on the utilization status of the Nacala Corridor identified through field surveys and expectations from local stakeholders, we have compiled proposed projects where public development is expected to yield high effectiveness and broad ripple effects.

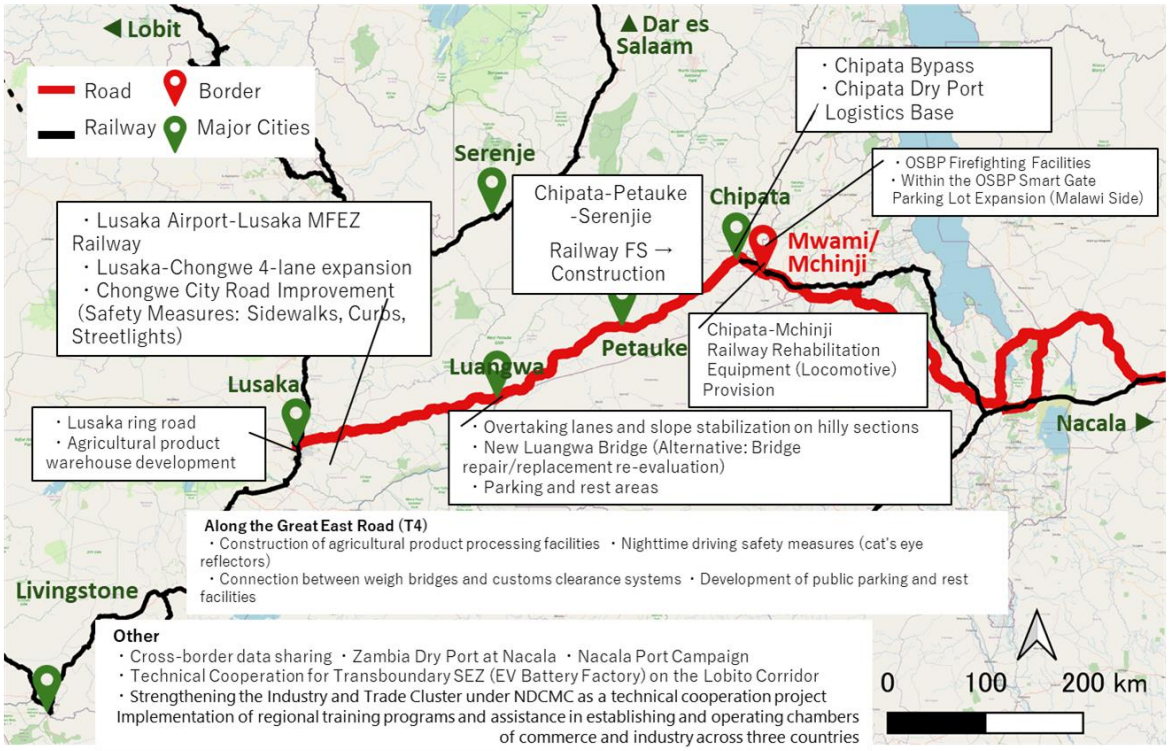
Table 3-2 lists existing projects in each sector on the left and proposed projects, including local requests, on the right. It also proposes projects feasible under the grant aid projects proposed in this study (projects in red are those where RDA could serve as the implementing agency). To illustrate the spatial relationships of these projects, a project location map was created (Figure 3-10).

Among these, the Logistics Base and access road in Chipata were proposed as projects contributing to the development potential discussed in the previous chapter and as high-priority initiatives in the phased scenario. Their overview is provided in (2).

Table 3-2 List of Existing and Proposed Projects

Sector	Existing Projects ▲Under Consideration/Planned ●In Progress ■Completed (Responsible Ministry/Donor)	Projects Requested by Local Authorities Projects Proposed by Joint Ventures (Potential alternative to Luangwa Bridge, grant-based cooperation project by RDA)
Road	■Luangwa-Chipata Road Rehabilitation (RDA/EU) ●Katete-Chanida Road Rehabilitation (RDA/PPP) ● Lusaka-Luangwa Road TRESA FS (RDA/WB) (No construction funding) ●Axle Load Scale Maintenance (RDA/AfDB)	• **Lusaka Ring Road** • Lusaka-Chongwe 4-lane expansion • **Chongwe Urban Road Improvement (Safety Measures: Sidewalks, Curbs, Streetlights)** • Luangwa Hill Section: Passing Lane & Slope Stabilization • Driver Parking Areas within Luangwa (Other Locations) • **Chipata Bypass** • Connection to Customs System at Weigh Bridge • New Luangwa Bridge • (Luangwa Bridge Repair/Replacement Re-evaluation) • Nighttime Driving Safety Measures (Cat's Eye Markers) • **Vulnerability Mitigation for Trunk Roads Against Climate Change (River Disaster Information Warning System, Strengthening Drainage Facility Capacity including Bridges combined with Retention Ponds and Irrigation Facility Development: Technical Program)**
Railways	■Chipata-Petauke-Serenjie Railway Pre-FS (MTL/China)	• Chipata-Petauke-Serenjie Railway FS → Construction (PPP) • Chipata-Muchinji Railway Rehabilitation and Equipment (Locomotive) Provision • Lusaka Airport-Lusaka MFEZ Railway
Border	■Muchinji OSBP Construction	• Muchinji OSBP Firefighting Facilities • Cross-border sharing of border data • Expansion of parking lot within Muchinji OSBP Smart Gate (Malawi side)
Logistics	▲Chipata Dryport (Chipata City Council, ZRL (Land), Private Sector)	• **Chipata Dry Port/Logistics Base** • Zambia Dry Port in Nacala
Industry	▲ Construction of 5 MFEZs and 3 Industry Parks (ZDA)	
Agriculture	● Farm Block Development Program (MA) ●Sustainable Agriculture Financing Facility (MA) * Provision of fertilizers and seeds to farmers	• Establishment of agricultural product warehouses around Lusaka • Construction of agricultural product processing facilities
Three countries	●NDCMC ●SATCP (WB)	• Nacala Port Campaign • As part of the organizational strengthening technical program under the Industry and Trade Cluster of NDCMC, implementation of regional training and assistance with the establishment and operation of chambers of commerce and industry in the three countries.

Source: JST



Source: JST

Figure 3-10 Project Location Map: Requests from the Field and JST

(2) Proposed Grant Aid Project: The Project for Chipata Logistics Base Construction

As shown in Section 3.1, it is crucial to advance logistics infrastructure development, particularly in the early stages of corridor development, to maximize utilization of the "rail transport system" characteristic of the Nacala Corridor. While railways in Malawi and Mozambique have undergone recent upgrades and improvements, their transport systems and infrastructure remain insufficient to support the development of rail freight transport within the Nacala Corridor. Meanwhile, it has been decided that after the completion of the railway rehabilitation between Lilongwe and Chipata, rail freight transport to Chipata (Nacala Port) will commence. This will be carried out by the railway operator, Nacala Logistics (under its subsidiary, the Malawi government-funded railway operator: CEAR), based on an agreement with the Zambia National Railways (the owner of the railway facilities on the section from the Malawi border to Chipata). Therefore, it is crucial to develop a location for cargo loading and unloading (rail-to-truck transshipment) at Chipata, the anticipated terminus of the reopened railway, along with connecting access roads. Consequently, as a grant project in Zambia, we propose the construction of a "Transshipment Facility for Rail Freight" and an "Access Road (part of a bypass road)" in Chipata.

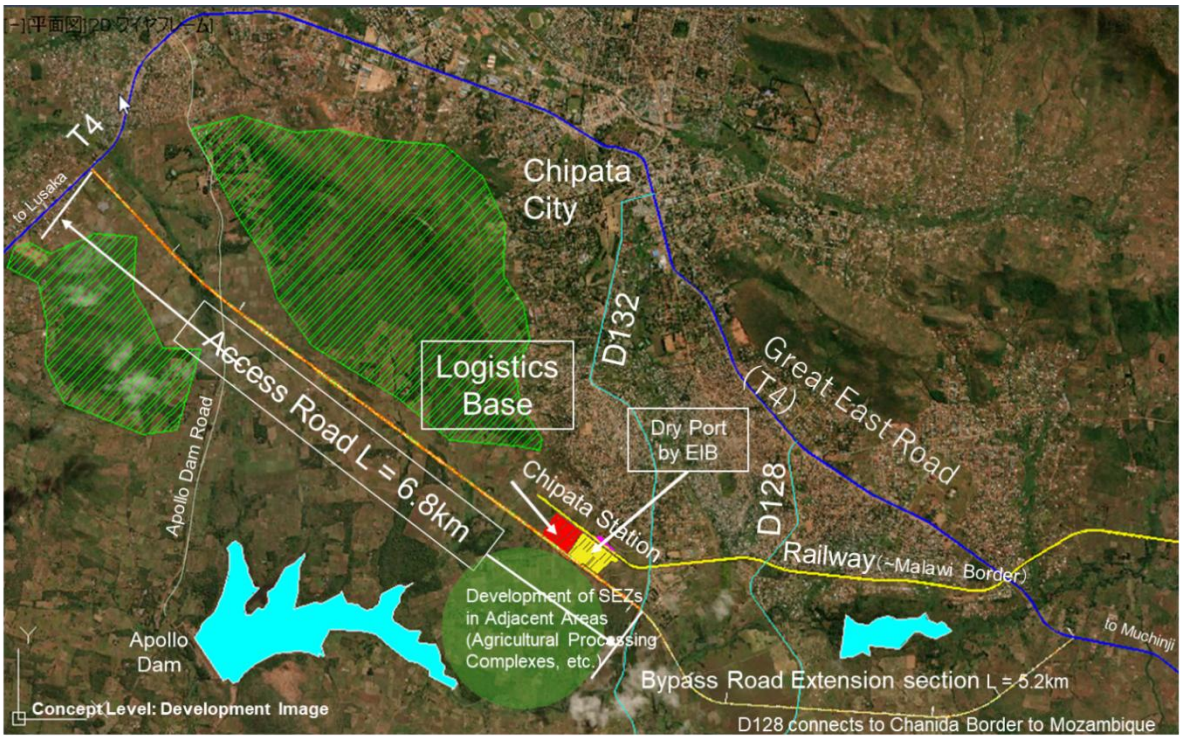
1) Project Objective

This project aims to enhance the convenience of rail freight transport connecting Nacala Port to Chipata City, Zambia. It involves constructing a cargo handling facility adjacent to Chipata Station and an access road to the facility. This will reduce transport costs and stimulate demand for the Nacala Corridor.

Additionally, the AfDB and EIB have been implementing a rehabilitation project for the Great East Road (Lusaka-Chipata section), part of the Nacala Corridor, since 2011. As part of this project, the EIB designed the "Chipata Dry Port" in 2014, a cargo transshipment facility including customs-related equipment; however, construction has not yet commenced. Regarding the construction of this facility, while support using remaining loan funds for design revisions and contractor procurement is being considered before the project's loan disbursement deadline (December 2026), the EIB design has been pointed out as having insufficient capacity to meet current cargo demand. Therefore, the facility development under this project remains highly significant even if EIB support is implemented.

2) Target Region

The project target area is the region shown in Figure 3-11, covering Chipata District and Chipata City. It is located northeast of the Malawi border at Mwami/Mchinji, with the Great East Road (T4) and the railway from Malawi (terminating at Chipata Station) passing nearby. The population of Chipata District is approximately 330,000, while the population of Chipata City is approximately 200,000 (2022 estimates, Central Statistical Office).



Source: JST

Figure 3-11 Location Map of Grant Projects in Zambia

3) Demand Forecast

Demand projections were made based on the assumption that the current volume of cargo crossing the eastern Zambian border (Mwami and Chanida borders) will change with Zambia's industrial and economic growth, and that part of this cargo will be transported via the Chipata Logistics Base. For imports, the demand volume for 2035 was forecasted based on the nominal GDP growth rate year-on-year from 2019 to 2024. For exports and transit cargo, it was forecasted based on the trade volume change rate year-on-year for the same period. Nominal GDP (local currency), used as an economic indicator, was referenced from the IMF International Monetary Fund, World Economic Outlook Database, April 2025. Customs data obtained from the ZRA was used for transit volumes at each border. However, for rail transport, which is suitable for bulk cargo, the impact of future changes not following past trends is significant. Therefore, interviews were also conducted with local private operators and government-affiliated think tanks (Zambia Institute for Policy Analysis and Research, Zambia Cargo & Logistics Limited, Africa Global Logistics Zambia, Africa Global Logistics Nacala, Africa Global Logistics Malawi). The results are shown in the table below.

Table 3-3 Items potentially exportable via the Chipata Logistics Base and projections for 2035

Item	Projected
Copper	• Total exports to **triple** current **levels**, with **20%** via Chipata LB • Total exports reach **3 million tons**, with 10-15% via Chipata LB (The government has set a target of 3 million tons annually by 2031, but the respondent company believes this is achievable by 2035) • Total exports reach **3 million tons**, with **15%** via Chipata LB • **50,000 tons** (possibly even **200,000 tons**)
Critical Energy Transition Minerals (e.g. lithium, cobalt, manganese)	• Total exports to **triple** current **levels**, with **20%** via Chipata LB • Manganese: Potential for **300,000 tons**, with **30%** via Chipata LB
Precious stones	• Total exports to **triple** current **levels**, with **20%** via Chipata LB
Wheat	• Total exports to reach **1 million tons,** with **20%** via Chipata LB • No potential
Maize	• Total exports increase to **2.5 times** the current **level**, with **30%** of that via Chipata LB • **20%** of total exports • Combined with soybeans**, 15,000 tons** (potentially even **340,000 tons**) • Unlikely
Soya Beans	• Total exports reach **1 million tons**, with **30%** via Chipata LB • **Combined** with Maize**: 15,000 tons** (potentially up to **340,000 tons**) • No export potential
Tobacco	• Total exports increased to **2.6 times** the current **level**, with **30%** of that via Chipata LB • **60%** of total exports • Difficult to utilize (currently restricted in Mozambique)
Manufactured substitutes	• Total exports increase to **2.6 times** the current **level**, with **30%** of that via Chipata LB
Beef	• Total exports increase to **4.0 times** current levels, with 30% via Chipata LB • No potential
Avocado	• Total exports increase to **2.6 times** the current **level**, with **20%** of that via Chipata LB
Fertilizer	• Total exports to increase to **2.6 times** the current **level**, with 20% of that volume transiting through Chipata LB • 100,000 tons (to Malawi, Botswana, etc.) • High potential
Cotton	• Total exports increase to **2.6 times** the current **level**, with 25% of that volume transiting through Chipata LB • Total exports reach **50**,0**00 tons**, with **30%** via Chipata LB

Source: JST

Table 3-4 Items potentially imported via Chipata Logistics Base and projections for 2035

Item	Projected
Fuels (Oil, Gas)	• Total national imports to **double** current **levels**, with **20%** via Chipata LB • High potential (requires investment in transport wagons) • **20%** (excluding diesel)
Vehicles, parts, and accessories	• Total national imports to **double** current **levels**, with **20%** via Chipata LB • High potential (Used Vehicles)
Electrical machinery, equipment, and parts	• Total national imports will double from current **levels**, with 15% of that volume coming through Chipata LB
Pharmaceuticals	• Total national imports will increase to **1.5 times** the current level, with 15% of that volume coming through Chipata LB.
Cereals	• The country's total imports will increase to **1.5 times** the current level, with 15% of that coming via Chipata LB • Port infrastructure investment required for silos, etc.
Clinker	• The country's total imports will increase to **1.5-2 times** the current level, with 20% of that volume passing through Chipata LB. • High potential
Fertilizer	• None. Transition to net exporter. • **100,000 tons** (possibly up to **300,000 tons**) • **50%** of Eastern State consumption • Nearly unnecessary
Sulphur	• Total national exports reach 3 million tons, accounting for **15%** of **all imports** • **10-15%** of the mining market
General cargo	• Potential exists (clothing, household goods, etc.)

Source: JST

Based on the above, we calculated the future demand for cargo via the eastern Zambia border in 2035 and the volume that could be transported via the Chipata Logistics Base. The results are shown in the table and Figure below. For items where the demand calculated from the interview results was greater than the estimated demand using macro indicators, the latter result was adopted to calculate demand. Consequently, the potential cargo demand passing through the eastern border in 2035 was calculated as 12.92 million tons/year for inbound and 3.10 million tons/year for outbound. Of this, the transportation demand via the Chipata Logistics Base was calculated as approximately 1,000 tons/year (75.3 wagons/day) for inbound and approximately 1,500 million tons (133.6 wagons/day) for outbound, totalling 3.10 million tons outbound.

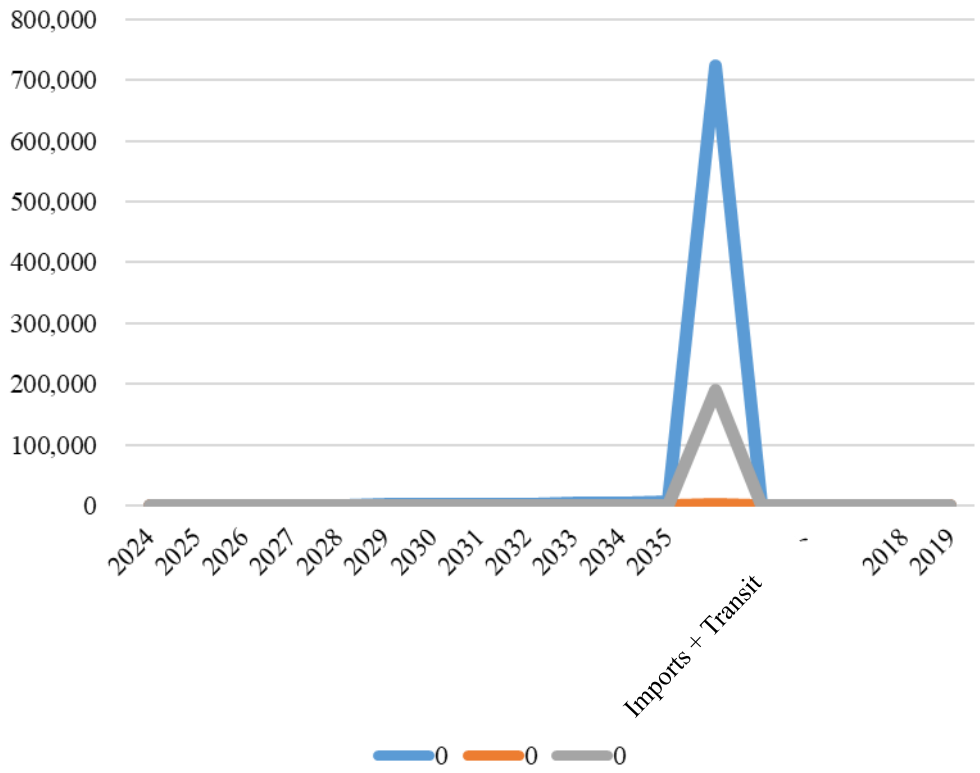
Table 3-5 Chipata Logistics Base Demand Volume in 2035

Export Item	ton/year	wagon/year	wagon/day
Copper	450,000	11,250	36.3
Lithium・Cobalt	320,287	8,007	25.8
Manganese	90,000	2,250	7.3
Precious stones	6,776	169	0.5
Wheat	200,000	5,000	16.1
Maize	24,895	622	2.0
Soybeans	300,000	7,500	24.2
Tobacco	45,840	1,146	3.7

Export Item	ton/year	wagon/year	wagon/day
Beef	4,860	122	0.4
Avocado	1,844	46	0.1
Fertilizer	75,140	1,878	6.1
Cotton	137,500	3,438	11.1
TOTAL	**1,657,142**	**41,429**	**133.6**
Imported Items	**ton/year**	**wagon/year**	**wagon/day**
Fuels (excluding diesel)	388,466	9,712	31.3
Vehicles, parts, and accessories	4,491	112	0.4
Electrical machinery, equipment, and parts	4,595	115	0.4
Pharmaceuticals	4,933	123	0.4
Cereals	72,551	1814	5.9
Clinker	8,440	211	0.7
Sulphur	450,000	11250	36.3
TOTAL	**933,476**	**23,337**	**75.3**

Note: Assumes 310 days of operation per year. Assumes each wagon carries 40 tons of cargo.
Manufactured substitutes and general cargo were also mentioned as possible items during the hearing, but they are not included in the above.

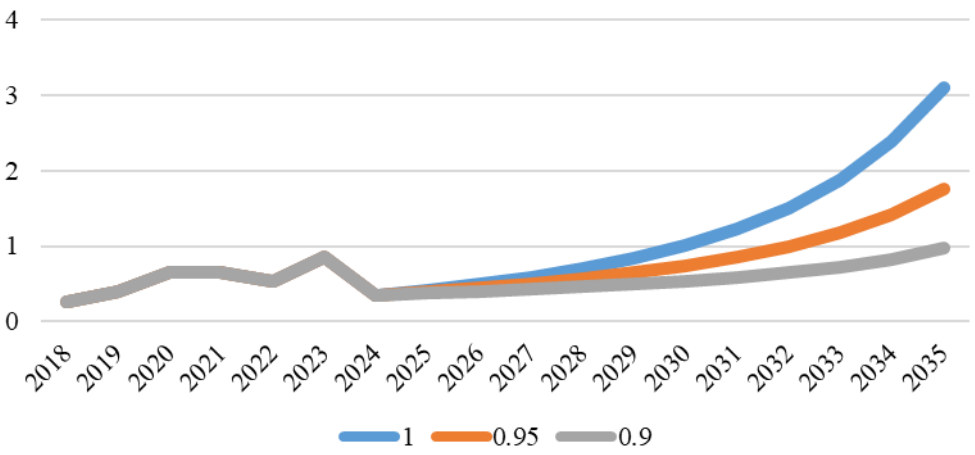
Source: JST



Note: Calculations also performed for growth rates reduced by 5% (0.95) and 10% (0.9).

Source: JST

Figure 3-12 Inbound cargo demand volume crossing the eastern border



Note: Calculations were also performed using growth rates reduced by 5% (0.95) and 10% (0.9).
Source: JST

Figure 3-13 Outbound cargo demand volume passing through the eastern border

4) Facilities, Equipment, etc.

The following outlines the proposed facility scale and project scope for the "access roads" and "logistics base" to be developed under this project.

- **Logistics Base Development (Facility Area: 69,000 sqm)**: Construction will be carried out to create space for installing rail freight transshipment facilities adjacent to the existing railway station, including site preparation (grading). The planned construction includes a concrete platform (300m × 5m), on-site roads (1,060m), an on-site parking lot (for 100 vehicles), on-site drainage facilities, protective barriers/fences, tracks/turnouts, and a management building. (Superstructure elements such as tracks/turnouts, signal systems, cargo handling facilities/buildings, power supply facilities, water/sewage facilities, and security facilities are planned for separate future development according to the operator's management methods).
- **Access Road (Total Width (W) = 11.5m)**: A new access road will be constructed (total length 6,840m). This road will connect directly to the aforementioned logistics base, bypassing the existing urban area from the existing main road (T4, commonly known as Great East Road). The road width is planned at 11.5m, considering economic feasibility and anticipating freight vehicles. This includes one lane in each direction (two lanes total) and full shoulders on both sides. The scope of work includes earthwork, paving, drainage, and safety facilities (one intersection signal, guardrails, lane markings, road lighting, and signage). For the paving work, considering the loads of large vehicles, the following structure is assumed: a modified asphalt surface layer (15cm), an asphalt stabilized upper base course (15cm), and a crushed stone base course (30cm).

5) Consulting Services / Soft Component Details

During project implementation, consulting services will include dialogue with private operators and technical support for initial LB operations.

6) Total Project Cost

The total estimated project cost assumed at this time is as follows. In addition to construction costs (including a 5% contingency), the project cost includes estimates for land compensation and the relocation of steel towers, which are expenses to be borne by the local government. Furthermore, detailed design and construction supervision costs were calculated at 10% of the construction costs, reflecting the fact that this is a complex project involving both roads and transshipment facilities.

- 4,881 million yen (Estimated cooperation amount (Japan side): 4,816 million yen; Republic of Zambia side: 65 million yen)

Table 3-6 Estimated Project Cost for the Chipata Logistics Base Improvement Project

Scope of Japan side			
Item	**CAPEX (USD)**	**CAPEX (JPY)**	**Remarks**
Construction Cost (BP Road)	17,981,626	2,739,680,500	
Construction Cost (Transshipment Facility)	9,383,407	1,429,655,883	
Detailed Design/Construction Supervision	2,736,503	416,933,638	Allocate 10% of construction costs
Subtotal	**30,101,536**	**4,586,270,022**	
Contingency	1,505,077	229,313,501	Allocate 5%
Total	**31,606,613**	**4,815,583,523**	
Scope of Local Government side			
Item	**CAPEX (USD)**	**CAPEX (JPY)**	**Remarks**
Land Compensation Cost	**376,500**	57,363,540	
Transmission Tower Relocation Cost	**60,000**	9,141,600	
Total	**436,500**	**65,475,000**	

Source: JST

The estimated amount for the logistics base fluctuates depending on the area settings for the cargo loading/unloading section and the internal roads. Additionally, the access road is assumed to be asphalt pavement designed for large cargo vehicles. While the target section has relatively flat terrain and the volume of cut and fill will be minimal, these earthworks still account for approximately 10% of the road construction costs; therefore, a topographic survey is necessary for a detailed calculation of quantities (the current estimate was calculated based on publicly available satellite DEM data). The calculation of the estimated cooperation amount and the breakdown of costs by item must be confirmed in detail during the preparatory survey.

7) Expected Effect

Implementing this project is expected to yield the following three effects.

Effect as an International Corridor for the Nacala Corridor: Awareness of the Nacala Corridor (integrated transport via rail freight to the Port of Nacala) within Zambia will increase. Transporting Zambia's import/export cargo via this corridor is expected to revitalize the Port of Nacala, developed under the yen loan project, and generate spillover effects for the Mozambican economy.

Effect as an Industrial Hub in Chipata: Leveraging its advantage as a logistics hub, the project is expected to stimulate private sector investment in the development of an economic zone and

agricultural processing complex around the logistics base. This is anticipated to have a ripple effect on promoting regional industry (including employment).

Improved Urban Environment in the Chipata Metropolitan Area: The construction and operation of this logistics base, combined with the development of a bypass road, will reduce the passage of large freight vehicles through the city center. This will create a safer and more pedestrian- and bicycle-friendly environment for local residents.

3.1.2 Proposal for Grant-Aid Projects in Malawi

(1) Grant Project Candidates in Various Sectors in Malawi

The Nacala Corridor in Malawi features rail and road routes that largely run parallel. The railway approaches from the west, originating in Chipata, Zambia, passing through Mchinji, Malawi, and continuing via Kanengo-Salima-Chipoka-Balaka-Nkaya. At Nkaya, it splits into branches for Liwonde and Blatayre. The Liwonde branch crosses the Nayuchi border into Mozambique. The road, meanwhile, follows a single route from Chipata, Zambia, through Mchinji, Malawi, and enters Lilongwe via the M12. However, it has been confirmed that there are three major routes eastward from Lilongwe toward Mozambique. The main trunk routes are: one via M1 from Dedza to just before Liwonde, then north on M3 to Mangochi and Chiponde (Mozambique border); and another north on S131 from Liwonde to Chiponde. An alternative route involves passing through Dedza, then taking the S127 through mountainous terrain via Golomoti, traveling on the M10, and proceeding to Chiponde via the M3 after Mangochi (Figure 3-14).

Source: JST

Figure 3-14 Route of the Nacala Corridor (Rail and Road)

Based on the utilization status of the Nacala Corridor identified through field surveys and local expectations, we have compiled proposed projects where public development is expected to yield high effectiveness and broad ripple effects. Table 3-7 lists existing projects in each sector on the left and local

request projects on the right, while proposing projects feasible through Grant Aid projects and other initiatives proposed in this work.

Table 3-7 Grant Aid Projects for Malawi (Proposal)

Sector	Existing Projects ▲Conceptual/Planned ●In Progress ■Completed	Projects Requested by Local Authorities Projects Proposed by Joint Ventures
Road	●Mchinji – Lilongwe Road Under design; to be completed within this year (no construction funding) ▲Lilongwe – Nsipe Road: Feasibility Study Planned ●Nsipe – Liwonde Road Construction scheduled to begin (AfDB) ■Liwonde – Mangochi Road Construction completed (AfDB) ●Mangochi – Chiponde Road: Feasibility Study & Design (AfDB) (No construction funding) ●Road Safety Improvements (Kampepuza, Tsangano) (WB) ●M1 & Lilongwe Bridge Improvement (Japan, Domestic, China) ▲Northern Section of Lilongwe Bridge Road Improvement (China) ●Road Asset Management (WB)	• Dedza OSBP Access Road Paving • Road Asset Management & Procurement Management • Dispatch of Experts to Road Fund • Road Authority: Information Communication System with HQ Regional Office • Main Road Traffic Safety Improvements (Cities other than Kampepuza and Tsangano) • Traffic Accident Data Sharing Database (MRTS, Police, Hospitals) and Black Spot Assessment & Countermeasures • Lilongwe Bridge Southern Section Road Improvement (Four-Lane Expansion) • Roadside Station Installation Plan and Pilot Project Implementation • Access Road Network Improvement • Overtaking Lane Improvement Project on Hilly Sections of Trunk Roads (M1, M8, M3) • **Climate Change Vulnerability Mitigation for Trunk Roads (Enhancing Drainage Facility Capacity Including Bridges: Combining River Disaster Information Warning Systems, Flood Retention Areas, and Irrigation Facility Improvements: Technical Project)** • **Early Warning System for Cyclone Damage Using Satellite Data**
Railways	●Reconstruction of Railway Bridges between Lilongwe and Chipata ●Reconstruction of Makhanga-Marka Railway (Domestic) ●Northern Railway FS connecting to TAZARA (Domestic)	• Upgrade of Entire Railway Line: 18 tons/axle → 20.5 tons/axle • Support for improvements to enhance passenger railway services (accurate operation) • Railway Station Improvements • Promotion to Transport Operators
Common		• Development of dry ports at rail-road interchanges • Introduction of Cold Storage and Containers • Coordination between railway stations and roadside stations • Development of bus terminals, railway stations, and urban public transportation • **Jatropha-based biofuel and biochar projects (utilizing carbon credits)**
Border	●Chiponde OSBP under construction (AfDB) ●Border security through drone utilization and collaboration with local communities (WB, domestic funding) ■Technical cooperation and support related to SQAM (Standardization, Quality Assurance, Accreditation, Metrology) (EU, UNDP-UNIDO)	• Smart Link (Cross-border Information Network) • X-ray Scanner Deployment at Dedza OSBP • Establishment of customs facilities on the Mozambican side equivalent to those in Malawi • Introduction of OSBP Equipment at Chiponde Border • Chiponde Border Area Commercial Development Project • Evaluation Database Construction • Stable Power Supply • **Countermeasures against smuggling (Utilization of Japanese technology capable of detailed vehicle detection even at night: high-sensitivity CCTV, AI image recognition and tracking technology)** • **Nayuchi Railway OSBP Improvement**
Logistics	■Construction of ICDs in Liwonde, Blantyre, and Kanengo ▲Malawi ICD in Nacala	
Industry	●Feasibility Study (FS) for Lilogwe Area 55 SEZ completed; construction scheduled to begin next year (ARISE IIP)	• Industrial Park Development
Agriculture	●Central Malawi Corridor project (Agricultural, residential, and industrial development along the railway) (Private sector)	• Irrigation Facilities • Access roads from production areas to collection warehouses and main roads • Establishment of agricultural product warehouses and sales outlets at roadside stations • Overseas investment and financing for the business expansion of Japanese fertilizer companies • Biofuel production technology transfer • Environmental conservation and landscape improvement projects for tourism resource development (dispatching experts to the Ministry of Tourism, participation in specialized training programs)
Water transport Transportation		• Chipoka Port Development • Mirango Port Development
River		• River Reservoir Development
Three Countries	●NDCMC ●SATCP (WB)	• Nacala Port Campaign

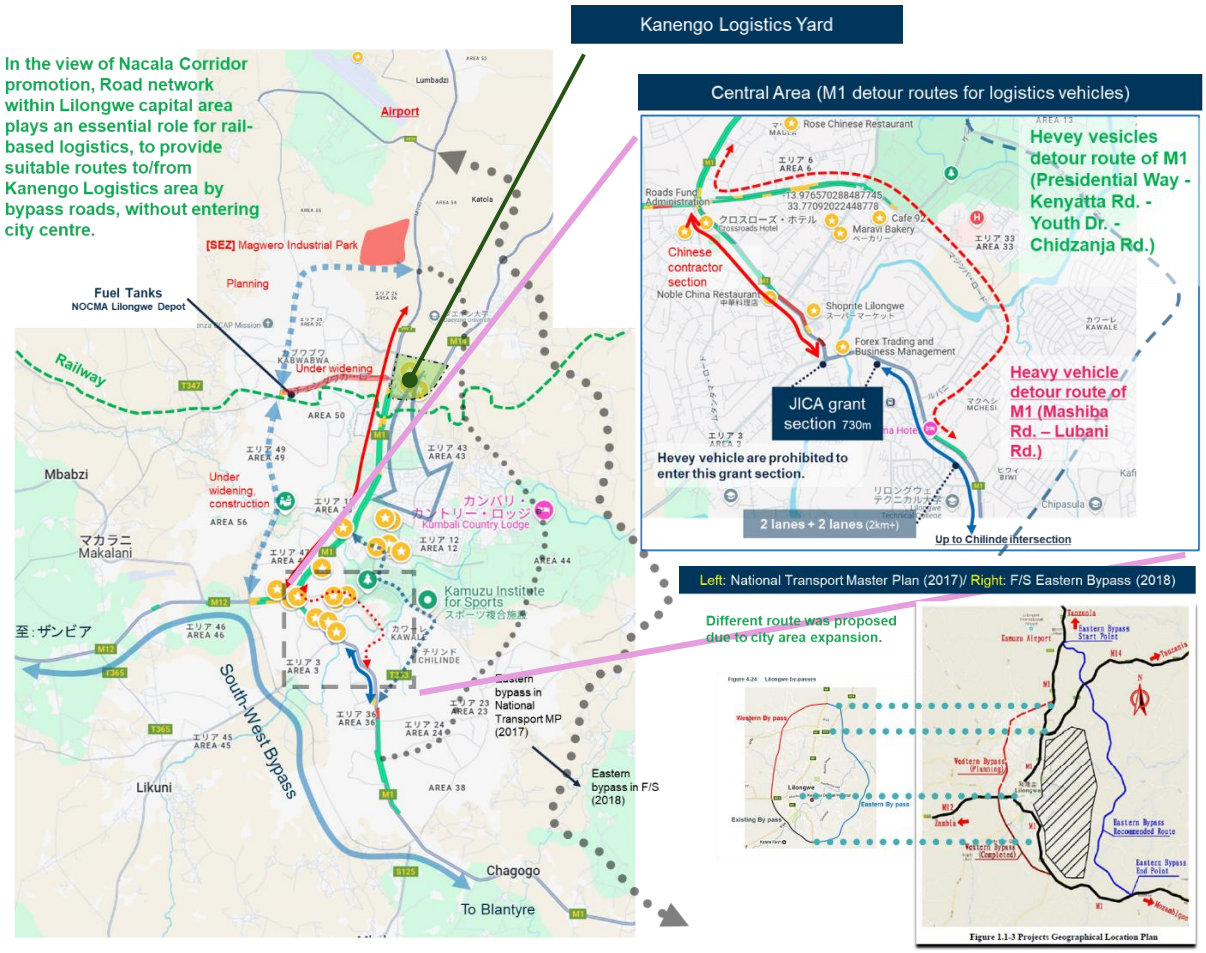
Source: JST

Among these, the M1 Road Improvement Project (extension south of Lilongwe Bridge) was proposed as a project contributing to the development potential discussed in the previous chapter and having high priority in the phased scenario. Its outline is described in (2).

(2) Road Improvement Project (M1 Road: Lilongwe Bridge to Chizanja Junction Section)

1) Future Road Network in the Lilongwe Metropolitan Area

Regarding the future road network for Lilongwe City, the National Transport Masterplan (NTMP) formulated in 2017 planned east-west ring roads. However, route revisions were made during the subsequent project development process, and construction is now underway. Currently, the southern section of the West Bypass Road, the South-West Bypass Road shown in the Figure below, has been completed (funded by the AfDB), while the northern section is under construction. Meanwhile, the eastern bypass faced challenges with the original NTMP route due to its location through a high-density residential area. Consequently, a slightly larger route was proposed in the Feasibility Study (FS) conducted by a Chinese company (2018: China CRBC, 45 million USD) compared to the NTMP route. This new East Bypass Road will not connect to the West Bypass Road. Its connection to the M1 Road (National Highway 1) will be located further south than the West Bypass at the southern point. At the northern point, it is planned to connect directly to the airport access road. The East Bypass will be constructed further east than the Kanengo railway freight station, which is connected by rail from Nacala Port. Regarding this new East Bypass Road, requests for loans and grants are currently being made to China. However, due to the large amount involved, future plans remain uncertain.



Note: The lower right diagram shows the ring road from the National Transport Master Plan (2017) and the proposed route for the East Bypass by China on the right side.

Source: JST

Figure 3-15 Lilongwe City Road Network Plan

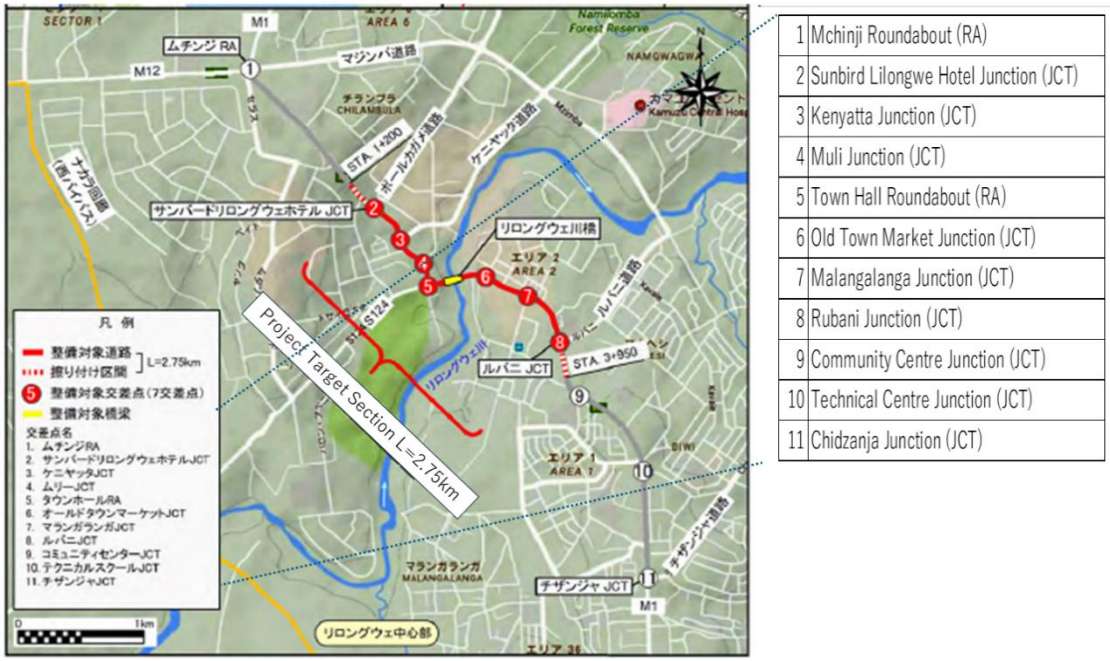
Therefore, the Ministry of Transport and Works (MOTW) has determined that a new eastern bypass road is necessary to serve as a detour for the M1 motorway (without deviating significantly from the M1), as the new eastern bypass road proposed by China would diverge significantly from the existing M1 and the city center. The Ministry envisions either the Yusudrive–Chirind Road–M1 or Yusudrive–Cizanjja Road–M1 routes as bypass alternatives. However, these routes also pass through established residential areas, making new four-lane development challenging. Therefore, in the short term, developing the road network from Mzimba Road (currently under four-lane expansion) to Lubani Road to M1 is the most realistic option. Construction on the unimproved section (Mzimba Road (currently under four-lane expansion) to Lubani Road to M1) is scheduled to commence using the country's own budget.

Under these circumstances, the Government of Malawi is seeking Japanese support for the development of the section from Lilongwe Bridge to Chisanjia Junction, following the M1 connection. Regarding the four-lane expansion plan south of the Chidzanja Junction, the "Consultancy Services for the Economic Feasibility Study and Detailed Engineering Design for Capacity Improvement of Blantyre – Lilongwe (M001) Road Lot 2: Nathenje – Junction with

Chidzanja Road (2024)", which covers the feasibility study and preparation of tender documents using domestic funds. The government is now seeking a donor to support the implementation of the main construction works.

2) Project Objective

Currently, under Japan's Grant Aid project, the Lilongwe Bridge is being upgraded from two to four lanes to alleviate congestion on the M1 road (sections 5 to 7 in the Figure below). However, the widening of the preceding and following two-lane sections to four lanes has not yet been implemented. Therefore, even if the bridge section is completed as a four-lane road, congestion will persist if the preceding and following sections remain two-lane, potentially negating the effectiveness of the grant-funded bridge widening. Among these preceding and following sections, sections 1 to 5 are scheduled for four-lane widening by the Malawi Government and the Ministry of Transport, Communications and Public Works. Japan is expected to undertake improvements for sections 7 to 11.



Source: JST (Additions to previous bridge section preparatory survey diagrams)

Figure 3-16 Sections related to the M1 Road improvement plan

If the sections (7-11) expected to be upgraded by Japan are kept as two lanes (i.e., if four-lane expansion is not implemented), traffic volume is projected to reach the road's capacity by 2031. Thereafter, congestion during peak hours (morning and evening commutes) is expected to become chronic. Conversely, if four-lane expansion is implemented, smooth traffic flow would be maintained even by 2034, and the effectiveness of the ongoing Lilongwe Bridge improvement project would be further enhanced. Below are the findings compiled by JST based on projected traffic volume values from cooperative preparatory surveys conducted in previous fiscal years.

Table 3-8 Congestion Levels Without M1 Improvement

Case without

Section	Length (m)	Number of Lanes	Traffic Capacity	2018		2024		2025		Number of Lanes	Traffic Capacity	2031		2034	
				Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio			Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio
⑥～⑦	500	2	24,000	14677	0.61	16,758	0.70	17132	0.71	4	41,000	33111	0.81	41,194	1.00
⑦～⑧	475	2	24,000	18157	0.76	20731	0.86	21194	0.88	2	24,000	23914	1.00	29,475	1.23
⑧～⑪	2175	2	24,000	19,740	0.82	21,494	0.90	21,803	0.91	4	41,000	24,453	1.02	29,104	1.21

Source: JST

Table 3-9 Congestion Levels with M1 Improvement Implemented

Case with

Section	Length (m)	Number of Lanes	Traffic Capacity	2018		2024		2025		Number of Lanes	Traffic Capacity	2031		2034	
				Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio			Traffic Volume (pcu)	V/C Ratio	Traffic Volume (pcu)	V/C Ratio
⑥～⑦	500	2	24,000	14677	0.61	16,758	0.70	17,132	0.71	4	41,000	33,111	0.81	41,194	1.00
⑦～⑧	475	2	24,000	18157	0.76	20,731	0.86	21,194	0.88	4	41,000	26,064	0.64	41,591	1.01
⑧～⑪	2175	2	24,000	19,740	0.82	21,494	0.90	21,803	0.91	4	41,000	26,428	0.64	39,599	0.97

Congestion Level Reference:

1.00 or below	Traffic flows smoothly without congestion.
1.00 to 1.25	There may be 1 to 2 hours of potential congestion, but the likelihood of continuous congestion lasting several hours is low.
1.25–1.5	A state where congestion is likely to increase rapidly, not only during peak hours but also around peak times.
1.75–2.00	Chronic congestion. Congested periods account for approximately 50% of the 12-hour daytime period.
2.00 or higher	Chronic congestion. Congested periods account for approximately 70% of the 12 daytime hours.

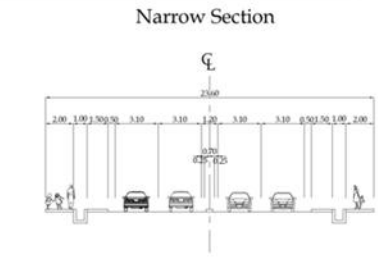
Source: JST

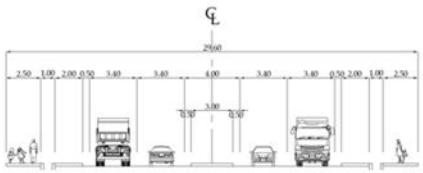
3) Facility Improvement Details

M1 Road Improvement: This involves widening approximately 2,800 meters south of the currently ongoing Lilongwe Bridge renovation section to four lanes. The specific improvement overview for each section is as follows.

- **Section 7-8**: Commercial This area features shops lining both sides of the road. To avoid impacting these facilities (e.g., relocation), a road width of "Narrow section: w = 23.6m" will be adopted. Furthermore, since large vehicle traffic restrictions are planned, a standard pavement structure will be adopted: standard asphalt for the surface layer (5cm), graded crushed stone for the upper base course (20cm), and crushed stone for the lower base course (30cm). Drainage facilities will be installed on both sides, connecting to the Lilongwe River. The total length of improvement is approximately 480m.
- **Section 8-11**: These sections involve widening to four lanes south of the Rubani Intersection and are expected to see increased traffic volume from large vehicles using the Rubani Road as a detour route. Therefore, heavy-duty pavement designed for large vehicle traffic will be used (surface layer (10cm): modified asphalt; base layer (10cm): asphalt stabilized base; upper subgrade (20cm): graded crushed stone; lower subgrade (30cm): crushed stone subgrade). Since this section is not in a densely populated area with commercial facilities or houses, a road width of "Standard section: w=29.6m" will be adopted. Improvements to three major intersections and installation of drainage facilities on both sides are also included. The total length of improvement is approximately 2,330m.

The following diagram shows the locations of the Narrow Section (Sections 7-8) and Standard Section (Sections 8-11), along with a standard cross-section diagram (width configuration).





M1 is a main road with a 30m+30m right-of-way secured along its entire length. There are no issues with removing/relocating facilities within the right-of-way (water supply, communications, etc.). (By hearing)

Source: JST

Figure 3-17 Overview Diagram (Sections, Length, Standard Cross-Section) for the M1 Road Improvement Project

4) Total Project Cost

The total estimated project cost currently anticipated is as follows. Note that the project cost includes construction costs (including a 10% contingency reserve) as well as consulting services. During project implementation, consulting services will include support for detailed design, bidding assistance, and construction supervision. Furthermore, the Narrow Section area, including the vicinity of the currently under-construction Lilongwe Bridge, has potential for development as a central business district with commercial facilities along the route and as a transportation hub. Technical support considering these aspects is also feasible.

- Japan: 2,130 million yen, Republic of Malawi: 604 million yen

Table 3-10　M1 Improvement Project Estimated Cost

Description	CAPEX (USD)	CAPEX (JPY)
Road (original section)	3,856,076	578,411,339
Road (additional section)	8,491,117	1,273,667,539
SUB-TOTAL	**12,347,193**	**1,852,078,878**
Consultant cost (original section)	269,925	40,488,794
Consultant cost (additional section)	594,378	89,156,728
SUB-TOTAL	**864,303**	**129,645,521**
CONTINGENCIES (10%)	1,321,150	277,811,832
TOTAL	**15,396,949**	**2,129,890,710**

Pavement	Narrow section
Carriage way	A-3 Compacted Subgrade (t=250)
	Soil/Quarry Dust Base Course (t=300)
	Soil/Quarry Dust sub-Base Course (t=200)
	Asphalt SP-19, PG76-22 (t=50)
	Standard section
Carriage way	A-3 Compacted Subgrade (t=250)
	Soil/Quarry Dust Base Course (t=300)
	Soil/Quarry Dust sub-Base Course (t=200)
	DBM-50 AS Base Couese (t=100)
	Asphalt SP-19, PG76-22 (t=100)

Narrow section	L=	474	m		
Standard section	L=	496	m		
Additional section	L=	1830	m		
Compensation for land loss		：ROW（30m＋30m）内での計画であり土地収用は発生しない。			
Removal of obstructions		：堀、看板の撤去が発生		50,000,000	円
Relocation of		単価（円）		174,600,000	円
Power-line	1,940	30,000	58200000		
Water-pipe	970	100,000	97000000		
Fiber cable	970	20,000	19400000		
			Total	224,600,000	円
Removal of obstructions		：堀、看板の撤去が発生		50,000,000	円
Relocation of		単価（円）		329,400,000	円
Power-line	3,660	30,000	109800000		
Water-pipe	1,830	100,000	183000000		
Fiber cable	1,830	20,000	36600000		
			Total	379,400,000	円

GOM cost

Description	CAPEX (USD)	CAPEX (JPY)
Compensation for land loss	0	0
Removal of obstructions	666,667	100,000,000
Relocation works	3,360,000	504,000,000
TOTAL	**4,026,667**	**604,000,000**

Source: JST

5)　Expected Effects

The improvement effects expected from implementing this project include a reduction in total travel time due to increased travel speeds resulting from the aforementioned congestion relief. The specific improvement effects (monetary conversion) are as shown in the table below, with an estimated annual reduction in travel costs of approximately ¥100 million.

Table 3-11　Improvement Effects from Reduced Total Travel Time

Y2034
with: All lanes of sections ⑥ to ⑪ converted to four lanes
Without: Sections ⑥–⑦ are four-lane (free section) + Sections ⑦–⑪ are unimproved

Section	Case	Total Travel Time / Day (Hours)	Total driving time per year (hours)
⑥～⑦	with	515	187,947
	without-with	0	0
⑦～⑧	without	694	253,230
	with	494	180,271
	without-with	200	72,958
⑧～⑪	without	2,534	924,899
	with	1,435	523,945
	without-with	1,099	400,954
Total time saved		1,298	473,912

Source: A Cost-Benefit Analysis of Upgrading Road Infrastructure for Tourism in Malawi (2021)

Total length of road improvement		1,407	km
a: Time saving		29,500,000	hour/year
b: Time saving cost		6,054,000,000	MWK/year (2023)
c: Operation cost		79,244,000,000	MWK/year
d: Cost saving	d=(b+c)/a	2,891	MWK/hour
e: Time saving		473,912	hour/year
f: Cost saving	f=d*e	1,370,297,649	MWK/year
		109,623,812	Yen/year (1MWK=0.08Yen)

Source: JST

Table 3-12 Basis for Calculating Total Travel Time Reduction Effect

with (2034)

Section	Travel speed (km/h)	Time Required (minutes)	Target Traffic Volume (pcu)	Percentage (%)	Total Travel Time / Day (Hours)	Total driving time per year (hours)	Remarks
⑥～⑦	40	0.750	41,194	100	515	187,947	
⑦～⑧	40	0.713	41,591	100	494	180,271	
⑧～⑪	60	2.175	39,599	100	1,435	523,945	
	Total				2,444	892,163	

without (2034)

Section	Travel speed (km/h)	Time Required (minutes)	Target Traffic Volume (pcu)	Percentage (%)	Total Travel Time / Day (Hours)	Total driving time per year (hours)	Remarks
⑥～⑦	40	0.750	41,194		515	187,947	
⑦～⑧	40	0.713	24,759	84	294	107,313	
	20	1.425	4,716	16	112	40,881	
	20	1.425	12,117	-	288	105,036	Detour traffic*
⑧～⑪	60	2.175	24,447	84	886	323,468	
	20	6.525	4,657	16	506	184,839	
	20	6.525	10,495	-	1,141	416,592	Detour traffic*
Total					3,743	1,366,076	

*Detour Traffic: Set traffic volume with and without as detour traffic

Prerequisites	・ The ratio of peak traffic volume to daily traffic volume (TP/T24) is approximately 8% for major arterial roads in urban and rural areas, serving as a benchmark. ・ The average travel speed during congested periods (congestion level 1.00 or higher) in large cities is approximately 20 km/h (guidlined by Ministy of Land, Infrastructure, Transport and Tourism (MLIT) in Japan).
Calculation Conditions	With Project: All traffic volume (pcu) can travel at 40 km/h and 60 km/h Without Project: During the 24hour period, the two peak hours (morning and evening) are designated as congested periods, during which 16% of the 24hour traffic volume (pcu) travels at a speed of 20 km/h.

Source: JST

3.1.3 Proposal for Grant Aid Projects in Mozambique

(1) Grant Project Candidates in Various Sectors in Mozambique

Through field surveys, we confirmed the significance and feasibility of project implementation based on locally obtained information, while also examining other potential candidate projects. The following Table 3-13 lists existing projects in each sector on the left and projects requested locally on the right, while proposing projects deemed feasible under the grant aid projects proposed in this study. Among these, three projects that contribute to the development potential discussed in the previous chapter and have high priority in the phased scenario are listed in (2) to (4).

Table 3-13 Grant Aid Projects for Mozambique (Draft)

Sector	Existing Projects ▲Conceptual/Planned ●In Progress ■Completed	Projects Requested by Local Authorities Projects Proposed by Joint Ventures
Road	●Nacala Road Corridor Development Project (AfDB) ●Natete Bridge Construction Project Preparatory Survey (JICA)	• **Nacala Port Access Road (Grant Version)** • **Connecting Road to ICD (Including Attracting Japanese Companies to ICD)** • Repair of N1/N12 Road from Nampula to Nacala • Construction of the Nampula South Bypass • Railway Bypass from Nampula Station to Waresta Market (Freight Terminal) Development • Introduction of Wight Bridge to N13 • **Climate Change Vulnerability Mitigation for Trunk Roads (Enhanced drainage capacity including bridges combined with river disaster warning systems, flood control basins, and irrigation facilities: Technical Program)**
Rail		• **Level Crossing Countermeasures, Notification, and Local Support System Development**
Border	●Project Fronteira Unica (WB)	• Smart Link: Cross-border information network • Develop customs facilities on the Mozambican side equivalent to those in Malawi (Due to bottlenecks on the Malawi side) • Improvement of access roads to the Mandimba border
Logistics	▲Malawi ICD in Nacala	• Establishment of logistics hubs and agro-processing zones.
Industry		• **Improvement of local roads + development of roadside stations (in conjunction with Green Corridor development)**
Agriculture	●CASCADE Project (GAIN・CARE)	• Improvement of Waresata Market • Support for agricultural mechanization (supporting farm scale-up). • Equipment and technical support for laboratories conducting agricultural product quality certification (UniLúrio, IIAM).
Tourism		• **Improvement of Mozambique Island in collaboration with Camões (Portuguese development agency)**
Three Countries	●NDCMC ●SATCP (WB)	• Nacala Port Campaign

Source: JST

(2) Nacala Port Access Road

1) Current Status of Access Roads

Currently, three main routes are considered for accessing Nacala Port from the main road (N12) within Nacala City, as shown in the diagram below. However, in actual operation, use of Routes 2 and 3 is not permitted, and Route 1 is the designated route available for freight vehicles. This Route 1 road is approximately 3.9 km in total length. However, as shown in the photos below, sections of the road (particularly around the intermediate intersection) have significant pavement damage, and sediment from upstream has accumulated. Furthermore, during the direct hit by a hurricane in March 2025, a cargo vehicle fell off the road due to a collapsed shoulder. Thus, despite being the sole access road to Nacala Port, this route is highly vulnerable not only due to its pavement condition but also to disasters such as rainfall and cyclones. This situation creates a negative impression for cargo vehicles intending to use Nacala Port, acting as a bottleneck hindering the promotion of its use.

Accessible Routes to Nacala Port
(Within Nacala Municipality)

Current Status of Route 1: Damaged Pavement

Midpoint on Route 1:
Damaged Pavement and Compiling of Sediment

Road shoulder collapsion, Cargo vehicle overturned due to the cyclone in March 2025

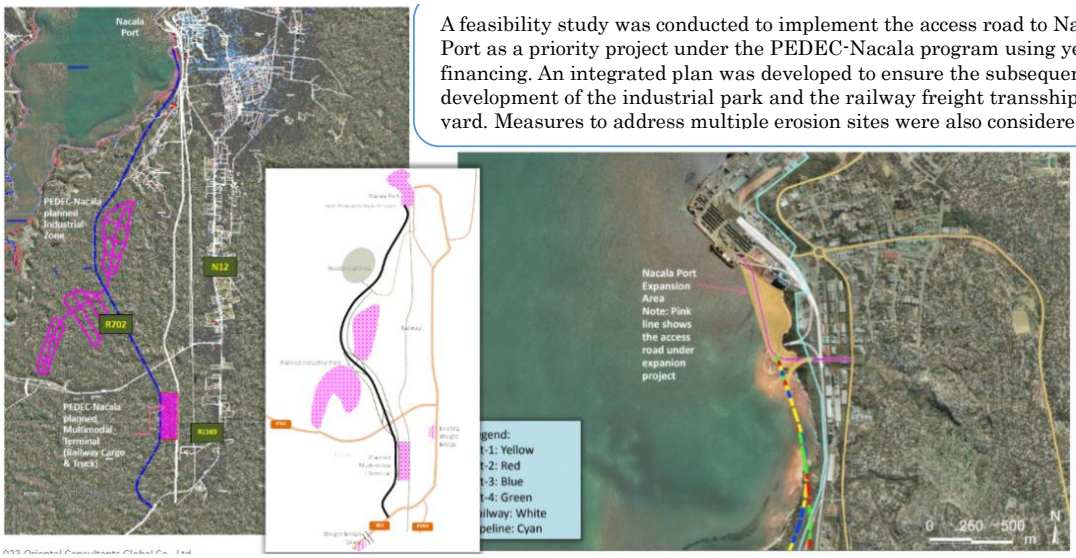
Source: JST

Figure 3-18 Current State of the Access Road to Nacala Port (Nacala City)

This proposed project aims to improve this situation and construct a reliable access road to Port Nacala. Note that the 2018 JICA survey (a preparatory survey for cooperation assuming a grant aid project) proposed a high-standard (exclusive motor vehicle road) access road to Nacala Port (Figure 3-19). Therefore, the access road proposed in this survey is envisioned as feasible through a grant aid project utilizing the existing access road (current road). It is also being considered as a future connection to the access road (automobile-only road) planned in the 2018 Feasibility Study (F/S).

Nacala Port Access Road Feadibility Study(2018)

A feasibility study was conducted to implement the access road to Nacala Port as a priority project under the PEDEC-Nacala program using yen loan financing. An integrated plan was developed to ensure the subsequent development of the industrial park and the railway freight transshipment yard. Measures to address multiple erosion sites were also considered.



Source: JST (Excerpted from the preparatory survey materials at the time)

Figure 3-19 Plan for Nacala Port Access Road (Exclusive Road) (2018 Preparatory Survey for Cooperation)

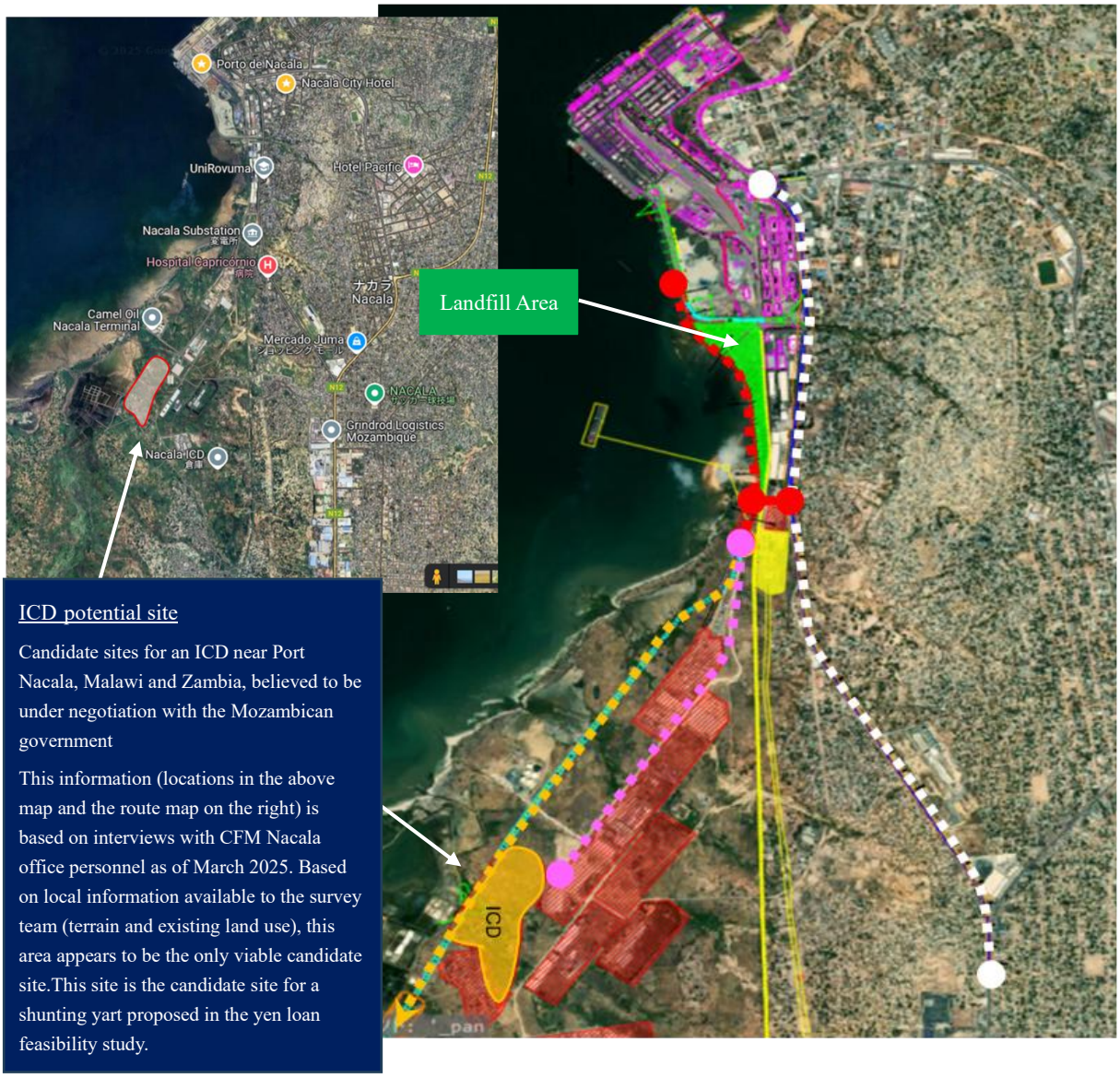
2) Nacala Port Access Road Improvement Method

The development of the access road to Nacala Port proposed in this survey is proposed in three phases, as shown in the table below: starting with the improvement of the existing road (Phase-I), and ultimately progressing to the construction of an "exclusive motorway" (Phase-III) as proposed in the F/S survey for the 2018 JICA yen loan project. (Table 3-14)

Table 3-14 Development Phases for the Nacala Port Access Road (Phases 1 and 2 constitute the current proposed project)

Phase-1: Grant Aid Level Projects [Project Purpose] Enhancing the reliability of existing access roads (eliminating vulnerability to rainfall, etc.)	[Facility Details] **The dashed white line in the Figure below indicates the section to be improved** • Existing road rehabilitation: 3,900m + 200m = 4,100m • Intersection Improvements: 2 locations • Number of Lanes: 2 lanes (3 lanes in sections with climbing lanes)
Phase-2: Project at the level of Grant Aid [Project Purpose] Improving functionality associated with access to Nacala Port	[Facilities and Details] **Red and pink dotted lines in the diagram below indicate the sections to be improved** • Port Access Road Improvement/Reclamation Section (Red Dotted Line): 1,140m • Intersection Improvement (Grade-separated crossing with railway): 320m • Planned ICD (access road development for Malawi and Zambia access roads (pink dotted line): 1,800m • Reclaimed land area (green hatching): 71,736 sqm (Required earth volume for reclamation: 685,000 sqm)
Phase-3: Project at the level of Grant Aid [Project Purpose] To ensure road redundancy and serve as foundational infrastructure for Nacala Bay Area development, including industrial parks	[Facility Details] The orange dotted line in the diagram below indicates the section to be developed (15km extension to N12, spanning the R702 section) • Construction of a high-standard port access bypass road (exclusive motorway/industrial road) providing direct access to Nacala Port without passing through Nacala city • Includes integrated development of industrial parks and rail transshipment terminals along the route

Source: JST

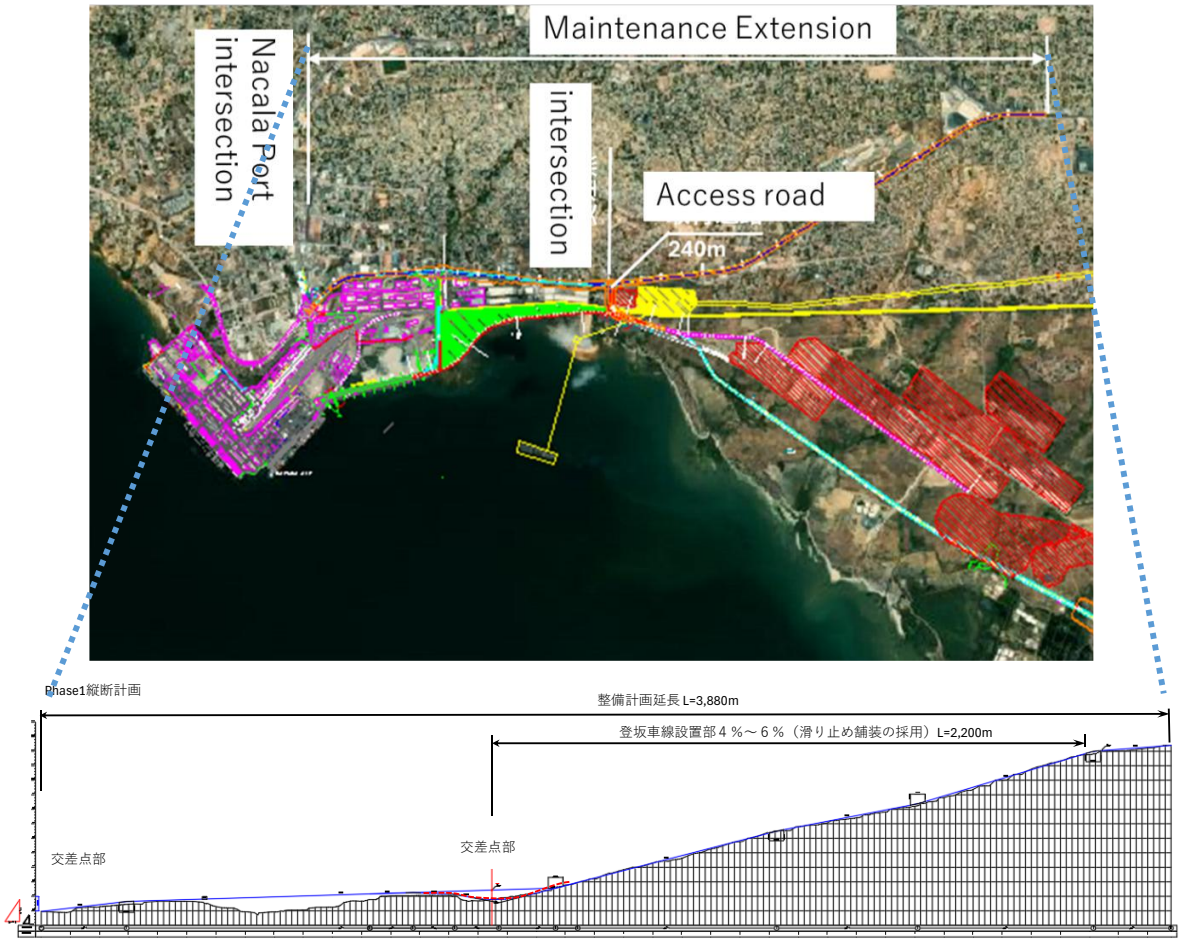


Source: JST

Figure 3-20 Target section for development of Nacala Port access road

3) Facility Details (Phase-1: Development via Grant Aid Project (Draft))

To enhance the reliability of the existing 3,880m access road (current road) to Nacala Port, this involves pavement rehabilitation, installation of climbing lanes, intersection improvements, drainage facility development, and installation of traffic safety facilities (intersection signals, guardrails, lane markings, road lighting facilities, signs). Given the road's use by large freight vehicles, heavy-duty pavement will be used: modified asphalt for the surface layer (15cm), asphalt stabilized base course (15cm) for the upper subgrade, and crushed stone subgrade for the lower subgrade (30cm). Anti-skid pavement (resin pavement) will be adopted on steep gradient sections to enhance safety.



Source: JST

Figure 3-21 Nacala Port Access Road (Existing Road) Improvement Overview Diagram

4) Total Project Cost

The estimated total project cost at this stage is as follows. The project cost includes construction expenses (including a 10% contingency reserve) plus consulting services. During project implementation, consulting services will include support for detailed design, bidding assistance, and construction supervision. The breakdown of project costs is shown in the table below.

- Japanese side: 2,669 million yen, Mozambican side: 248 million yen

Table 3-15 Estimated Project Cost for the Access Road to Nacala Port (Existing Road)

Item	CAPEX (USD)	CAPEX (JPY)	Remarks
Detailed Design/Construction Supervision	1,470,717	220,607,576	10% of construction cost
Construction Cost	14,707,172	2,206,075,762	
Subtotal	**16,177,889**	**2,426,683,338**	
Contingency Reserve (10%)	**1,617,789**	**242,668,334**	
Total (Project Cost)	**17,795,678**	**2,669,351,672**	1 USD = 150 JPY

Item	CAPEX (USD)	CAPEX (JPY)	Remarks
Land Acquisition Costs	1,650,000	247,500,000	
Total	**1,650,000**	**247,500,000**	1 USD = 150 JPY

Source: JST

(3) Green Corridor: Inclusive Development and Climate Change Mitigation through Improved Rural Access

1) Background and Higher-Level Plans Leading to Project Proposal

The Mozambican government announced its Energy Transition Strategy 2023-2050 (Estratégia de Transição Energética 2023-2050; ETE) at COP28 (Dubai) in December 2023, setting out the strategic direction for the country's energy transition. This plan sets out 14 programs under four pillars: (1) a modern energy system based on renewable energy, (2) green industrialization, (3) universal access to modern energy, and (4) the introduction of clean energy in the transportation sector. This project responds to this national strategy (specifically, Program 5 of the second pillar, "Development of Green Industrial Parks and Industrial Corridors") and aims to create an advanced corridor model that integrates two meanings of the word "green": "utilization of rural potential" and "climate change countermeasures."

2) Project Overview

The target areas are expected to be the Iapara district of Ribaue district in Nampula province, Mozambique, to the Alto Morocue district (southbound on EN13 to EN326), the central Ribaue district to the Lalaua district (northbound on EN13 to ER694), and the Nakololo district of Monapo district to the Kanakue settlement (southbound on local roads from EN12). (Refer to the solid black lines in the map at Figure 3-22).

Source: Prepared by JST using Google Maps

Figure 3-22 Project Target Area

Specifically, we will implement the infrastructure development, establishment of infrastructure management systems, and technical support outlined below. We will also promote collaboration with

private companies, including those from Japan, to facilitate business development and economic growth along the Nacala Corridor.

- **Repair, Improvement, and Maintenance of Local Roads and Bridges**: Establish a system for repairing, improving, and maintaining roads and bridges connecting main roads and railway stations along the Nacala Corridor to farmland and settlements.
- **Support for introducing small mobility vehicles and animal-drawn transport**: Promoting the use of "small mobility vehicles" (bicycles, motorcycles, tricycles, etc.) capable of maneuvering on unpaved roads, while also supporting the introduction of traditionally rural "animal-drawn transport" (cattle, donkeys, and carts they pull) for short-distance haulage.
- **Establishment and operation of collection and information centers (permanent/temporary collection points at roadside stations along main roads and in rural areas)**: Incorporating the development of "collection and information centers" into the improvement of the Nacala Corridor's main roads and local road networks. This involves establishing hubs at "roadside stations" located on the corridor's main roads, while also connecting satellite hubs utilizing permanent warehouses and temporary collection points located in more remote areas.
- **Support for Establishing Agricultural Processing Parks and Roadside Stations**: Support for establishing "agricultural processing parks" and "roadside stations" that serve as the foundation for simple processing of agricultural products and direct sales from production areas.
- **Human Resource Development**, **etc**.: In collaboration with local public institutions such as the State Department of Agriculture and Fisheries (DPAP), District Economic Activity Offices (SDAE), the Institute of Agricultural Research (IIAM), and Agricultural Schools (Instituto Agrário), this initiative focuses on developing local leadership. It also implements human resource development, technology transfer, and provision of equipment and materials to individuals, agricultural cooperatives, and small and medium-sized enterprises (SMEs), including young people and women in the local community, through technical support from JICA and other means.

3) Expected Effects

Establishing a circular and self-sustaining rural logistics system that combines transportation and compost utilization will reduce farmers' fuel costs and greenhouse gas emissions. Furthermore, by providing integrated support for agricultural product distribution, information sharing, and ultimately financial access, essential goods will reach rural areas efficiently (improving the last mile), while products from rural areas will be efficiently aggregated (improving the first mile). This is expected to contribute to increased productivity and cash income for small-holder farmers.

Furthermore, supporting afforestation (e.g., jatropha for biofuel) and "greening activities" or "environmentally sustainable agriculture" that consider food security and rural economies, along

with implementing fruit tree seedling cultivation, agroforestry, intercropping, and fuelwood forest management, can contribute to increasing farmers' income, stabilizing food supply, and addressing climate change (Figure 3-23). However, for decarbonization projects such as biofuels and biochar, it is considered more effective to promote them through "collaboration with private sector entities" rather than direct public sector involvement, with public support focused on foundational infrastructure development and institutional design.

Therefore, by utilizing rural potential and adapting to climate change, the Nacala Port and Nacala Corridor are expected to develop into a cutting-edge green port and green corridor with international competitiveness and inclusiveness, enabling the rapid selection of highly sustainable commodities, transportation methods, and energy sources compared to other corridors. The image of the development of a green corridor utilizing jatropha is shown below. Although the project will be implemented in Mozambique, it is also possible to consider utilizing rail freight transport for these shipments, with a view to expanding the project to Malawi and Zambia.

Source: JST

Figure 3-23 Conceptual diagram of a green corridor utilizing jatropha

(4) Strengthening the capacity of the Nacala Corridor (road) to respond to climate change (as technical cooperation between three countries)

1) Background to the project proposal

In recent years, roads have frequently been cut off due to changes in rainfall patterns (short, intense rainfall) associated with climate change and the frequent cyclones in southern Africa. These road disruptions have halted the transport of daily necessities such as fuel and food, dealing a heavy blow to the lives of citizens, and the affected countries are struggling to respond. During Cyclone JUDE in March 2025, a bridge on a local road in Ribaue, a major city along Mozambique's Nacala Corridor route, was washed away. This halted the transport of supplies, significantly impacting citizens' lives.

Source: JST

Local road bridge washed away by Tropical Cyclone Jude (March 2025) (Ribaue, Mozambique: a major city on the Nacala Corridor)

Furthermore, despite being a main artery as an international corridor, the Nacala Corridor (road) suffers frequent disruptions due to rainfall and cyclones, resulting in low reliability as a logistics backbone. This vulnerability to natural disasters is also a factor contributing to the avoidance of using the Nacala Corridor (road). The following photographs all depict damage to the Nacala Corridor (road) that occurred in 2025. This damage was not caused by large bridges (over rivers) as seen in, but rather by the insufficient capacity of drainage culverts to handle recent rainfall levels.

Source: ZNBC
Zambia: Road washout on the Great East Road due to heavy rain (January 2025)

Source: JST
Malawi: Road washout on T388 caused by heavy rain (March 2025)

Source: JST
Mozambique: Road washout on N12 caused by Cyclone "JUDE" (March 2025)

2) Project Overview

This project aims to reduce road vulnerability to natural disasters for road administrators in the three countries traversed by the Nacala Corridor. While Japan has primarily provided cooperation for river bridge maintenance and management through the "Bridge Maintenance and Management Technical Cooperation Project," road disruption due to insufficient drainage capacity has an impact comparable to that caused by bridge collapse. Therefore, this proposed technical cooperation project targets all drainage structures, including bridges. It aims to strengthen the capacity of road administrators in each country to respond to natural disasters by evaluating the capacity of drainage structures against events like short-duration heavy rainfall, confirming their integrity, and providing rapid disaster information. The specific proposed cooperation activities are as follows.

- Establishment of a drainage structure database (location, shape, capacity, integrity, etc.)
- Development of a drainage structure risk assessment system based on rainfall intensity
- Pilot implementation of rainfall monitoring and river disaster information warning systems (for major rivers, etc.)
- Development of planning guidelines combining flood control measures such as flood detention basins (regulating reservoirs) and irrigation facility improvements
- Establishment of disaster information exchange guidelines and systems among the three countries

3) Expected Effects

The project goal is to enhance the reliability of the Nacala Corridor (road) against natural disasters (reducing road closure periods). The following effects are expected from the project:

- Enhanced capability to recognize risk levels for standard drainage structures

- Enhanced preventive capabilities through the development and implementation of guidelines for risk assessment
- Enhancing maintenance capabilities for standard drainage structures
- Enhancing the ability to formulate and implement countermeasures against natural disasters
- Improving road safety through the provision of hazard information for road use in collaboration among the three countries
- Enhancing the reliability of road networks through the provision of detour information via trilateral cooperation

3.2 Recommendations on the Significance of Japan's Development Cooperation for the Nacala Corridor

The previous chapter, through field surveys and discussions with stakeholders conducted as part of this project, assessed the current state of the logistics and transportation corridor in the three countries of the Nacala Corridor as of 2024-2025, examined the industrial and economic conditions of the corridor's surrounding regions, and identified challenges (such as bottlenecks) hindering the corridor's revitalization. Furthermore, while proposing the potential (hypothesis) of the Nacala Corridor as an international corridor and a phased support scenario, the previous section (3. 1) proposed "candidate cooperation projects."

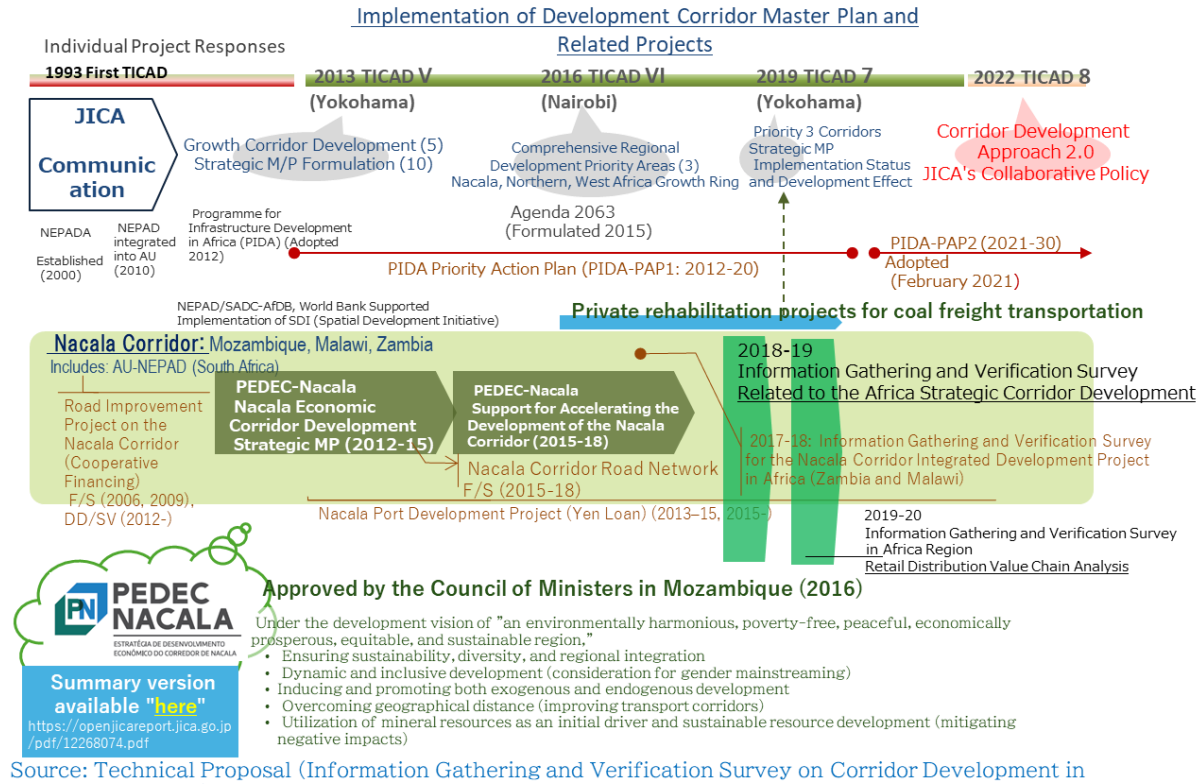
This section, based on the above, organizes recommendations concerning the following items, including the significance of implementing development cooperation in the Nacala Corridor. Furthermore, it is structured to contribute to the realization of the "Strengthening Global Supply Chains through the Development of the Nacala Corridor" initiative, announced by Prime Minister Shigeru Ishiba at the 9th Tokyo International Conference on African Development (TICAD 9, August 20-22, 2025) in Yokohama, as a form of "Wide-Area Offer-Based Cooperation" for Mozambique, Malawi, and Zambia.

- Roadmap for Promoting Logistics in the Nacala Corridor
- Japan's Medium- to Long-Term Cooperation Direction
- Specific Details of Grant Aid Projects in the Three Target Countries

3.2.1 Roadmap for Promoting Logistics in the Nacala Corridor

(1) JICA Support History in the Nacala Corridor Region

The Nacala Corridor region, which flourished during the colonial era and around the time of independence through the Cotton Corridor and railway construction, saw its utilization as a corridor stagnate due to the social and economic devastation and damage to infrastructure facilities caused by the civil war (1977-1992). JICA has contributed to corridor development from an early stage to help overcome these challenges. The following chronology diagram (Figure 3-24) traces the lineage of support from TICAD V (2013) onwards.



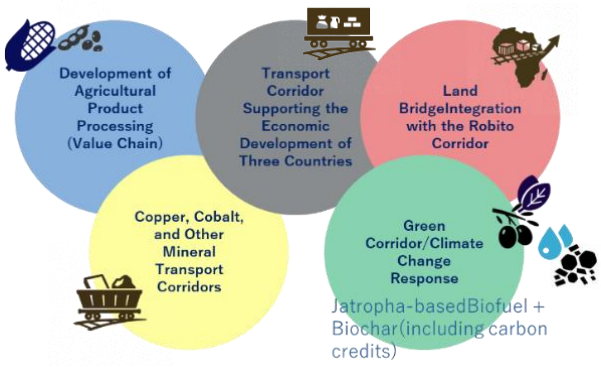
Source: Technical Proposal (Information Gathering and Verification Survey on Corridor Development in the African Region) Prepared by OCG and submitted on June 3, 2021, with additions

Source: OCG

Figure 3-24 Genealogy of JICA Support for the Nacala Corridor (Up to TICAD 8)

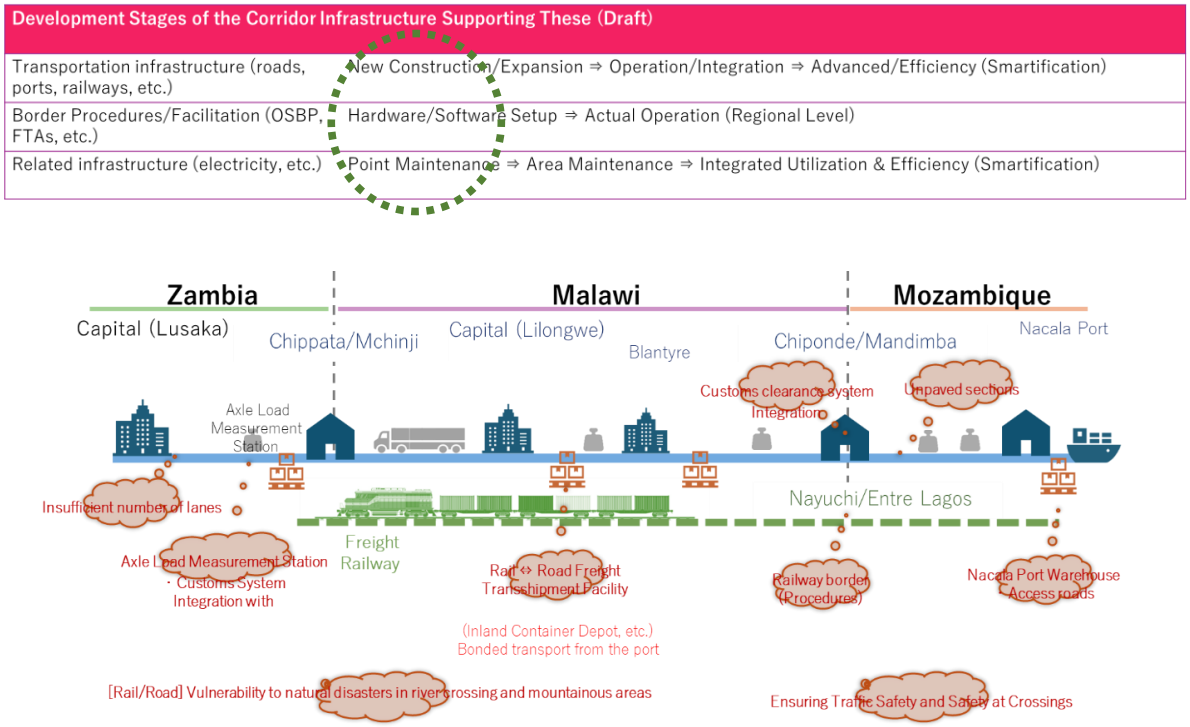
(2) Roadmap for Logistics Promotion (Draft)

In proposing a roadmap for promoting logistics in the corridor, it is important to consider a phased support scenario that addresses the current bottlenecks faced by the Nacala Corridor, based on an understanding of the "potential of the Nacala Corridor" while taking into account the "economic development stages of the corridor" described in Section 1.8 (potential and phased support scenarios are described in Section 3.1 (1) and (2)).



Furthermore, the advantage of the Nacala Corridor identified through this study is that "the rail freight transport system from the Port of Nacala is operational. “Specifically, the Nacala Corridor (Nacala Port – Northern Mozambique – Malawi – Eastern Zambia) has undergone rehabilitation of railway infrastructure and construction of new sections for coal (fuel coal) rail transport in the Southern African region. Nacala Logistics (the operator) has achieved stable operations based on favorable revenues from coal freight transport, while also securing capacity for general cargo transport. This represents a distinctive feature and advantage as a "rail freight corridor" not found in other neighboring corridors.

However, it has been identified that the Nacala Corridor has several areas requiring improvement (bottlenecks) within its transport infrastructure system to fully leverage the aforementioned characteristics. Figure 3-25 illustrates the challenges within the rail freight transport system and the supporting road infrastructure and customs systems that underpin its characteristics. Although the corridor infrastructure is in the initial stage (indicated by the green dotted line), challenges marked in red remain. Moving forward, it is crucial to address these areas for improvement in an integrated manner and with necessary support to promote logistics along the corridor.



Source: JST

Figure 3-25 Bottlenecks in Promoting Corridor Logistics (Items Requiring Improvement)

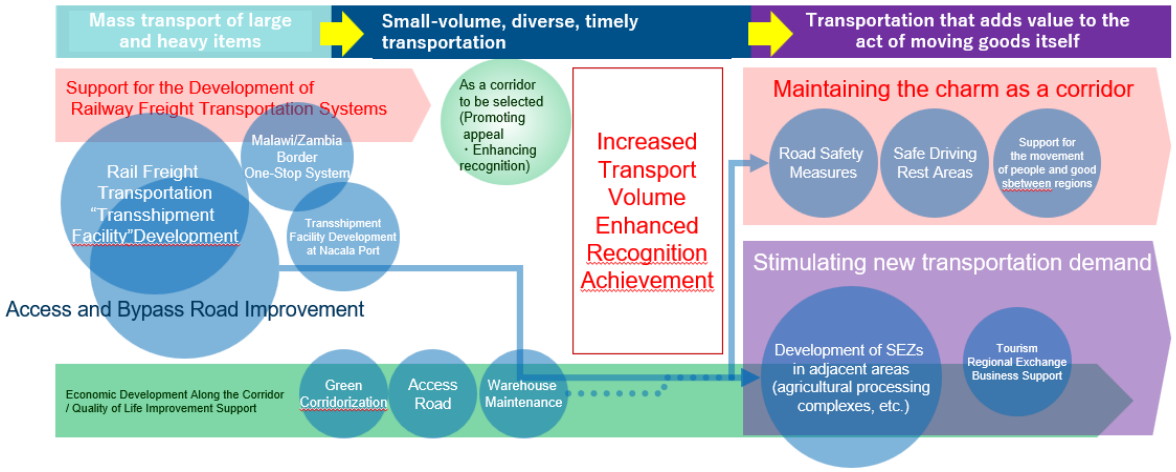
The "Strengthening Global Supply Chains through the Development of the Nacala Corridor" initiative, proposed at TICAD 9 as a form of "Wide-Area Offer-Based Cooperation," states the objectives of corridor development as follows:

- To enhance the transportation infrastructure and promote industrial development in the Nacala Corridor region, thereby strengthening connectivity within the area. This will elevate the corridor's value as a transport route for mineral resources and other goods, promote investment in the region, and create employment opportunities. Through these measures, sustainable development will be achieved, thereby strengthening Japan's global supply chains for various resources.

Given the "wide-area" nature of the Corridor spanning three countries, the document identifies "improving connectivity with inland areas" as a key challenge for further utilizing the Corridor. It also notes that the surrounding areas are endowed with abundant mineral resources and arable land. To fully

leverage this potential, improvements in the technical level of mineral resource exploration and extraction, as well as in agricultural productivity, are expected.

Based on these considerations, the "Roadmap for Logistics Promotion" will reiterate the "Phased Support Scenario for Corridor Development Promotion" outlined in Section 3.1(2). Building upon the Nacala Corridor's strength - its "rail freight transport system" - it envisions a development path from transporting large quantities of heavy goods (coal transport in the case of the Nacala Corridor) through transporting small quantities of diverse goods in a timely manner, to transport that adds value to the act of transport itself. heavy goods (coal transport in the case of the Nacala Corridor) through the stage of transporting small quantities of diverse goods in a timely manner, to the development of transport that adds value to the act of moving goods itself. The diagram serves as a roadmap, prioritizing: (ⅰ) Resolving logistics bottlenecks and enhancing corridor reliability to secure selection as a corridor, thereby increasing transport volume and raising awareness. Building on this, it is desirable to advance: (ⅱ) Maintaining the corridor's appeal, and (ⅲ) Stimulating new transport demand. Furthermore, economic development and QOL improvement along the corridor should be pursued in parallel from the initial stages of establishing the rail freight transport system. Figure 3-26 schematically illustrates these concepts.



Source: JST

Figure 3-26 Roadmap for Logistics Promotion

As concrete examples of initiatives to realize this roadmap, we have organized them by the fields of "Eliminating Logistics Bottlenecks/Improving Reliability as Transport Corridors" and "Stimulating New Transport Demand/Economic Development Along Corridors" in Table 3-16. These are expected to be utilized in initiatives forming broad-based cooperative frameworks, involving stakeholders such as private companies, international organizations, and civil society, as well as in exploring development assistance through cooperation with India and Middle Eastern countries based on the "Indian Ocean-African Economic Zone Initiative" proposed at TICAD 9.

Table 3-16 Initiatives and Candidate Projects Included in the Roadmap for Logistics Promotion

Initiative Areas		Specific Initiatives/Projects
Eliminating Logistics Bottlenecks / Enhancing Reliability as Transport Corridors	Natural Disaster Countermeasures	• Measures against soil erosion around Nacala Port • Enhancing drainage facilities and capacity for bridges and roads • Providing Weather Information for Bridges and Mountain Road Sections • Strengthening Rapid Response Systems for Natural Disasters • Railway Track Maintenance for Recovery Following Natural Disasters
	Expansion of Port Handling Capacity	• Improving Access Roads to Nacala Port • Development of ICDs and good connections to ports • Development of Bulk Terminal and Rail Transfer Facilities
	Alleviating Urban Congestion	• Construction of bypass roads in major cities along the corridor • Development of railway bypasses (e.g., in Nampula City)
	Improving railway safety	• Improvement of railroad crossings • Establishing a notification system and local support framework for level crossing accidents • Track Maintenance for Safe Railway Operations
	Improving Road Safety	• Improving Nighttime Driving Safety through Lighting, Road Markings, and Delineators • Establishing systems for maintaining good pavement and conducting regular inspections • Creation of Safe Driving and Rest Facilities through Roadside Station Development • Enhancing enforcement capabilities against overloaded vehicles (through multilateral cooperation) • Construction of all-weather roads
	Simplifying border crossing procedures	• Simplifying border procedures for rail transport (supporting bonded transport) • Integration of customs clearance systems at road border crossings
Stimulating new transportation demand / Economic development along the corridor	Enhancing Port Services	• Facility Development (e.g., Warehouses) • ICT-based port operations and procedures • Strengthening Port Sales at Nacala Port
	Improving railway services	• Improving loading facilities at stations • Increasing general cargo rail transport capacity (adding rolling stock/increasing train frequency) • Enhancing operator skills for improved punctuality • Strengthening facilities and operational capabilities required for railway OSBP Implementation • Improving operating speed and efficiency through track reinforcement and stabilization
	Utilization of Northern Agricultural Potential	• Improving the last mile/first mile from corridors (main roads) to farmland and settlements (improving local roads, establishing transport systems using animal power) • Establishment of collection centers in combination with local roads (e.g., roadside stations along corridors as hubs, satellites in rural areas) • Creation of green corridors (promotion of decarbonization through greening: biofuels, biochar, initiatives integrated with rural development) • Development of agricultural processing complexes
	Fostering new industries	• Fostering industries, including attracting Japanese companies through the development of SEZs • Fostering industries that utilize marine resources such as Nacala Port and Lake Malawi • Promotion of the local economy through direct sales at roadside stations • Utilization of tourism resources (Improvements to world heritage sites like Mozambique island, etc.)

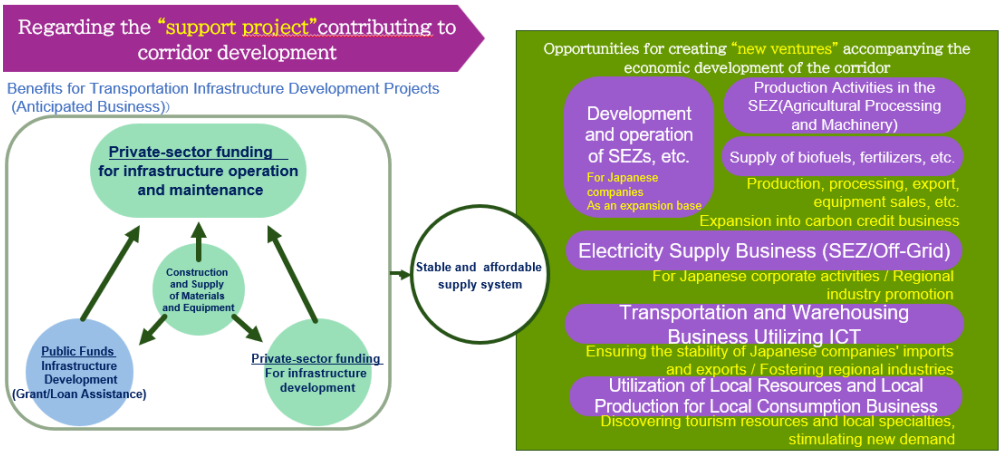
Source: JST

Moving forward, as part of offer-based cooperation, when considering cooperation and support options for these initiatives, we believe that proposing projects that leverage the technologies and solutions possessed by Japanese companies and are attractive to the partner countries (the three countries) will lead to project formation. Furthermore, in implementing projects, it is necessary to consider maximizing development impact through collaboration with various actors (private companies, public financial institutions, international organizations, other donors, civil society, local governments, universities and research institutions, etc.).

3.2.2 Japan's Medium- to Long-Term Cooperation Direction

TICAD 9 presents cooperation initiatives based on currently ongoing projects as a draft cooperation menu for "Wide-Area Offer-Based Cooperation."

From a medium-to-long-term perspective, cooperation will focus on realizing stable and affordable transportation and supply systems essential for corridor development. This will involve support for transportation infrastructure projects and cooperation/support for new business opportunities arising from the corridor's economic development (benefits and participation opportunities for Japanese companies) as transportation and supply systems are established. Figure 3-27 illustrates the types of public-private partnerships (PPPs) in transport infrastructure development projects and shows the new business clusters anticipated in the Nacala Corridor.



Source: JST

Figure 3-27 Potential Public-Private Partnerships and Projects in the Nacala Corridor

In transportation infrastructure development projects, the operation of infrastructure facilities built with public funds will be transferred from public entities to private-sector projects in the future. This allows private operators to invest flexibly and incrementally in the superstructure facilities and equipment necessary for operation, leading to more sustainable and efficient transportation infrastructure. For medium- to long-term cooperation on transportation infrastructure that requires significant time to develop, exploring such public-private partnership approaches is desirable to create opportunities for actively introducing private funding.

Regarding the creation of projects in various sectors listed on the right side of the diagram, while focusing cooperation on realizing transport infrastructure, there is also a need for cooperation beyond public funds (grants, technical cooperation with fees). This includes serving as a bridge to collaboration with international organizations and other donors, and facilitating cooperation with civil society, local governments, universities, and research institutions as part of technical cooperation, in response to private companies' initiatives and ideas for individual projects.

Specifically, it is desirable to establish a "platform (receptacle)" to leverage ideas from various stakeholders, expanding possibilities and facilitating their realization. Strategically, considering that WB support for the Tripalate Nacala Development Corridor Management Committee (NDCMC) introduced in Section 1.2 is scheduled to end in 2027. Therefore, for Japan's support beyond 2028, it may be considered to develop the current NDCMC secretariat support into a platform. This platform would serve as a forum for promoting projects proposed in this work, such as those discussed with input from private companies, and as a venue for discussing corridor development.

Attachment

1. Interview List

(1) Zambia

Organization Name	Position of Primary Interviewee	Date of Visit
Presidential Delivery Unit (PDU)		
Presidential Delivery Unit (PDU)	Delivery Manager (Energy, Infrastructure and Trade Facilitation), Advisor, Data Analysis Specialist, etc.	October 22
SMART Zambia Institute (SZI)	Director of Digital Government Services, Assistant Director of Projects and Quality Assurance, Principle Technical Services Standards Officer, Assistant Director of Electronic Services, etc.	October 25
Relevant Ministries		
Ministry of Transport and Logistics (MOTL)	Permanent Secretary, Director of Transport, Chief Planner, Senior Public Relations Officer, etc.	October 22
− Nacala Development Corridor Management Committee (NDCMC)	The Permanent Secretary of the Ministry of Transport and Local Government (MOTL) mentioned above is the coordinator for the Zambian side of the NDCMC. The contact person is the Chief Planner.	October 31
− Zambia Railways Limited (ZR)	Acting Managing Director, Director of Technical Services, Manager of Corporate Affairs	October 23
Ministry of Infrastructure, Housing and Urban Development (MIHUD)	Permanent Secretary, Principal Engineer, Senior Planner	October 22
− Road Development Agency (RDA)	Director of Planning, Principal Environmentalist, Engineer, etc. Chief Engineer, Network Planning and Design Dept.	October 23, November 18, 21
− National Road Fund Agency (NRFA)	Acting Chief Executive Officer, ADME, Acting Assistant Accountant, Acting Manager of Totalizing Operation, AM-MBE	October 25
− Road Transport and Safety Agency (RTSA)	Principal Examination Officer	November 1
Ministry of Commerce, Trade and Industry (MCTI)	Senior Economist for Industrial Affairs, Monitoring and Evaluation, etc.	November 15
− Zambia Development Agency (ZDA)	Assistant Director, Policy and Research Specialist, etc.	October 25
Ministry of Agriculture (MoA)	Economist, Principal Agricultural Economist, etc.	October 29
Ministry of Local Government and Rural Development (MGL)	Director of ICT, Principal Planner of Policy and Planning, Principal Engineer, Chief Planning Assistant, Senior Planner, etc.	October 28
Ministry of Mines and Minerals Development (MMMD)	Director of Planning and Information, Chief Planning Engineer, etc.	October 30
Ministry of Finance and National Planning (MOFNP)	Principal Economist of Economic Management Department, Economist of Budget Department, etc.	November 22
Zambia Revenue Authority (ZRA)	Regional Manager/ Assistant Commissioner – East Customs Services Division @ Mwami-Mchinji OSBP	November 2
National Authorizing Office (NAO) of the EDF	Acting Coordinator and Deputy NAO Officer, Infrastructure & Energy Expert, Infrastructure Sector Program Officer under Economic Management Department (EMD) in MOFNP	November 22
Government Think Tank		
Zambia Institute for Policy Analysis & Research (ZIPAR)	Research Fellow – Transport & Infrastructure Development	November 1, 13
Regional Administration & Donors		
COMESA	Program Officer for the European Development Fund (EDF), Tram Leader, CBM expert, Cross-border trade expert, Senior	October 28, 30

Organization Name	Position of Primary Interviewee	Date of Visit
	Customs Affairs Officer	
EU	Attaché/Program Manager of Infrastructure Team, Team Leader of Infrastructure Section, Project Manager	November 14
World Bank Zambia Office	Transport Specialist	November 21
SADC	TBD	TBD
WFP Zambia Country Office	Programme Officer (UNV), Climate Resilience and Smallholder Agricultural Market	November 20
PISCA (Participatory Integrated Climate Services for Agriculture), University of Reading	Postdoctoral Research Associate, School of Agriculture, Policy and Development (Online)	November 18, 21
Private Sector (Japanese Companies / Logistics Related)		
Shimizu Corporation, Africa Office (Nairobi)	General Manager, Deputy General Manager	November 1
Hitachi Construction Machinery Zambia Co., Ltd.	Director - Supply Chain & Reman Operation, Technical and Planning Manager	November 18
AGL Zambia Limited	Country Managing Director	November 1, 19
Aristair Logistics Zambia Limited	Head of Operation (Road Freight), Area Lead & Government Liaison Officer	November 14, 19

(2) Malawi

Organization Name	Position of Primary Interviewee	Visit Date
Relevant Ministries		
Malawi Revenue Authority	Head of Corporate Affairs	November 11
− Mchinji Border	Station Manager	November 3
− Dedza Border	Station Manager	November 4
− Mwanza Border	Director	November 11
− Chiponde Border	Station Manager	November 18
− Roads Fund Administration	Director of Audit, Chief Executive Officer	November 6
Ministry of Transportation and Public Works		
− Southern Africa Trade and Connectivity Project (SATCP)	Project Manager, Monitoring and Evaluation Specialist	November 4
− Road Authority	Director of Planning and Development	November 6
− Department of Rail Transport Services	Director of Rail Transport Services, CEO of Malawi Railways Limited	November 6
− Department of Road Traffic and Safety Services	Director of Roads Director of Road Traffic and Safety Services	November 6 November 7
Ministry of Water and Sanitation	Deputy Director of Ministry of Water and Sanitation	November 7
Ministry of Mining	Principal Secretary, Director of Mining, Chief Inspector of Explosives	November 7
Ministry of Tourism	Deputy Director of Tourism Planning & Development	November 7, 14
Ministry of Energy	Director of Energy Services	November 7
Ministry of Local Government	Director, District Commissioner	November 8
Ministry of Natural Resources and Climate Change	Chief Environmental Officer, EIA & Pollution Control Section, Deputy Director of Industry – Policy and Competitive Enhancement	November 8

Organization Name	Position of Primary Interviewee	Visit Date
Ministry of Trade and Industry	Deputy Director of Industry - Policy and Cooperation Enhancement	November 8
− Malawi Bureau of Standards	Quality Monitoring Office, Quality Assurance Services Department, Testing Services Department, Metrology Services Department	November 11
Malawi Cargo Centres	Branch Manager	November 8
Wide-area Administration and Donors		
African Institute of Corporate Citizenship (AICC)	Project Manager, Empowerment and Value Chain	November 7
UNDP	Programme Coordinator Inclusive/Green Business	November 11
Farmers Union of Malawi	Chief Executive Officer	November 12
The Trade, Industry and Private Sector Development Partners (TIPDeP)	Coordinator	November 12
National Planning Commission	Director General, Senior Development Planning Specialist - Infrastructure and Spatial	November 12
Small Farmer City	Founder & CEO	November 12
JST-JICA SATREPS Building a Sustainable Regional Development Model Based on Integrated Natural Resource Management in Lake Malawi National Park (IntNRMS Project)	SATREPS Long-term Researcher	November 17
Private Sector (Japanese Companies/Logistics-Related)		
Paramount	PIC of Finance	November 6
Arizo	Managing Director	November 6
AGL	Managing Director Malawi & Zimbabwe	
Nacala Logistics	Commercial & Marketing Manager, External Affairs Social Monitoring Officer – Salima Station	November 12
Tokyo 8 Global	International Sales	November 11
Agri Value Chain (AVC)	Country Head	November 11
Salima Sugar	AG. Sales & Marketing Manager	November 14
Salima Mangoes	Factory Manager	November 15
Malawi Shipping Corporation (Chipoka Port), (Chipoka Port)	Manager Security Manager	November 15 November 17
Lilongwe City Trunk Road Rehabilitation Project [Grant Aid] (Dai Nippon Construction / Katahira Engineering International)	Project Manager, Development Operations Headquarters, Chief of Specialized Division	November 8

(3) Mozambique

Organization Name	Position of Main Interviewee	Date of Visit
Relevant Ministries		
Mozambique Revenue Authority - Mandimba Border	Deputy Station Manager	March 1
The Northern Integrated Development Agency (ADIN)	Nampula Director, Technician President of ADIN Maputo, Engineer of ADIN Maputo	March 3, March 13
The National Roads Administration (ANE)	Unknown	March 3
- Planning Department	Deputy Planning Director	March 19
The governmental delegation	Provincial Director of Economy and Finance, Provincial Director of Transport and Logistics, Provincial Director of Agriculture and Fisheries, Representative of the Provincial Director of Industry and Commerce	March 4
APIEX	Director of the Special Economic Zone Division	March 13
Former GAZEDA President	PCA of Kudumba Investments, Ltd.	March 13
Ministry of Communication and Digital Transformation (MCTD)	Director of the Planning, Statistics and Cooperation Department, Technicians of the Planning, Statistics and Cooperation Department, Technicians of the Planning, Statistics and Cooperation Department	April 9
Wide-area Administration and Donors		
The delegation of the municipality of Nampula	Councilor for Urban Planning, Construction, and Environment, Technician in Urbanization, Construction, and the Environment	March 4
State-owned and private companies (Japanese companies, logistics-related)		
Mozambique Ports and Railways (CFM) Nacala Office	CFM North Executive Director, Nacala Port Director, Operation Manager at Nacala Port CFM North Chief Director, Port Maintenance, Operation Manager, etc.	March 4, March 5, March 7
Africa Global Logistics (AGL)	Mr. Pedro Mendes, Clearing & Forwarding Manager (Deputy Branch Manager) - Nacala Branch Country Head of Front Office - Mozambique	March 5, March 11
Nacala Logistics	Unknown	March 6
Manica Freight Services (Mozambique) S.A.	Branch Manager	March 17
Transnet	Country Head of Front Office-Mozambique	March 19
GreenLight	Director, Business Development	March 20

2. Supplementary Materials for the Main Text

Supplement [1-1] Mozambique National Development Strategy (ENDE) 2025-2044

VII. National Development Model and Macroeconomic Scenarios

7.1.2 Key Strategic Sectors

Infrastructure Sector - Modernizing and expanding infrastructure is fundamental to ensuring regional connectivity, securing access to essential services, and supporting the efficient development of key strategic sectors. Emphasis will be placed on building an integrated infrastructure network that underpins sustainable economic growth and improves the quality of life for citizens.

Priority tasks include guaranteeing regional connectivity, access to basic services, and the development of efficient transport and logistics corridors linking production areas to domestic and international markets.

VIII. Priorities and Pillars for Implementing ENDE

8.1 ENDE Priorities

iii. Overcome deficiencies in essential infrastructure, particularly in the transport, energy, water, and sanitation sectors, to promote economic growth, facilitate regional trade, and significantly improve the quality of life for residents.

8.2 Pillars for Strategy Implementation

Pillar III. Infrastructure, Institutions, and Territorial Organization

3.1 Pillar Objectives

a) Economic Infrastructure

i. Modernize and expand transportation networks to facilitate the movement of agricultural and industrial products, improve logistics efficiency, and reduce transportation costs

ii. Invest in port modernization to enhance cargo handling capacity and international competitiveness

3.2 Expected Effects

i. Improved accessibility and connectivity

3.3 Key Indicators and Targets

Port cargo handling volume

Target: Increase from 48,227 thousand tons (actual 2021 national port cargo handling volume) to 100,004 thousand tons

3.4 Priority Programs

Program 3.4.1 Economic Infrastructure

The objective is to promote the development of resilient and sustainable economic infrastructure that supports production and market access to boost economic growth. Robust infrastructure is fundamental to economic development, facilitating efficient goods transportation, reducing production costs, and promoting regional integration.

(i) Construction, maintenance, and rehabilitation of roads, railways, ports, airports, and power systems; (ii) Improving interregional connectivity to enhance competitiveness and productivity; (iii) Incentives for enterprises to expand into remote areas; and improvements to transport and communication systems.

IX. Strategy Implementation Mechanism

9.3 ENDE Funding and Estimated Costs

9.3.1 ENDE Funding Sources

i. Public Revenue

ii. Loans and External Financing

- World Bank and International Monetary Fund (IMF): These institutions provide loans on favorable terms to finance major infrastructure projects and social programs.
- African Development Bank (AfDB) and Other Regional Institutions: The AfDB, along with other

regional financial institutions, provides financial assistance for development projects tailored to the African context.

- International Cooperation Agencies: Agencies such as the United States Agency for International Development (USAID) and the Japan International Cooperation Agency (JICA) provide funding and technical assistance for development projects.

i. Public-Private Partnerships (PPP)

Collaboration with Private Companies:

- Sharing Resources and Risks: In large-scale infrastructure projects like roads, ports, and airports, PPPs enable the private sector to invest capital, share risks, and introduce expertise, while governments maintain regulatory and promotional roles.
- Accelerating Infrastructure Development: PPPs help accelerate the development of critical infrastructure that previously relied solely on public funding.
- Efficiency and Innovation: Private sector participation can bring efficiency and innovation to the management and operation of public services.
- Concession and Partnership Contract Models: These models are used to attract private investment into public works and infrastructure projects.

Supplement [1-2] Impact of increased shipping through African waters due to disruptions in the Suez and Panama Canals

Regarding the Suez Canal, following the armed conflict between Hamas and Israel that began in October 2023, the Houthi armed group in Yemen has repeatedly attacked vessels navigating the Red Sea region since November of that year[35]. In response, shipping companies have increasingly avoided the Red Sea and Suez Canal route, opting instead to detour around the Cape of Good Hope in South Africa.

Meanwhile, regarding the Panama Canal, the Panama Canal Authority began limiting the number of vessels permitted to transit the canal per day on July 30, 2023, due to the record drought that year causing a drop in the water level of Gatun Lake, the primary water source for canal operations. Prior to the restrictions, an average of 38 to 40 vessels transited daily. By December 2023, this was limited to 22 vessels per day. Subsequently, the restrictions gradually eased. From August 2024, the limit was relaxed to 35 vessels per day, gradually returning to pre-drought conditions.

Figure A-1 shows the number of vessels transiting the Cape of Good Hope, Suez Canal36, and the Panama Canal. It is based on data from PortWatch[37] showing the daily number of cargo ships and tankers affected by the "disruption in the Red Sea" and "traffic restrictions in the Panama Canal" (January 1, 2019, to June 30, 2015). The number of vessels transiting the Suez Canal and the Bab el-

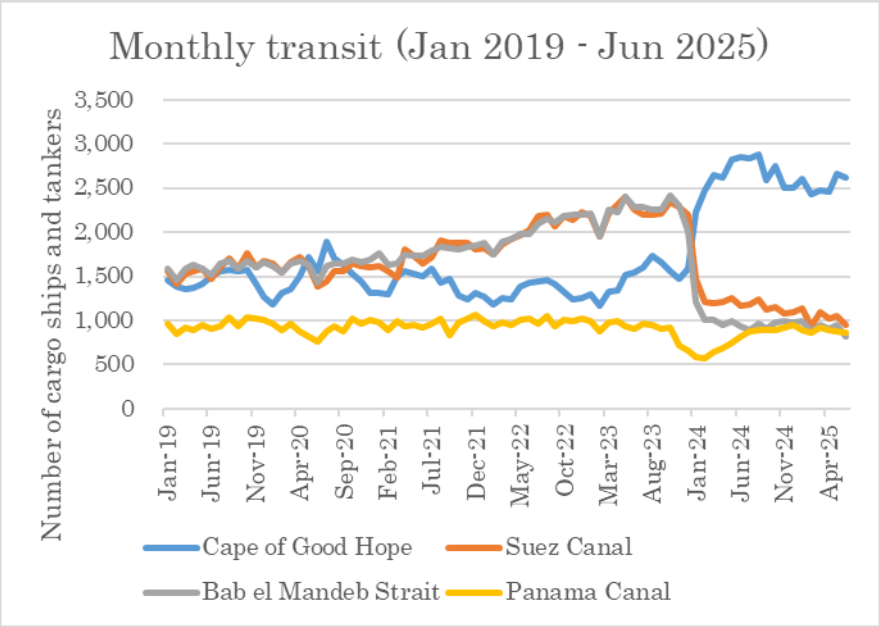
[35] The Houthis declared on November 19, 2023, that they would target vessels associated with Israel and hijacked the car carrier Galaxy Leader. While attacks by the Houthis on ships had temporarily subsided since December 2024, reports indicate the following two incidents occurred during the week of July 6, 2025.
(1) The bulk carrier Magic Seas (Liberian-flagged, operated by a Greek company) was sunk by missile and drone attacks.
(2) The bulk carrier Eternity C (Liberian-flagged, operated by a Greek company) was sunk by a rocket attack.
Source: "Search for survivors after Houthis sink second Red Sea cargo ship in a week, " BBC, July 10, 2025

[36] The Bab el-Mandeb Strait connects the Red Sea to the Gulf of Aden on the Indian Ocean side, located south of the Suez Canal. Sandwiched between Yemen and Djibouti, its narrowest point is approximately 15 km wide. Incidents of attacks on ships by the Houthis have occurred in these surrounding waters.

[37] PortWatch is an analytical tool provided by the International Monetary Fund (IMF) in collaboration with the University of Oxford. It is intended for use by policymakers, international organizations, and the general public to assess the impact of actual and future disasters, such as extreme weather events, on trade.

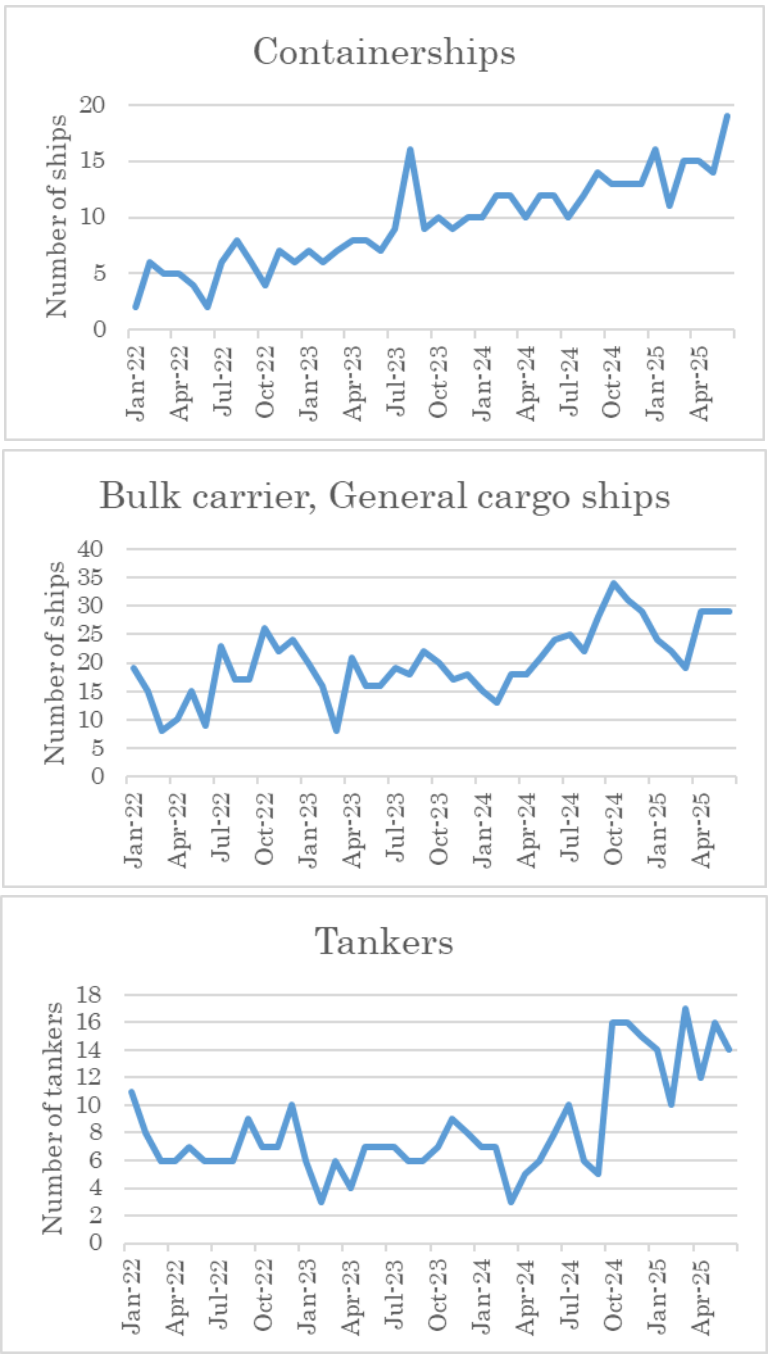
Mandeb Strait had been increasing since January 2019. However, it peaked in October 2023 (Suez Canal: approx. 2,350 vessels/month, Bab el-Mandeb Strait: approx. 2,420 vessels/month) and then sharply declined, falling to less than half the previous level(June 2025: Suez Canal: approx. 950 vessels/month, Bab el-Mandeb Strait: approx. 810 vessels/month). Traffic around the Cape of Good Hope surged sharply from approximately 1,560 vessels/month in November 2023 and has remained above approximately 2,500 vessels/month between March 2024 and June 2025 (June 2025: 2,620 vessels/month).

Meanwhile, Panama Canal traffic declined from approximately 950 vessels per month in August 2023 to about 580 vessels per month in February 2024 before rebounding. Since July 2024, traffic has consistently exceeded approximately 850 vessels per month, returning to levels seen before the start of transit restrictions (July 30,2023).



Source: Prepared by the JST based on data published on PortWatch

Figure A-1 Monthly vessel traffic trends at the Cape of Good Hope, Suez Canal, Bab el-Mandeb Strait, and Panama Canal



Source: Prepared by the JST based on Lloyd's List Intelligence Seasearcher

Figure A-2 Monthly vessel arrivals by type at Nacala Port and Nacala Port-a-Bela

Figure A-2 shows a graph based on AIS data depicting the monthly trend in the number of vessels entering Nacala Port and Nacala Port-a-Bela by vessel type (container ships, dry bulk carriers/general cargo ships, tankers) over a two-and-a-half-year period from January 2022 to June 2025[38]. All vessel types show an increasing trend in the number of arrivals, though the rate of increase differs. While container ships have generally increased at a steady rate over the two-and-a-half-year period, albeit with minor fluctuations, tankers have seen a sharp increase starting in October 2024, the latter half of the

[38] To analyze the relationship between the increase in vessels transiting around the Cape of Good Hope and the number of vessels calling at the ports of Nampula and Nampula-A-Bela, vessels likely used for domestic cargo transport or for refueling ships within the Gulf of Nampula have not been counted in the port call figures.

period. The growth pattern for dry bulk carriers and general cargo ships falls between the two former types. Among these three, the growth pattern for tankers closely resembles that of vessels transiting around the Cape of Good Hope, as shown in the graph at Figure A-2.

However, the tanker routes estimated to have transported imported petroleum products to Nampo Port in 2023 (1/1–12/31) are summarized at Table 1-18, tanker routes from Yanbu Commercial Port on the Red Sea coast to Nacala Port passed through the Bab el-Mandeb Strait five times annually. If this continues, a certain percentage (Table 1-18 indicates 67 tanker movements from overseas to Nacala Port in 2023. Five out of 67 is approximately 7%) of tankers could face potential risks. Therefore, the situation around the Red Sea could lead to a shift in the destination port (export port) for petroleum product imports at Nacala Port, moving away from Yanbu Commercial Port to other ports that do not require passage through the Bab el-Mandeb Strait (e.g., Fujairah Port in the UAE). If such a change actually occurs, from the perspective of its impact on the number of vessels calling at Nacala Port, the number of vessels might not change, as only the location of the destination port (export port) would change.

Considering the above, the sharp increase in tanker arrivals at Nacala Port since October 2024 may not be attributable to the rise in vessels transiting via the Cape of Good Hope due to the Red Sea situation, but rather influenced by other factors[39]. It can also be inferred that tanker imports increased following the resumption of rail freight transport to Malawi by Nacala Logistics, restarted in September 2024.

The shift of container shipping routes connecting Asia and Europe from the Red Sea/Suez Canal route to the Cape of Good Hope route has expanded. Ports in South Africa near the Cape of Good Hope, which have gained potential as transshipment hubs due to proximity to this new maritime route, stand to benefit most directly from this change. The South African government plans to expand the container terminal at the Port of Durban. If the use of the Cape of Good Hope route continues to increase over the long term, this could provide a boost to realizing this plan[40].

On the other hand, the location of Nacala Port is not as close to the Cape of Good Hope route as South African ports, making direct benefits less likely. Figure A-2 The increase in container ship arrivals at Nacala Port may be attributable to the commencement of operations at a modern container terminal under the ODA-funded "Nacala Port Development Project I & II" (completion in 2023).

Table A-1 Mozambique's Clinker Imports by Country (Value and Volume, 2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
World Total	63	1,036
Saudi Arabia	25	462
Singapore	11	210

[39] Another possible factor is the potential increase in fuel demand related to the LNG extraction project in Cabo Delgado province.

[40] The potential for serving as a transshipment port could disappear if the situation in the Red Sea stabilizes and the Red Sea/Suez Canal route recovers. Therefore, new investment plans heavily reliant on this potential are unlikely. It is more reasonable to consider this potential as a positive factor in investment decisions for new projects designed to meet demand under the premise that the situation in the Red Sea remains unaffected.

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
UAE	9	140
Hong Kong	10	104
Egypt	3	50
Others	4	70

Note: This shows the import value and quantity by country for items corresponding to [HS Code 252310] in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

Table A-2 Value and Quantity of Mozambique's Wheat Imports by Originating Country (2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
World Total	255	737
Russia	77	229
Canada	51	119
Lithuania	30	93
Latvia	12	82
Poland	22	70
Others	63	144

Note: This shows the import value and quantity by country for items corresponding to [HS Code 100190] in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

Table A-3 Value and Quantity of Mozambique's Rice Imports by Originating Country (2023)

Imports (Country → Mozambique)		
Country	**Trade Value (million USD)**	**Quantity (Thousand tons)**
World Total	347	554
India	128	220
Thailand	99	163
Vietnam	57	81
China	28	39
Pakistan	17	26
Others	19	14

Note: This shows the import value and quantity by country for items corresponding to [HS Code 100630] in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

[Reference] Shipping routes for dry bulk carriers transporting coal exported from Nacala Port

According to CFM port statistics, 146 vessels were moored at Nacala Port in 2023. Using Mozambique's export statistics published on WITS, the destination countries for Mozambique's coal exports in 2023 are summarized in Table A-4.

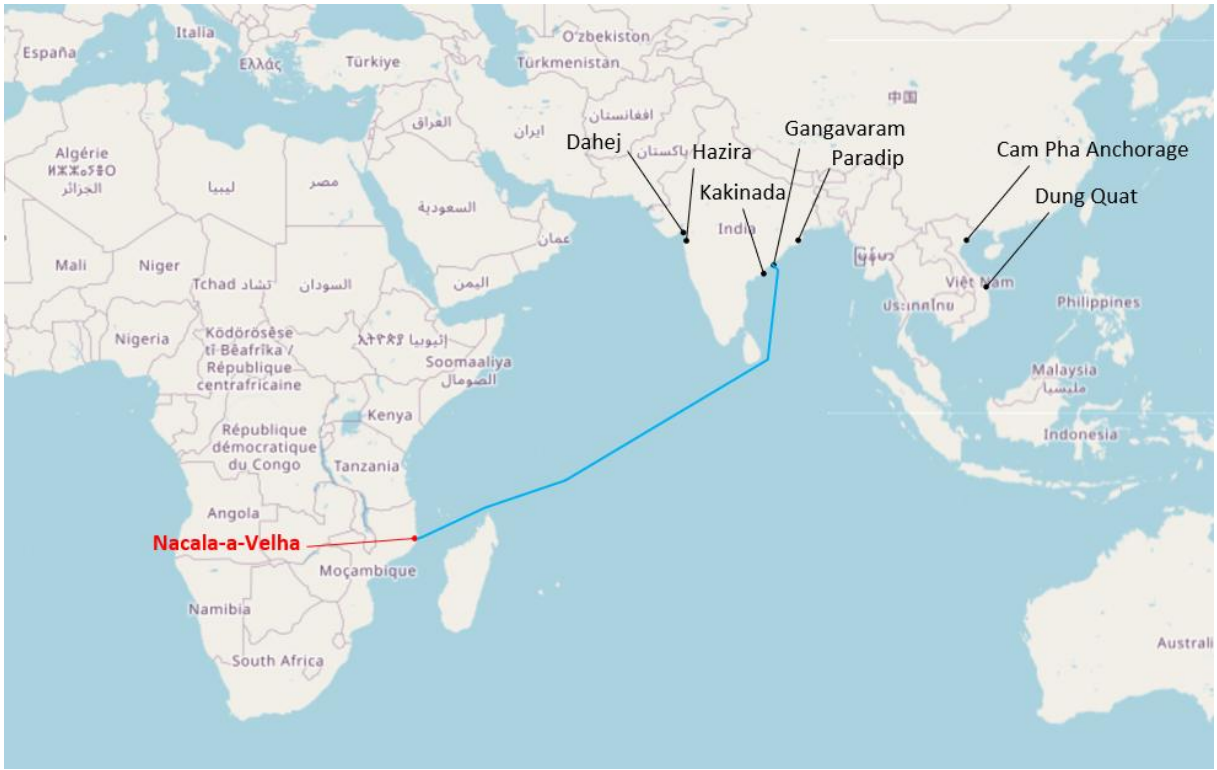
Table A-4 Mozambique Coal Exports by Destination Country (Value and Volume, 2023)

Exports (Mozambique → Destination Country)		
Destination Country	**Trade Value (million USD)**	**Quantity (thousand tons)**
Worldwide Total	1,761	13,083
India	570	5,364
Vietnam	244	2,387
Korea, Rep.	421	1,875
China	200	1,239
Netherlands	58	373
Others	267	1,844

Note: This shows the import value and quantity by country for items corresponding to [HS Code 270119] in Mozambique's import statistics.

Source: Compiled by the JST based on data published on WITS

Based on the above information, AIS data was used to analyze the movement routes of dry bulk carriers that made multiple calls at the coal berth in Nacala Port during 2023 (January 1 to December 31). Figure A-3 shows examples of port locations visited and movement routes. Figure A-3 shows that vessels also called at ports located behind steel mills in South Korea and Japan, in addition to those shown.



Source: Prepared by the JST based on Lloyd's List Intelligence Seasearcher and OpenStreetMap

Figure A-3 Example of a dry bulk carrier's movement route from Nacala-a-Velha Port

Supplement [1-3] <u>Estimated Cargo Movements and Primary Commodities of Tankers</u>

Table A-5 is an excerpt of 2023 data for items estimated to be transported as liquid bulk cargo, derived from Table 1-10 ~ Table 1-12 (Trends in cargo volume handled at Maputo, Beira, and Nacala ports

(2019–2023)). This data shows the domestic and international cargo volumes by item for Mozambique's major ports, but it does not identify the partner countries or ports.

Table A-5 Liquid Bulk Cargo Throughput at Maputo Port, Beira Port, and Nacala Port (2023)

1000 Toneladas Líquidas / 1000 Net Tonnes

Designação / Designation	2023 Liquid Bulk		
	Maputo	Beira	Nacala
1. Cabotagem / Cabotage	**9.7**	*0.0*	**12.4**
Embarque / Load	**9.7**	*0.0*	**12.4**
Gasóleo / Diesel	**9.7**	*0.0*	**12.4**
2. Internacional Moçambique / International Mozambique	**773.7**	**714.6**	**594.3**
Exportação / Exports	**39.1**	*0.0*	*0.0*
Gás / Gas	21.1	*0.0*	*0.0*
Melaço / Molasses	18.0	*0.0*	*0.0*
Importação / Import	**734.6**	**714.6**	**594.3**
Gasóleo / Diesel	343.3	335.5	346.2
Gasolina /Gasoline	203.1	82.9	99.0
Jet / Jet	43.4	10.3	20.7
GPL / LPG	41.8	6.4	*0.0*
Óleo / Oil	53.1	279.5	128.4
Alcatrão / Pitch	49.9	*0.0*	*0.0*
3. Transito / Transit	**837.5**	**2,595.8**	**17.3**
Exportação / Exports	**9.7**	*0.0*	*0.0*
Óleo / Oil	9.7	*0.0*	*0.0*
Importação / Imports	**827.8**	**2,595.8**	**17.3**
Avgas	10.2	*0.0*	*0.0*
Gasóleo / Diesel	689.8	1,751.0	17.3
Gasolina / Gasoline	1.1	762.4	*0.0*
Gás / Gas	1.6	*0.0*	*0.0*
GPL / LPG	4.3	4.9	*0.0*
Jet / Jet	120.8	77.5	*0.0*
4. Baldeação / Transhipment	*0.0*	*0.0*	***112.4***
Combustíveis / Fuel	*0.0*	*0.0*	112.4

Source: Compiled by the JST based on CFM data

For trading partner countries, we referenced Mozambique's 2023 trade statistics published on the World Integrated Trade Solution (WITS)[41]. The commodity classification in these trade statistics is based on the Harmonized System Code (HS Code), which differs from the commodity classification used in Mozambique's port statistics. Generally, the HS codes (consisting of 6-digit numbers) used for calculating tariff rates provide a finer classification of items than port statistics. However, in the statistics published on WITS, items appearing in Mozambique's port statistics such as diesel oil, gasoline, and jet fuel are grouped together and aggregated under "Petroleum Products"[42].

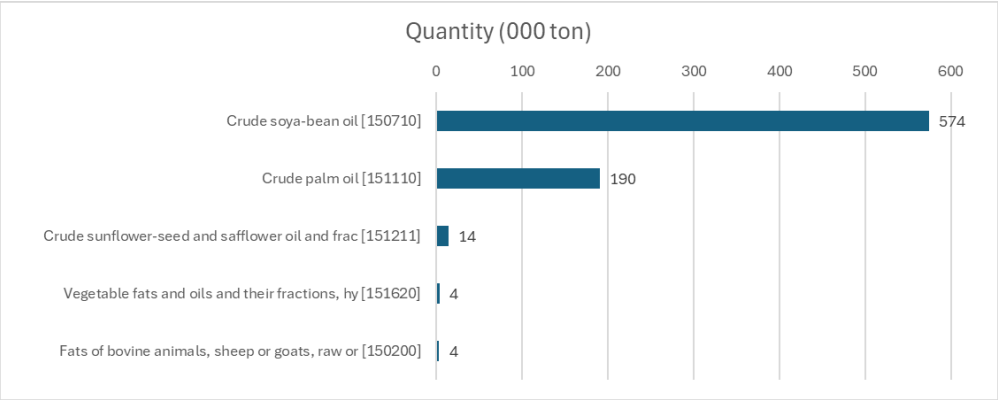
Conversely, the [Óleo / Oil] category in Mozambique's port statistics (believed to correspond to HS Chapter 15:[43]) is broken down into 52 distinct items in the statistics published on WITS.

Figure A-4 shows the top five import volumes for Mozambique in 2023 among items belonging to Chapter 15. Soybean oil [crude oil] ranked first in import volume, palm oil [crude oil] ranked second (about one-third of soybean oil), and sunflower oil and safflower oil ranked third (about one-tenth of palm oil). This indicates that most of the [Óleo / Oil] can be considered vegetable oils.

[41] Trade analysis tools developed by the World Bank in collaboration with international organizations such as the United Nations Conference on Trade and Development (UNCTAD)

[42] The HS code for gasoline is 271012, for diesel oil and jet fuel it is 271019, and for petroleum products it is 271000 (271000 is the higher-level classification encompassing 271012, 271019, etc.).

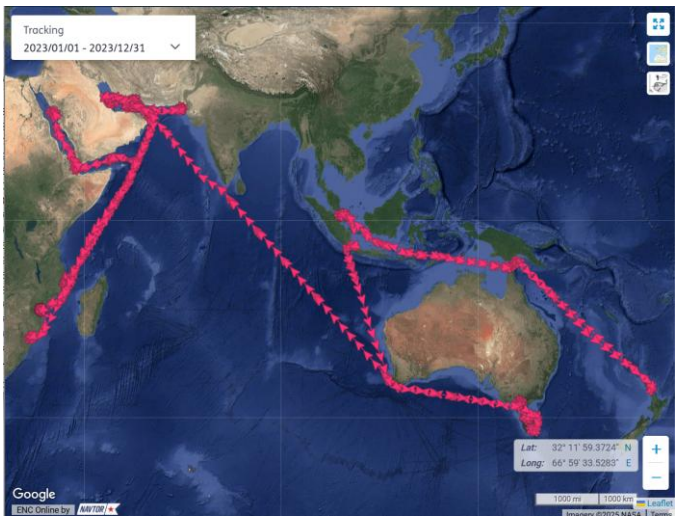
[43] HS Chapter 15 is "Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes."



Source: Compiled by the JST based on WITS data

Figure A-4 Top 5 Imported Items by Volume under HS Code Chapter 15 in Mozambique (2023)

Next, we describe the method used to estimate cargo movements by cross-referencing the above statistical information with AIS data. Figure A-5 shows the movement route of a tanker (one vessel) from January 1, 2023, to December 31, 2023, as determined using AIS data. Based on the vessel position and time information from the AIS data, it was confirmed that this tanker entered and departed the berthing area of the liquid bulk terminal at Nacala Port twice: from October 6 to October 9, 2023, and from December 24 to December 27, 2023. Furthermore, it was found that this tanker moved in the port sequence shown in Table A-6 before and after calling at Nampo. Table A-6 shows the tanker's movement from Saudi Arabia's Yanbu Commercial Port to Nacala Port (1-2). This aligns with the flow of petroleum product trade from Saudi Arabia to Mozambique (Mozambique imports) shown in Table A-5. Therefore, it is estimated that this tanker loaded petroleum products at Yanbu Commercial Port and moved to unload them at Beira Port and Nacala Port. Furthermore, by cross-referencing the tanker's movements and trade statistics from Ras Laffan Port (Qatar) to Nacala Port in Table A-6 , it is estimated that this tanker loaded petroleum products at Ras Laffan Port (Qatar) and Fujairah Port (UAE) and moved to discharge at Maputo Port, Beira Port, and Nacala Port.



Source: Lloyd's List Intelligence Seasearcher

Figure A-5 Example of a vessel's one-year movement route tracked using AIS data

Table A-6 Port sequence before and after Nacala Port call, identified using AIS data

No.	Port Sequence Before and After First Port Call at Nacala		No.	Port Sequence Before and After Second Port Call at Nacala	
	Port	Country		Port	Country
1-1	Beira	Mozambique	2-1	Qasim	Pakistan
1-2	Yanbu Commercial Port	Saudi Arabia	2-2	Ras Laffan	Qatar
13-	Beira	Mozambique	23-	Fujairah	UAE
1-4	Nacala	Mozambique	2-4	Maputo	Mozambique
1-5	Sitrah	Bahrain	2-5	Beira	Mozambique
—	—	—	2-6	Nacala	Mozambique
—	—	—	2-7	Jamnagar	India

Source: Edited by the JST based on Lloyd's List Intelligence Seasearcher

[Note]

Table A-6: Among the import values and volumes of petroleum products by country for Mozambique (2023) based on Mozambique's import statistics, Qatar is not listed Qatar is also not included in the breakdown of "Others" in Table A-6. However, in Table A-7 compiled based on export statistics from other countries showing export values and volumes of petroleum products to Mozambique (2023), Qatar ranks 5th.

Table A-7 Petroleum Product Exports to Mozambique by Country (2023)

Exports (Country → Mozambique)		
Country (Exporting Country)	Export Value (Million USD)	Quantity (thousand tons)
India	1,510	1,794
Oman	206	212
UAE	188	235
Malaysia	136	155
Qatar	130	133

Note: This shows the import value and quantity by country for items corresponding to [HS Code 271000] in each country's statistics.

Source: Compiled by the JST based on WITS data

Table A-6 and Table A-7 show discrepancies in amounts and quantities. While no information identifying the cause has been obtained, various possibilities exist, such as:

- Trade values (export and import values) differ between import and export statistics because freight and insurance costs are borne by either the buyer or the seller depending on trade terms such as FOB or CIF.
- For transactions via third countries, for example, the exporting country records the quantity shipped to the final importing country, while the importing country records the quantity as an import from the third country through which it transited.
- Transactions occurring near the end or beginning of a period may be recorded in different years' statistics by the exporting and importing countries.
- Simple errors (e.g., digit or unit mistakes).
- False declarations made by the declarant to customs.

The movements of tankers estimated to have been used primarily for importing petroleum products, palm oil, soybean oil, and various fats and oils to Nacala Port (referenced in Table A-17) are organized by country, showing the specific ports of call and number of calls. This data is presented in Table A-8 ~ Table A-11. Additionally, examples of port locations and movement routes for Table1-17 are shown in Figure A-6 ~ Figure A-8.

<Petroleum Products>

Table A-8 Port of call and number of calls for tanker routes estimated to be primarily for petroleum product imports

No.	Country	Number of Calls	Port [Number of Visits]
1	UAE	26	Fujairah [22], Ruwais Port [2], Jebel Ali [1], Sharjah/Khalid [1]
2	India	12	Kandla/Deendayal [3], New Mangalore [2], Jamnagar [2], Sikka [1] Vadinar [1], Chennai [1], Visakhapatnam [1], Paradip Port [1]
3	Bahrain	11	Sitrah [11]
4	Saudi Arabia	5	Yanbu Commercial Port [5]
5	Qatar	3	Ras Laffan [3]
6	Oman	3	Sohar [3]
7	Kuwait	1	Mina' al Ahmadi [1]
8	Malaysia	1	Tanjong Bin [1]
9	Thailand	1	Map Ta Phut [1]

Source: Prepared by the JST based on Lloyd's List Seasearcher, CFM Port Statistics, and World Integrated Trade Solution

Source: Prepared by the JST based on Lloyd's List Intelligence Seasearcher and OpenStreetMap

Figure A-6 Example of tanker movement routes primarily estimated for petroleum product imports

Figure A-6 shows a route calling at ports in the sequence Sitrah (Bahrain) – Fujairah (UAE) – "Nacala Port and Mozambican ports (Maputo, Beira, Pemba)" (hereafter referred to as Nacala Port, etc.). Among the movements counted as 40 times/year in Table 1-17 No.1, this route accounts for the highest number at 7 times/year. Adding Fujairah – Nacala, etc. [6 times/year] and Fujairah – Ports in India and the Gulf States other than Sitrah (Kandla/Deendayal, Jamnagar, Ras Laffin, Sohar, Mina' al Ahmadi, Jebel Ali,

Sharjah/Khalid) [9 times/year] brings the total to 22 times. This indicates that Fujairah Port serves not only as an export port for petroleum products to Mozambique but also as a distribution hub for petroleum products for India and Gulf countries. The Fujairah Oil Tanker Terminal (FOTT) at Fujairah Port is connected via pipelines to the storage facilities (tank farms) and refineries of multiple liquid cargo-related companies located in the Fujairah Oil Industry Zone (FOIZ) behind the port. This connectivity is considered to contribute to its role as a petroleum product distribution hub. Figure A-6 The second most frequent route shown in the Figure was Yanbu Commercial Port–Nacala Port, etc. [5 times/year].

<Palm Oil>

Table A-9 Port of call and frequency of tanker routes estimated to be primarily for palm oil imports

No.	Country	Number of Visits	Port [Number of Visits]
1	Malaysia	26	Pasir Gudang [5], Bintulu [5], Lumut [4], Kuantan [4], Port Klang [2] Penang [2], Kunak [1], Sungai Udang [1], Pengerang [1], Tanjong Bin [1]
2	Indonesia	21	Kualatanjung [10], Lubuk Gaung [4], Dumai [3], Balikpapan [1] Panjang [1], Pulau Laut [1], Teluk Bayur [1]

Source: Prepared by the JST based on Lloyd's List Seasearcher, CFM Port Statistics, and World Integrated Trade Solution

Source: JST based on Lloyd's List Intelligence Seasearcher, OpenStreetMap

Figure A-7 Example of tanker movement routes primarily estimated for palm oil imports

Figure A-7 shows a route calling at ports in the sequence: Kuantan (Malaysia) – Kualatanjung (Indonesia) – Durban – Port of Beira – Nacala Port. This movement pattern, involving ports in both Malaysia and Indonesia (1 to 3 ports each) followed by ports in Nacala and along the east coast of Africa, accounts for 17 out of the 21 movements counted annually for No.2 in Table 1-17.

<Soybean Oil>

Table A-10 Port of call and frequency of tanker routes primarily estimated for soybean oil imports

No.	Country	Number of Visits	Port [Number of Visits]
1	Argentina	4	San Lorenzo - San Martin [4], Bahia Blanca [1]

Source: JST compilation based on Lloyd's List Seasearcher, CFM Port Statistics, World Integrated Trade Solution

Source: JST based on Lloyd's List Intelligence Seasearcher, OpenStreetMap

Figure A-8 Example of tanker movement routes estimated to be primarily for soybean oil imports

Figure A-8 shows the route of movement calling at ports in the following order: San Lorenzo - San Martin (Argentina) – Kualatanjung (Indonesia) – Beira Port – Nacala Port. The Port of San Lorenzo - San Martin is located approximately 300 km upstream from the mouth of the Río de la Plata and plays a vital role as a central hub for Argentina's agricultural exports. Table 1-17 In the movements counted as No.3 (4 times per year) in the table, all calls at 23- terminals in the Port of San Lorenzo - San Martin were followed by calls at ports in Mozambique (and South Africa).

<Various Oil and Petroleum Products>

Table A-11 Port of call and number of calls for tanker routes presumed to be for importing various oils and petroleum products

No.	Country	Number of Calls	Port [Number of Visits]
1	Netherlands	2	Rotterdam [2]
2	Spain	2	Algeciras [1], Bilbao [1]

No.	Country	Number of Calls	Port [Number of Visits]
3	Belgium	1	Antwerp [1]
4	Germany	1	Hamburg [1]

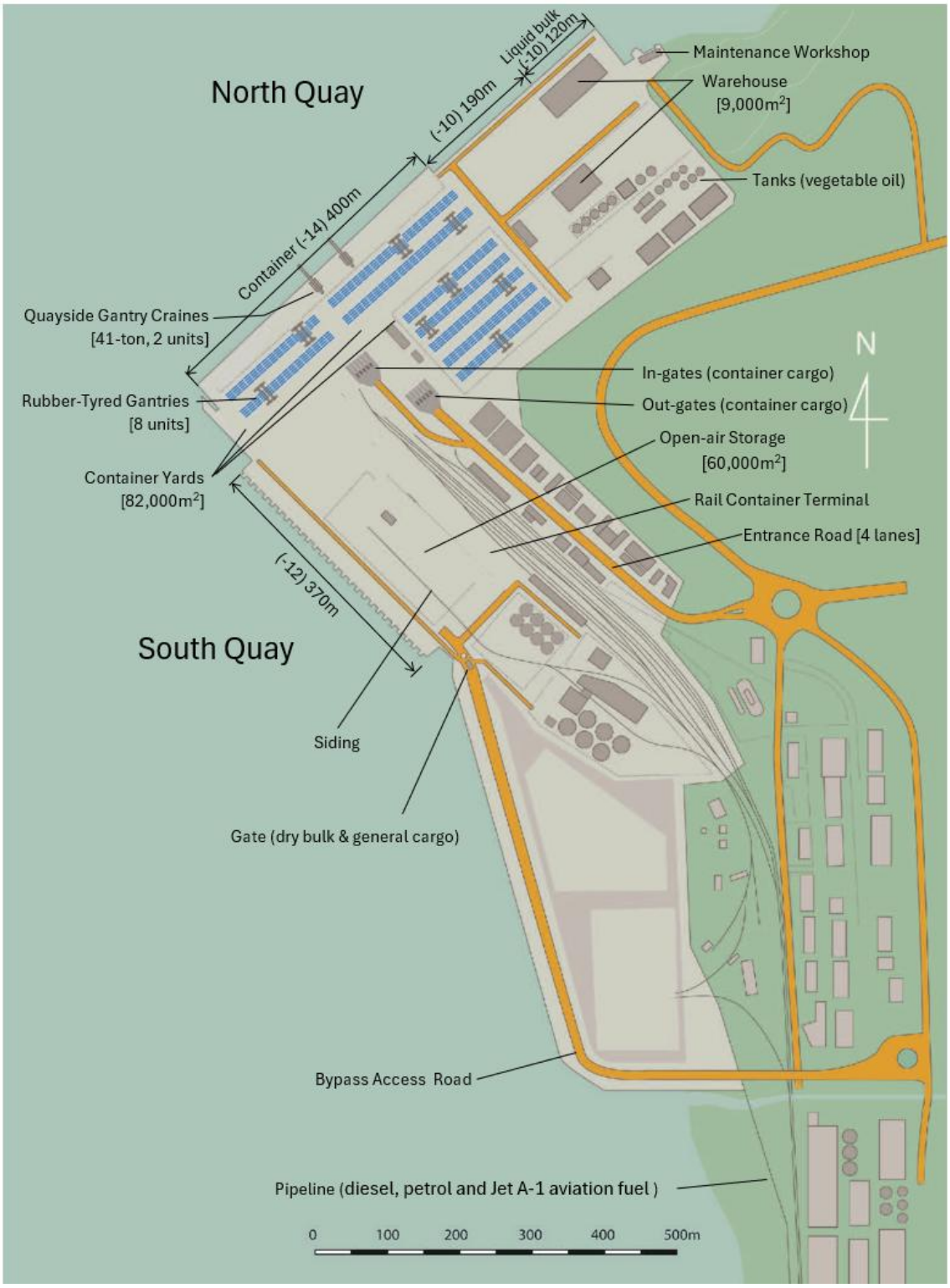
Source: Compiled by the JST based on Lloyd's List Seasearcher, CFM Port Statistics, and World Integrated Trade Solution

Source: Created by the JST based on Lloyd's List Intelligence Seasearcher and OpenStreetMap

Figure A-9 Example of tanker movement routes estimated for importing various oils and petroleum products

Supplement [1-4] <u>Main Port Facilities at Nacala Port</u>

The following details each terminal's facility specifications, current photos (taken during the March 2025 field survey), operational status, and challenges, including yards (cargo handling areas, open storage areas) functioning alongside berths, cargo handling machinery, and storage facilities.



Source: Prepared by the JST based on the NACALA PORT HANDBOOK & DIRECTORY

Figure A-10 Location of Major Port Facilities in Nacala Port

Container Terminal

Grant Aid Project "Nacala Port Emergency Rehabilitation Plan" (Grant Agreement Signed: December 2012), Yen Loan Project "Nacala Port Development Project I" (Loan Agreement Signed: March 2013), Yen Loan Project "Nacala Port Development Project II" (Loan Agreement Signed: June 2015) deepened

the North Pier, developed facilities such as a container yard, and introduced high-efficiency cargo handling machinery.

Table A-12 Specifications of Facilities and Cargo Handling Equipment at the Container Terminal

Facilities and Cargo Handling Machinery	Specifications
Container Berth	Length 400m, Water Depth -14m
Container Yard	Area: 82,000 sqm, Storage Capacity: 8,000 containers Reefer Container Plugs: 200 outlets
Rail Transfer Yard	Length 260m
Container gates	Booth count: Entry: 5 booths, Exit: 5 booths
Entrance Road	4 lanes
Cargo Handling Machinery	Gantry Cranes: 2 units (41-ton capacity) Rubber-Tired Transfer Crane (RTG): 8 units (6 rows, 5-tier stacking) Reach stackers: 9 units
Storage Facilities	Warehouses: 2 buildings (storage area: 9,000 sqm)
Lighting towers	7 units

Photo by JST (March 6, 2025)

Figure A-11 Container Terminal (from northeast aerial view)

Photo by JST (March 6, 2025)

Figure A-12 Container Terminal (from southwest aerial view)

Photo by JST (March 6, 2025)

Figure A-13 Reefer Container Power Supply Status, Reefer Plug Installation Status

Photo by JST (March 6, 2025)

Figure A-14　Full view of container gate

Photo by JST (March 6, 2025)

Figure A-15　Container Gate (Entrance)

Photo by JST (March 6, 2025)

Figure A-16　Container Gate (Exit)

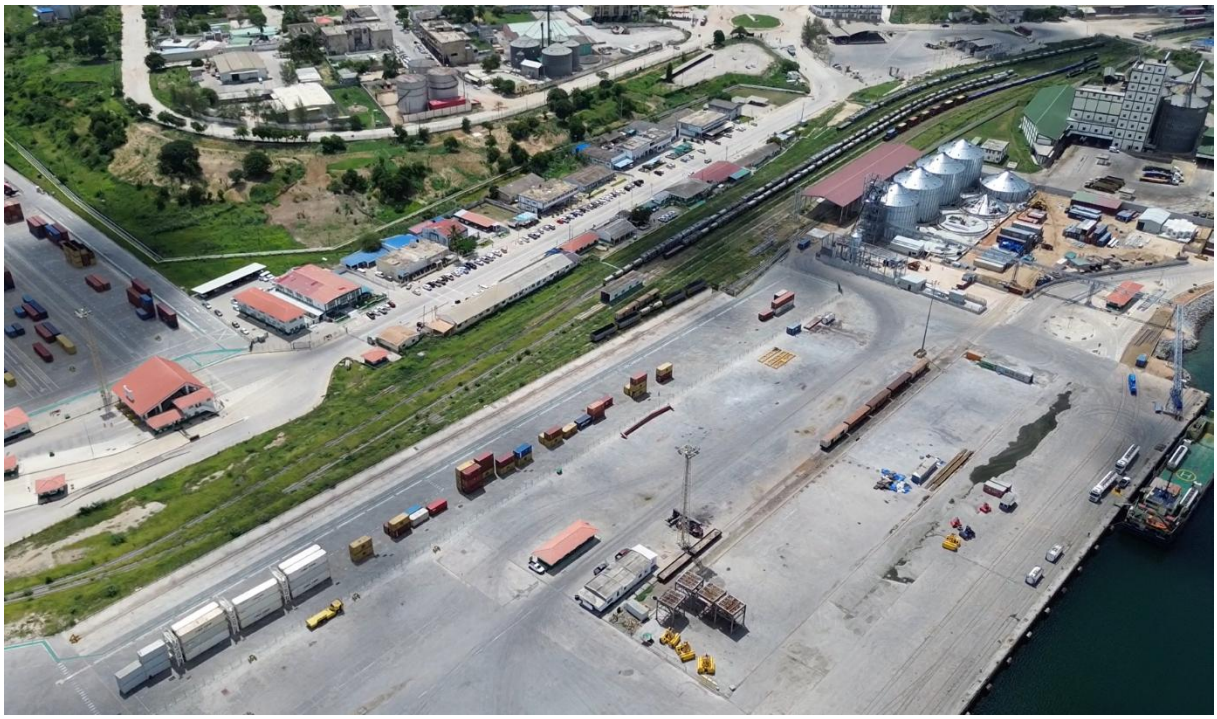


Photo by JST (March 6, 2025)

Figure A-17　Railway transshipment yard (lower left to center) and freight car loaded with containers (upper right)

Photo by JST (March 6, 2025)

Figure A-18　Railway transshipment yard

Photo by JST (March 6, 2025)

Figure A-19　Gantry Crane

Photo by JST (March 6, 2025)

Figure A-20　Rubber-Tired Transfer Crane (RTG) (Aerial View)

Photo by JST (March 6, 2025)

Figure A-21 Rubber-Tired Gantry Crane (RTG) (ground view)

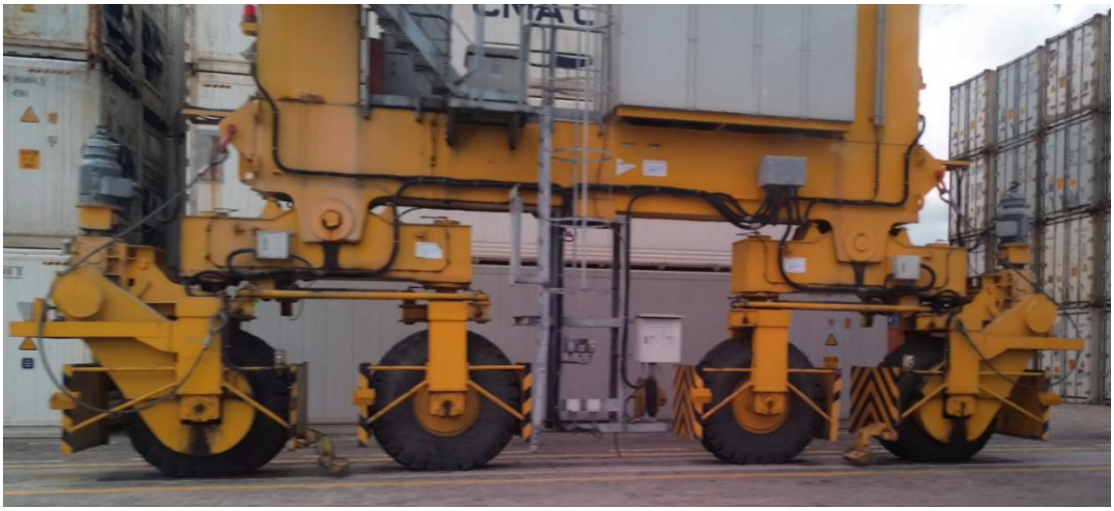


Photo by JST (March 6, 2025)

Figure A-22 Structure around the tires of a Rubber-Tired Transfer Crane (RTG)

Regarding the operational status of the container terminal, AIS data was used to analyze the number of times container ships (full container ships, semi-container ships) berth at the berths of Nacala Port (≈ number of ships entering port) and the number of days.

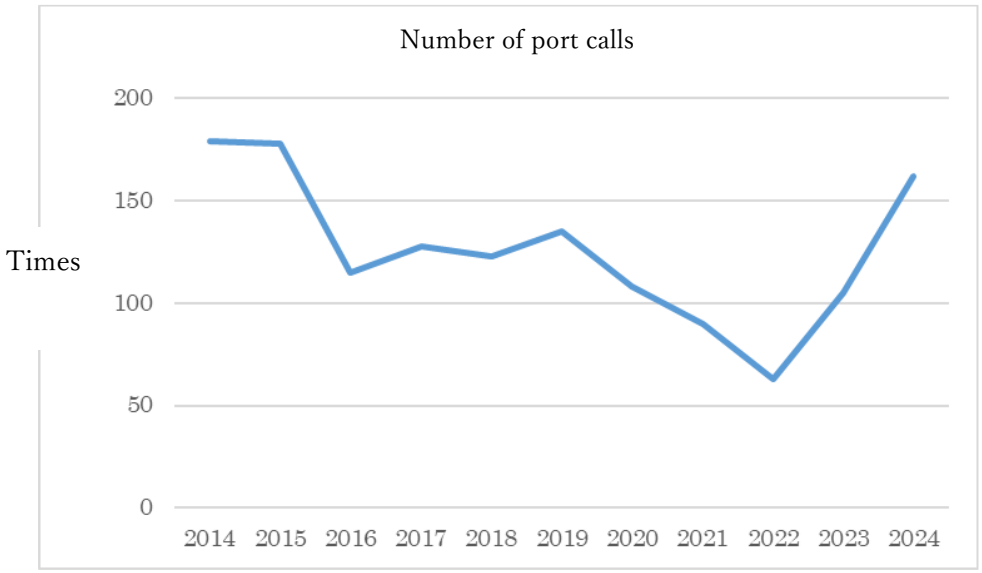
The number of berthing occasions had been declining since 2014 but, after bottoming out at 63 in 2022, increased sharply, reaching 162 in 2024 - more than double the 2022 Figure. This is close to the 2014 level of 179 (Figure A-23).

This trend closely mirrors the evolution of container throughput at Nacala Port (annual, unit: TEU). Container throughput at Nacala Port increased steadily from the 2000s. Growth accelerated around 2010, partly due to cargo related to projects implemented in the hinterland (such as railway upgrades). After

peaking in 2014, it entered a decline phase. However, it bottomed out in 2022 and surged sharply, recovering to the 2014 peak level by 2023. (The difference lies in the greater magnitude of the decline in container throughput between 2020 and 2020) (Figure A-24).

The trend in the annual average number of days container ships spent at berth is shown in Figure A-25. This shows that berthing days peaked at 6.7 days in 2021 and then decreased sharply, falling to 1.9 days in 2024. Compared to 2014 (a year with berthing frequency and container throughput levels similar to 2024), this represents only about half the number of days, or 3.6 days.

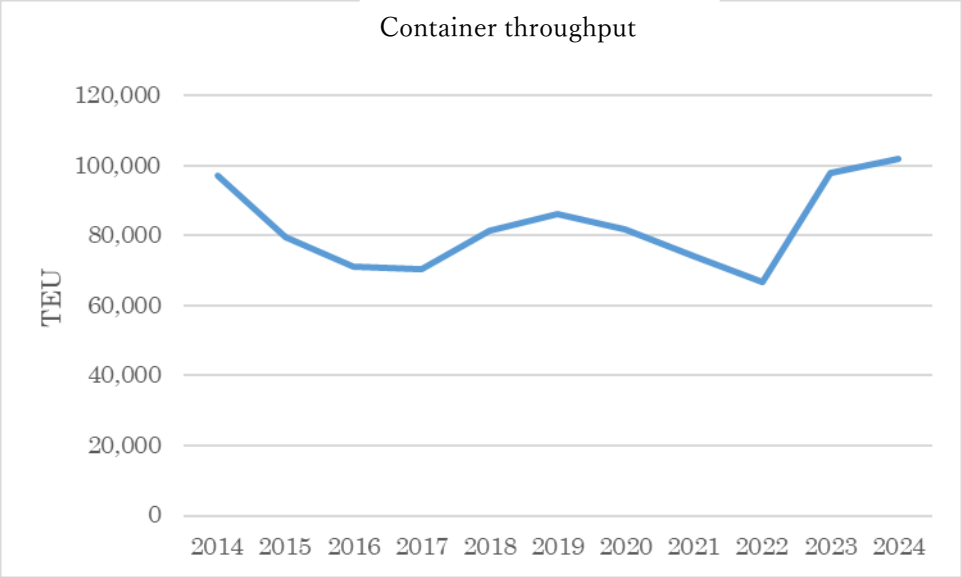
This may be a result of improved efficiency at the container terminal, achieved through projects like the yen loan-funded "Port Nacala Development Project."



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Number of Docking Times (Times)	179	178	115	128	123	135	108	90	63	105	162

Source: Prepared by the JST based on data from Lloyd's List Intelligence's Seasearcher

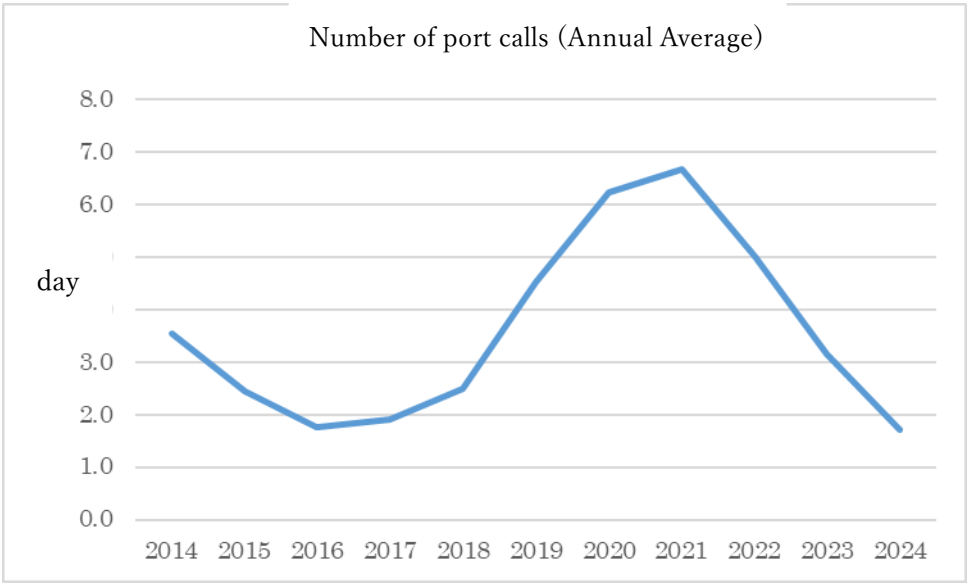
Figure A-23 Annual trend in container ship berthing at Nacala Port



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Container Throughput (TEU)	97,024	79,417	71,142	70,248	81,217	86,327	81,608	73,915	66,588	97,988	102,000

Source: CFM (2024 data from CFM interview article; other years from CFM statistical materials)

Figure A-24 Trend in Container Handling Volume (Annual) at Nacala Port



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Days at Anchor (Annual Average) (Days)	3.6	2.4	1.8	1.9	2.5	4.5	6.2	6.7	5.0	3.2	1.9

Compiled by the JST based on data from Lloyd's List Intelligence's Seasearcher

Figure A-25 Trend in the average annual number of days container ships berth at Nacala Port

South Wharf

Grant Aid Project "Nacala Port Emergency Rehabilitation Plan" (Grant Agreement Signed: December 2012), Yen Loan Project "Nacala Port Development Project I" (Loan Agreement Signed: March 2013),

Yen Loan Project "Nacala Port Development Project I" (Loan Agreement Signed: June 2015). Until the container terminal was developed at the North Pier, the South Pier served as the container terminal. After the container terminal functions were transferred to the North Pier, the South Pier is now used as a multipurpose terminal handling dry bulk and general cargo.

Table A-13 Specifications of Facilities and Cargo Handling Equipment at the South Pier

Facilities and Cargo Handling Machinery	Specifications
Multi-purpose Berth	Length 370m, Water Depth -12m
Yard (Open Storage Area)	Area: 60,000 sqm
Railway spur line	2 lines
Gates	Vehicle Weighing Platforms 2 units
Bypass access road	4 lanes (currently operating as 2 lanes)
Loading/unloading equipment	Grab: 8 units, Bulk Hopper: 8 units
Lighting towers	4 units

Source: JST

Photo by JST (March 6, 2025)

Figure A-26 South Pier Multipurpose Berth

Photo by JST (March 6, 2025)

Figure A-27　South Pier Yard, Railway Siding

Photo by JST (March 6, 2025)

Figure A-28　South Pier Bulk Hopper, Grab

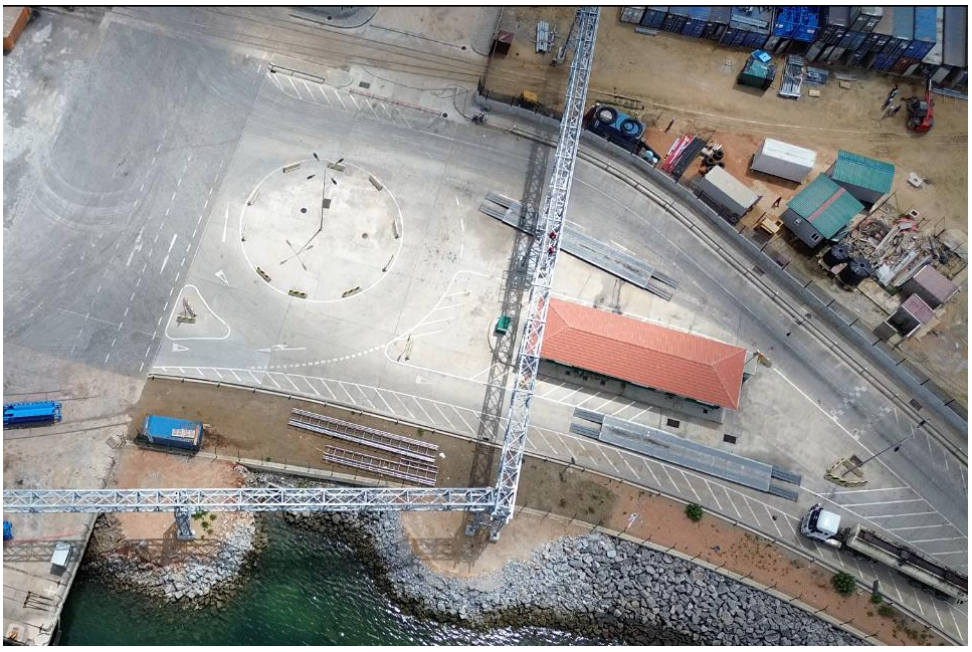


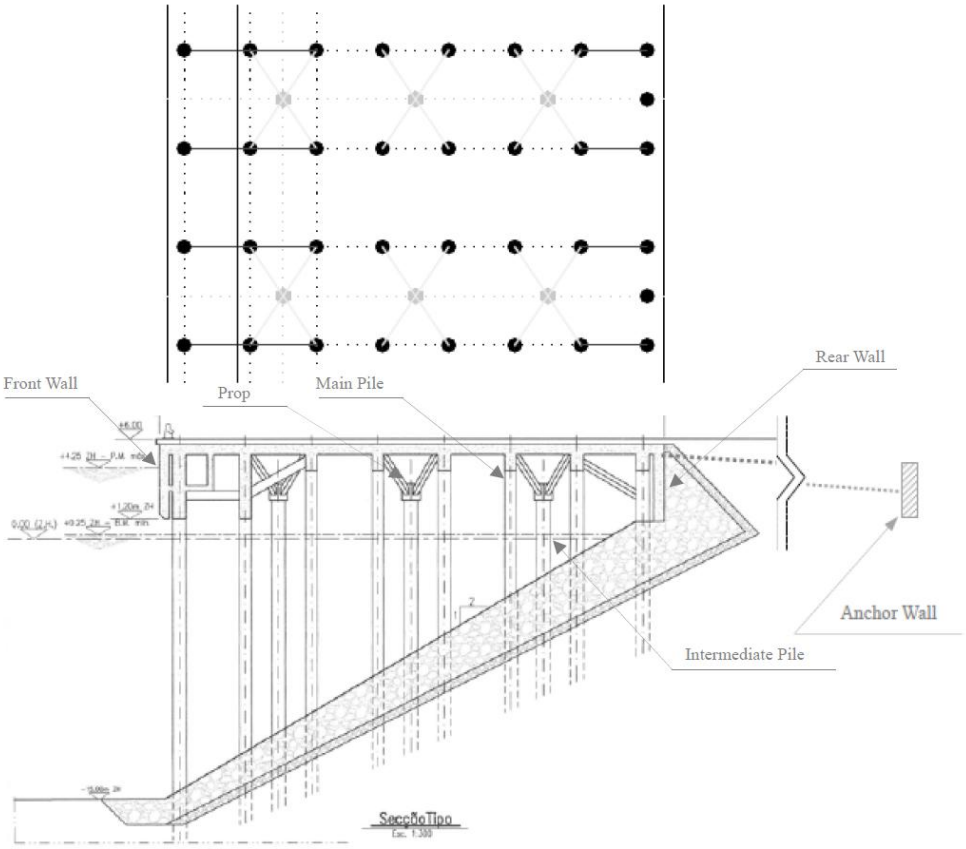
Photo by JST (March 6, 2025)

Figure A-29 South Pier Gate, Vehicle Weighbridge

Additionally, the following box cites information from the Nacala Port Development Project Preparatory Survey Report (2011) while describing the quay structure at South Pier.

A representative cross-section of the South Pier quay structure is shown in Figure and Figure A-30 While the structural form is classified as a direct pile pier structure, the pile and beam sections feature a complex configuration (Figure A-30 show a plan view illustrating the pile and beam arrangement to explain this complex structure).

The deck consists of 60cm thick prestressed concrete (PC) and 25cm thick concrete pavement. Approximately 750mm diameter vertical piles (piles are reinforced concrete encased in steel pipe covers) supporting the deck slab bear the vertical loads from the deck. Impact forces generated by ships may be distributed via horizontal and diagonal props connecting the piles at the front (ship side) three piles. Horizontal forces may be distributed via the main piles and four diagonal props (connecting the main piles to the intermediate piles, which have a top elevation of approximately +3.4m). Towing forces from moored vessels and seismic forces are supported by the anchor wall behind the quay, connected to the concrete deck slab via seven 0.5-inch cables. The deck slab is pre-stressed concrete (PC), with PC tendons embedded in the concrete at 1-meter intervals both vertically and horizontally.



Note: Corresponds to Figure 1-60 cited in the preceding text

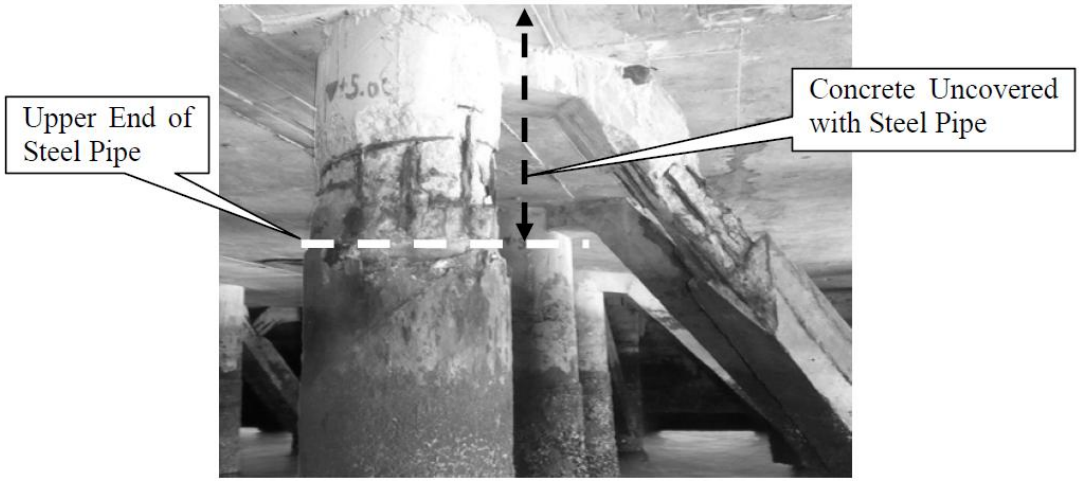
Source: PROMAN, The preparatory survey on Nacala Port Development Project in the Republic of Mozambique: Final Report (2011)

Figure A-30 Typical Cross-Section of the South Pier Quay Structure

Furthermore, the "Nacala Port Development Project Preparatory Survey" (2011) conducted additional investigations based on the results of visual inspections of concrete surfaces, measurements of concrete cover thickness, and measurements of chloride content in concrete performed in 2008 by Oz, Lda., commissioned by the Portuguese consulting firm PROMAN. Based on these findings, the survey assessed the current condition of the quay structure, evaluated it, and considered methods for its renovation. The following box summarizes the key points.

1) Current Condition of Reinforced Concrete Piles

As shown in Figure A-31, the upper sections of piles not covered by steel pipe casings are damaged, exposing corroded reinforcement bars. The sections without steel pipe casings are presumed to be most vulnerable to bending moments.



Note: Corresponds to Figure 1-60 cited in the preceding text

Source: The preparatory survey on Nacala Port Development Project in the Republic of Mozambique: Final Report (2011)

Figure A-31 Condition of Damage to Piles and Supports Beneath the Deck Slab

For a total of 470 piles, excluding those inaccessible due to tidal fluctuations or the influence of the structure itself, the degree of deterioration was assessed using the criteria in Table A-14, resulting in a four-tier rating from A to D. The results are shown in Table A-15. 90.4% of the piles received an A rating (significantly deteriorated).

Table A-14 Criteria for Assessing the Degradation Level of Concrete Members

Degree of Deterioration	Assessment Criteria
D	No significant deterioration, damage, or defects. Minor localized cracking or damage is present.
C	Significant cracking, hollowed-out concrete, and minor spalling are present.
B	Significant spalling and severe corrosion of reinforcing bars.
A	Severe spalling and corrosion of weak reinforcement.

Note: Corresponds to Table 1-36 cited in the preceding text

Source: The preparatory survey on Nacala Port Development Project in the Republic of Mozambique: Final Report (2011)

Table A-15 Inspection results of piles under the deck slab

Block	Degree of deterioration of main piles				Total
	D	C	B	A	
1	1	7	0	122	130
2	0	9	0	166	175
3	11	10	7	137	165
Total	12	26	7	425	470
%	2.6	5.5	1.5	90.4	100.0

Note: Corresponds to Table 1-37 cited in the preceding text

Source: The preparatory survey on Nacala Port Development Project in the Republic of Mozambique: Final Report (2011)

2) Evaluation of Reinforced Concrete Piles

- Since the port began operation, external forces have been acting on the reinforced concrete quay structures.
- Due to their nature, reinforced concrete structures develop microcracks when subjected to bending moment stresses.

- Repeated bending moments from external forces have caused micro-cracks to form and progress within the members.
- As the width of the cracks increases, the reinforcing bars rust, and the concrete cover peels off.
- Nearly all reinforcing bars are completely rusted, reaching the final stage of deterioration.

3) Evaluation of the Remaining Strength of the South Pier Quay Structure

- No cracks or openings were observed between the deck slab and the yard, and the anchor wall appears to be effective.
- No localized settlement is observed in the deck slab, and pile bearing capacity appears to be maintained.
- The deck slab is generally in sound condition.
- There is almost no reinforcing bar remaining at the top of the pile, with a remaining diameter of approximately 600 mm. However, it appears capable of withstanding axial force.
- The front wall and rear wall are effective against horizontal forces.
- The columns are severely damaged to the point of being structurally ineffective. However, the pile-supported structural system remains effective even without the columns.
- The chloride ion concentration in the concrete is elevated in all structural members of the quay wall, except for the deck slab.

This quay wall is considered structurally serviceable, particularly since the anchors and rear wall remain structurally effective. This structural condition restrains overall facility displacement and minimizes the generation of bending moments against external forces. Therefore, even if the piles do not retain durability against bending moments, this pile-supported structural system can withstand external forces from vessels. However, the concrete in the front/rear walls is definitely deteriorated.

Therefore, supported by the deteriorated concrete rear wall and anchor wall, the pile-supported structure system can be said to currently be in a "vulnerable" state of stability.

4) Considerations Regarding the Renovation of the South Pier Quay Structure (Pile-Supported Structure System)

- Regarding the deteriorated concrete rear wall, if the existing wall could be demolished and completely renovated, the facility could be used for several decades. However, during renovation work, the earth pressure acting on the rear wall would cease, causing the entire structure to become unstable.
- Similarly, when renovating the underground anchor wall, excavating the surrounding ground eliminates the earth pressure, affecting the stability of the quay structure just as it does the rear wall.
- Thus, the release of earth pressure caused by the excavation work necessary for renovation disrupts the mechanical balance of the structural system, inducing instability in the structure during the renovation work.
- Even if the rear wall and anchor wall renovations are successful, it is impossible to restore the bending resistance of the damaged pile heads, so the vulnerability of the structure remains unchanged.

Therefore, as a comprehensive repair method for the structure, demolishing the entire structure and constructing a new one is the most practical approach.

Supplement [1-5] <u>Container Routes for Each Port</u>

Table A-16 ~ Table A-22 organizes information on container shipping routes for each port, including operating shipping companies, service names, example port call routes, vessel types (full container ships, semi-container ships, etc.), maximum TEU capacity, number of vessels deployed for the service, and port call frequency. Maps showing the locations of ports listed in the route examples are also included.

Table A-16 Container Routes for Nacala Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	COSCO (EMS)	Mombasa – Maputo – Beira – **Nacala** – Mombasa	FC, 1100 to 1200 TEU × 2 vessels, Once every 1 to 2 weeks
2	MSC (IND OC 4)	Port Louis – **Nacala** – Moroni - Port Louis	FC, 900 TEU × 1 vessel, Once every 2 weeks
3	MSC (EAST AFRICA EXPRESS)	Khalifa – Ras al Khaimah – Bahrain – Mundra – Colombo – Mombasa – Beira – Maputo – **Nacala** – Mombasa – Mundra – Dammam – Khalifa	FC, 3300 to 4600 TEU × 5 vessels, Weekly
4	CMA-CGM (NOURA EXPRESS)	Jebel Ali – Mogadishu – Mombasa – Beira – **Nacala** – Port Victoria – Jebel Ali	FC, 1600 to 2300 TEU × 5 vessels, Weekly
5	UAFL (MIDDLE EAST EXPRESS)	Nhava Sheva – Karachi – Jebel Ali – Port Victoria – **Nacala** – Mutsamudu – Nhava Sheva	FC/GC, 1800 to 1900 TEU × 2 vessels, Once every 2 to 3 weeks
6	PIL (MZS)	Singapore – Port Louis – Pointe des Galets – Toamasina – Maputo – Beira – **Nacala**	FC, 1800 to 2000 TEU × 5 vessels, Weekly

Note 1: FC: Full Container Ship, GC: General Cargo Ship
Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: Prepared by the JST based on OpenStreetMap

Table A-17 Container Shipping Routes at Dar es Salaam Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	Messina (E AF)	Genoa – Salerno – Alexandria – Iskenderun – Port Said – Jeddah – Mombasa – **Dar es Salaam** – Durban – Maputo – **Dar es Salaam** – Mombasa – Jeddah – Genoa	FC, 4400 to 4600 TEU × 3 vessels Once every 3 weeks
2	Maersk (MASIIKA)	Jebel Ali – Salalah – **Dar es Salaam** – Salalah – Port Qasim - Jebel Ali	FC, 2500 to 2800 TEU × 7 vessels, Weekly
3	HDS Lines (SAS 2)	Bandar Abbas – Kandla – **Dar es Salaam** – Zanzibar – Bandar Abbas	FC, 2500 TEU × 2 vessels, Monthly
4	OOCL / Sea Lead Shipping / TS Lines (EAX5/IDEA)	Nhava Sheva – Mundra – Jebel Ali – Khalifa – Mombasa – **Dar es Salaam** – Nhava Sheva	FC, 1100 to 2, 200 TEU × 4 vessels, Weekly
5	CMA-CGM/Emirates Shipping/ Hapag-Lloyd (SWAHILI EXPRESS/ EA2)	Nhava Sheva – Mundra – Jebel Ali – Mombasa – **Dar es Salaam** - Nhava Sheva	FC, 3600 to 4300 TEU × 5 vessels, Weekly
6	COSCO/Maersk (EAX2/MAZURI)	Tanjung Pelepas – Singapore – **Dar es Salaam** - Tanjung Pelepas	FC, 2500 to 2800 TEU × 5 vessels, Weekly
7	CMA-CGM (ASEA TANZ)	Singapore – Tanjung Pelepas – Port Klang – Colombo – Male – Port Victoria – **Dar es Salaam** – Mtwara – Colombo – Singapore	FC, 2200 to 2600 TEU × 7 vessels, Weekly
8	MSC (DAR ES SALAAM EXPRESS)	Singapore – Mombasa – **Dar es Salaam** – Colombo – Singapore	FC, 2600 to 4700 TEU × 6 vessels, Weekly
9	Gold Star/Hapag-Lloyd/ ONE/PIL (EA4)	Shanghai – Ningbo – Nansha – Singapore – Port Klang – **Dar es Salaam** – Port Klang – Singapore – Shanghai	FC, 2700 to 3600 TEU × 7 vessels, Weekly
10	Emirates Shipping/GFS/ Interasia/KMTC/RCL/ TS Lines (FAX/IEA/EAX)	Qingdao – Shanghai – Ningbo – Nansha – Port Klang – Mombasa – **Dar es Salaam** – Port Klang – Qingdao	FC, 2500 to 2800 TEU × 8 vessels, Weekly

Note 1: FC: Full Container Ship

Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: Prepared by the JST based on OpenStreetMap

Table A-18 Container Routes at Port Klang

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	COSCO (EMS)	Mombasa – Maputo – **Beira** – Nacala – Mombasa	FC, 1100 to 1200 TEU × 2 vessels, Once every 1 to 2 weeks
2	MSC (MOZAMBIQUE SHUTTLE)	Maputo – **Beira** – Coega – Maputo	FC, 2700 to 2800 TEU × 2 vessels, Weekly
3	Feedertech/ONE (MIM)	Jebel Ali – Mundra - Nhava Sheva – Mombasa – **Beira** – Maputo – Jebel Ali	FC, 1700 to 1900 TEU × 3 vessels Once every 1 to 2 weeks
4	CMA-CGM (NOURA EXPRESS)	Jebel Ali – Mogadishu – Mombasa – **Beira** – Nacala – Port Victoria – Jebel Ali	FC, 1600 to 2300 TEU × 5 vessels, Weekly
5	PIL (MZS)	Singapore – Port Louis – Pointe des Galets – Toamasina – Maputo – **Beira** – Nacala – Singapore	FC, 1800 to 2000 TEU × 5 vessels, Weekly
6	CMA-CGM/Maersk (MOZEX/SAFARI 3)	Singapore – Tanjung Pelepas – Pointe des Galets – Maputo – **Beira** – Pointe des Galets – Singapore	FC, 3400 to 4300 TEU × 7 vessels, Weekly
7	MSC (EAST AFRICA EXPRESS)	Khalifa – Ras al Khaimah – Bahrain – Mundra – Colombo – Mombasa – **Beira** – Maputo – Nacala – Mombasa – Mundra – Dammam – Khalifa	FC, 3300 to 4600 TEU × 9 vessels, Weekly

Note 1: FC: Full Container Ship

Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: JST based on OpenStreetMap

Table A-19 Container Shipping Routes at Maputo Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	CSAL/MACS (GAL)	Houston – Brownsville – New Orleans – Walvis Bay – Cape Town – Durban – **Maputo** – Richards Bay – Durban – Cape Town – Walvis Bay – Houston	SC, 1000 to 1800 TEU × 4 vessels, Monthly
2	MACS (MACS)	Rotterdam – Hamburg – Antwerp – Leixoes – Walvis Bay – Cape Town – Port Elizabeth – **Maputo** – Durban – Cape Town – Walvis Bay – Vigo – Rotterdam	SC, 400 TEU × 1 vessel, Once every 2 weeks
3	Messina (E AF)	Genoa – Salerno – Alexandria – Iskenderun – Port Said – Jeddah – Mombasa – Dar es Salaam – Durban – **Maputo** – Dar es Salaam – Mombasa – Jeddah – Genoa	FC, 4400 to 4600 TEU × 3 vessels, Once every 3 weeks
4	MACS (ACS COASTAL)	Durban – **Maputo** – Durban	FC, 400 TEU × 1 vessel, Once every 2 weeks
5	MSC (MOZAMBIQUE SHUTTLE)	**Maputo** – **Beira** – Coega – **Maputo**	FC, 2700 to 2800 TEU × 2 vessels, Weekly
6	COSCO (EMS)	Mombasa – **Maputo** – Beira – Nacala – Mombasa	FC, 1100 to 1200 TEU × 2 vessels, Once every 1 to 2 weeks
7	MSC (EAST AFRICA EXPRESS)	Khalifa – Ras al Khaimah – Bahrain – Mundra – Colombo – Mombasa – Beira – **Maputo** – Nacala – Mombasa – Mundra – Dammam – Khalifa	FC, 3300 to 4600TEU × 9 vessels, Weekly
8	Feedertech/ONE (MIM)	Jebel Ali – Mundra - Nhava Sheva – Mombasa – Beira – **Maputo** – Jebel Ali	FC, 1700 to 1900 TEU × 3 vessels, Once every 1 to 2 weeks
9	PIL (MZS)	Singapore – Port Louis – Pointe des Galets – Toamasina – **Maputo** – Beira – Nacala – Singapore	FC, 1200 to 2200 TEU × 6 vessels, Weekly
10	CMA-CGM/Maersk (MOZEX/SAFARI 3)	Singapore – Tanjung Pelepas – Pointe des Galets – **Maputo** – Beira – Pointe des Galets – Singapore	FC, 3400 to 4300TEU × 7 vessels, Weekly

Note 1: FC: Full Container Ship, SC: Semi-Container Ship
Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: JST based on OpenStreetMap

Table A-20 Container Shipping Routes at Durban Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	MACS (ACS COASTAL)	**Durban** – Maputo – **Durban**	FC, 400 TEU × 1 vessel, Once every 2 weeks
2	OACL (EASTERN CAPE FEEDER)	**Durban** – Port Elizabeth – **Durban**	FC, 1200 TEU × 1 vessel Weekly
3	Messina (E AF)	Genoa – Salerno – Alexandria – Iskenderun – Port Said – Jeddah – Mombasa – Dar es Salaam – **Durban** – Maputo – Dar es Salaam – Mombasa – Jeddah – Genoa	FC, 4400 to 4600 TEU × 3 vessels Once every 3 weeks
4	Bahri (USEC)	Houston – Baltimore – Genoa – Alexandria– Jeddah – Dammam – Taicang – Shanghai – Ho Chi Minh City – Jakarta – Ennore – **Durban** – Pensacola – Wilmington – Houston	Ro-Ro Cargo Ship, 1000 TEU × 4 vessels Once every 4 to 5 weeks
5	CSAL/MACS (GAL)	Houston – Brownsville – New Orleans – Walvis Bay – Cape Town – **Durban** – Maputo – Richards Bay – **Durban** – Cape Town – Walvis Bay – Houston	SC, 1000 to 1800 TEU × 4 vessels, Monthly
6	MACS (MACS)	Rotterdam – Hamburg – Antwerp – Leixoes – Walvis Bay – Cape Town – Port Elizabeth – Maputo – **Durban** – Cape Town – Walvis Bay – Vigo – Rotterdam	SC, 400 TEU × 1 vessel Once every 2 weeks
7	MSC (ANGOLA)	Coega – Durban – Cape Town – Lobito – Luanda – Lagos – Lome – Tema – Pointe Noire – Namibe – Walvis Bay – Coega	FC, 1700 to 2800 TEU × 6 vessels, Weekly
8	CMA-CGM/ Maersk (MIDAS2)	Jebel Ali – Mundra – Nhava Sheva – **Durban** – Jebel Ali	FC, 2500 to 2800 TEU × 7 vessels, Weekly
9	MSC (ILANGA EXPRESS)	Jebel Ali – Khalifa – Hamad – Hazira – Mundra - Nhava Sheva – Colombo – Port Louis – **Durban** – Jebel Ali	FC, 2200 to 5000 TEU × 8 vessels, Weekly
10	COSCO/Evergreen/Gold Star/ONE/ OOCL(ZAX3/FAX/SA1/SAC)	Qingdao – Shanghai – Ningbo – Singapore – **Durban** – Singapore – Shanghai – Qingdao	FC, 4300 to 5700 TEU × 8 vessels, Weekly
11	Maersk/MSC (AMEX)	New York/New Jersey – Baltimore – Norfolk – Charleston – Freeport – Port Elizabeth – **Durban** – Cape Town – New York/New Jersey	FC, 1800 to 4900 TEU × 8 vessels, Weekly
12	COSCO/Evergreen/ONE/PIL (ZAX2/ASA/SAS)	Kaohsiung – Xiamen – Hong Kong – Nansha – Shekou – Singapore – **Durban** – Cape Town – Singapore – Hong Kong – Kaohsiung	FC, 3900 to 5400 TEU × 9 vessels, Weekly
13	MSC (INGWE)	Qingdao – Shanghai – Ningbo – Shekou – Singapore – Port Louis – **Durban** – Coega – Port Louis – Colombo – Singapore – Qingdao	FC, 4300 to 9600 TEU × 9 vessels, Weekly
14	CMA-CGM/Maersk (SHAKA 2/SAFARI)	Shanghai – Ningbo – Shekou – Tanjung Pelepas – Port Louis – **Durban** – Tanjung Pelepas – Hong Kong – Shanghai	FC, 5700 to 10000 TEU × 9 vessels, Weekly
15	Hapag-Lloyd/ Maersk/ ONE (SAECS)	Rotterdam – London Gateway – Bremerhaven – Algeciras – Port Elizabeth – **Durban** – Cape Town – Rotterdam	FC, 6600 to 7200 TEU × 9 vessels, Weekly
16	MSC (NWC/S AF)	Rotterdam – London Gateway – Antwerp – Hamburg – Bremerhaven – Le Havre – Sines – Las Palmas – Coega – **Durban** – Cape Town – Las Palmas – Rotterdam	FC, 8800 to 12100 TEU × 9 vessels, Weekly
17	Hapag-Lloyd/ONE (MIAX/AIM)	Jebel Ali – Mundra – Hazira – Nhava Sheva – Colombo – **Durban** – Tema – Tin Can Island – Apapa – **Durban** – Jebel Ali	FC, 2700 to 4400 TEU × 10 vessels, Weekly
18	Hapag-Lloyd (WWA/SAT)	Rotterdam – Antwerp – Le Havre – Lisbon – Tanger Med – Tema – Pointe Noire – Luanda – Paranagua – Santos – Navegantes – **Durban** – Port Elizabeth – Luanda – Tanger Med – Rotterdam	FC 2800 to 4900 TEU × 13 vessels, Weekly

Note 1: FC: Full Container Ship, SC: Semi-Container Ship

Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: JST based on OpenStreetMap

Table A-21 Container Shipping Routes at Walvis Bay Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	CSAL/MACS (GAL)	Houston – Brownsville – New Orleans – **Walvis Bay** – Cape Town – Durban – Maputo – Richards Bay – Durban – Cape Town – Walvis Bay – Houston	SC, 1000 to 1800 TEU × 4 vessels, Monthly
2	MACS (MACS)	Rotterdam – Hamburg – Antwerp – Leixões – **Walvis Bay** – Cape Town – Port Elizabeth – Maputo – Durban – Cape Town – **Walvis Bay** – Vigo – Rotterdam	SC, 400 TEU × 1 vessel, Once every 2 weeks
3	Maersk (WAF 7)	Algeciras – Tanger Med – Freetown – Conakry – Abidjan – Luanda – **Walvis Bay** – Coega – Algeciras	FC, 2500 to 3500 TEU × 7 vessels, Weekly
4	MACS (ST HELENA)	Cape Town – Luderitz – **Walvis Bay** – Rupert's Bay – Cape Town	SC, 200 TEU × 1 vessel, Monthly
5	MSC (ANGOLA)	Coega – Durban – Cape Town – Lobito – Luanda – Lagos – Lome – Tema – Pointe Noire – Namibe – **Walvis Bay** – Coega	FC, 1700 to 2800 TEU × 6 vessels, Weekly
6	CMA-CGM/ COSCO/Maersk/ Hapag-Lloyd (ASAF/FEW6/FEWA)	Qingdao – Shanghai – Ningbo – Nansha – Tanjung Pelepas – Singapore – Pointe Noire – Kribi – Luanda – **Walvis Bay** – Singapore – Qingdao	FC, 7500 to 9200 TEU × 12 vessels, Weekly

Note 1: FC: Full Container Ship, SC: Semi-Container Ship

Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: JST based on OpenStreetMap

Table A-22 Container Shipping Routes at Lobito Port

	Shipping Company (Service Name)	Example of Port Call Route	Vessel Type, Capacity × Number of Vessels, Frequency
1	PSL Navegação (PT/AO)	Leixões – Lisbon – São Tomé – Luanda – **Lobito** – Namibe – Leixões	SC, 1800 TEU × 2 vessels Once every 3 weeks
2	Hapag-Lloyd (AOF)	Luanda – **Lobito** – Namibe – Luanda	FC, 1100 TEU × 1 vessel Weekly
3	Universal Africa Lines (USA)	Houston – **Lobito** – Luanda – Soyo – Port Gentil – Douala – Malabo – Port Harcourt – Veracruz – New Orleans – Houston	SC, 300 to 700 TEU × 5 vessels Once every 2 weeks
4	MSC (ANGOLA)	Coega – Durban – Cape Town – **Lobito** – Luanda – Lagos – Lome – Tema – Pointe Noire – Namibe – Walvis Bay – Coega	FC, 1700 to 2800 TEU × 6 vessels, Weekly

Note 1: FC: Full Container Ship, SC: Semi-Container Ship
Source: Prepared by the JST based on MDS Transmodal (Aug 2024)

Source: JST based on OpenStreetMap

Supplement [1-6] Container Port Performance Index (CPPI) for Each Port

The efficiency evaluation results for Nacala Port and surrounding ports, as published by the World Bank in September 2025 in The Container Port Performance Index 2020 to 2024: Trends and lessons learned, are outlined below.

The CPPI aims to objectively measure container port performance, identify global and regional trends in maritime container trade efficiency, and highlight areas where vessel dwell time at ports can be improved. It has been published annually since its first edition in 2021. The fifth edition of the CPPI, published in September 2025, organizes the index for the five-year period from 2020 to 2024 (recalculating the indices for 2020 to 2023 using 2024 as the base year).

(1) Features of the CPPI

- To evaluate container port performance, it focuses on the port time of container ships (: specifically, the time from arrival at the harbor limit or anchorage zone to departure from the berth).
- The goal is to enable comparison between large and small ports using the same index.
- The index is created using two complementary approaches (a managerial approach and a statistical approach). The final CPPI is the average of the results from these two approaches.
- **Administrative Approach**: To enable fair comparison, raw layover time is adjusted based on "vessel size" and "call size (number of containers moved per port call)". The layover time of the port under evaluation is compared to the average of ports in the same call size group. The comparison result is then adjusted using the Fuel Consumption Index (an index based on the relative difference in fuel consumption by vessel size. This index accounts for the impact of a layover being one hour longer/shorter on fuel consumption).
- **Statistical Approach**: An approach applying multivariate factor analysis. The goal is to create a statistically rigorous composite index by reducing noise, among other methods.
- The data used to calculate the CPPI is an operational dataset provided by major shipping lines through S&P Global's Port Performance Program. This program began in 2009 and now includes participation from the world's ten largest liner shipping companies, representing approximately 75-80% of global container shipping capacity. Each shipping company provides the program with a series of data points, including timestamps of operations and the number of container moves during port calls worldwide. S&P Global verifies the port call data provided by shipping companies using dynamic and static vessel information (position, IMO number, etc.) transmitted by the Automatic Identification System (AIS). Port call data inconsistent with AIS data is removed.
- Ports with fewer than 24 annual container ship calls are excluded from the calculation. Of the 529 ports for which S&P Global obtained port call information, 403 ports are included in the 2024 CPPI index.

(2) CPPI for Nacala Port and Surrounding Ports

Table A-23 shows the CPPI trends for Nacala Port and surrounding ports from 2020 to 2024. For comparison, Table A-24 shows the regional average CPPI values for 2024. The CPPI for Nacala Port has been calculated for 2023 and beyond. In the 2024 ranking, it placed 368th among surrounding ports, following Port of Beira, Port of Maputo, and Port of Dar es Salaam. The 2024 CPPI index for Nacala Port, at -64, shows a slight improvement compared to the 2023 index of -68.

Table A-23 CPPI Trends for Nacala Port and Neighboring Ports (2020–2024)

Port	CPPI					Rank (2024)
	2020	2021	2022	2023	2024	
Nacala	n.a.	n.a.	n.a.	-68	-64	368
Dar es Salaam	-19	-176	-72	-80	-53	360

Port	CPPI					Rank (2024)
	2020	2021	2022	2023	2024	
Beira	-8	-6	-1	3-8	-13	292
Maputo	-2	33-	-9	-27	-40	347
Durban	-108	-246	-220	-206	-721	403
Walvis Bay	-19	-47	3-7	-86	-91	376
Lobito	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: The Container Port Performance Index 2020 to 2024: Trends and Lessons Learned

Table A-24 CPPI Regional Averages (2024)

World Bank Region	CPPI Regional Average
East Asia & Pacific	31.0
South Asia	30.9
Middle East & North Africa	22.6
Europe & Central Asia	4.7
North America	-16.7
Latin America & Caribbean	-18.2
Sub-Saharan Africa	-81.0

Source: The Container Port Performance Index 2020 to 2024: Trends and lessons learned

Although Port of Durban's 2024 index stands at -721 (ranked 403rd), it is working to introduce new tugboats, gantry cranes, trailers, etc., and it has already been confirmed that this will have a measurable positive impact on performance by 2025. According to the latest data provided by Transnet, South Africa's state-owned rail and port company, vessel berthing at South African ports decreased by approximately 75% between mid-2024 and August 2025, while crane moves per hour improved by 13%.

Supplement [1-7] <u>Trends in Port Stay Duration and Berth Occupancy Rate</u>

CFM has established productivity indicators for terminals it directly operates (as opposed to those operated by concessionaires, private companies). These indicator values are published annually in CFM's statistical reports, allowing comparison with the previous year. Based on these materials, the trends in Dwell Time in Port and Rate of Berth Occupancy for the ports of Nampula, Beira, and Maputo (2016–2023) are summarized and presented respectively at: Table A-25 ~ Table A-26

Table A-25 Changes in Port Stay Duration at Nacala Port, Beira Port, and Maputo Port (2016–2023)

(Unit: Days)

		2016	2917	2018	2019	2020	2021	2022	2023
Nacala	General Cargo Terminal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.8	6.0
	Container Terminal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.7	5.6
	Liquid Bulk Terminal	6	5	7.0	4.5	13.0	4.5	1.3	2.2
Beira	TCC8	n.a.	n.a.	n.a.	1.9	1.8	1.7	1.7	1.6
	Fuel Terminal	7	6	5.5	4.6	9.8	18.2	18.4	39.0
Matola (Maputo)	Liquid Bulk Terminal	5	7	4.2	4.1	3.7	3.4	6.2	10.2
	Grain Terminal	7	6	5.0	5.1	4.8	4.5	6.2	7.0
	Aluminum Terminal	6	6	9.3	8.7	8.6	11.1	8.0	7.4

Note: Where Figure s differed between CFM's annual statistical reports, the Figure s published in the later reports were adopted.

Source: Caderno de Estatísticas do CFM (2017, 2018, 2019, 2020, 2021, 2022, 2023)

Table A-26 Trends in Port Stay Time (or Dwell Time) at Nacala, Beira, and Maputo Ports(2016–2023)

(Unit: %)

		2016	2917	2018	2019	2020	2021	2022	2023
Nacala	General Cargo Terminal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	52	65
	Container Terminal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	53	73
	Liquid Bulk Terminal	37	41.8	36	42	38	38	41	42
Beira	TCC8	n.a.	n.a.	n.a.	55	53	57	56	44
	Fuel Terminal	62	59.3	59.8	66	73	77	83	83
Matola (Maputo)	Liquid Bulk Terminal	56.5	57.1	57.8	66.4	47	53	67	177
	Grain Terminal	43.3	24.5	19.6	14.6	22	13	21	18
	Aluminum Terminal	74.3	74.1	86.7	88.2	87	92	86	87

Note: Where Figure s differed between CFM's annual statistical reports, the Figure s published in the later reports were adopted.

Source: Caderno de Estatísticas do CFM (2017, 2018, 2019, 2020, 2021, 2022, 2023)

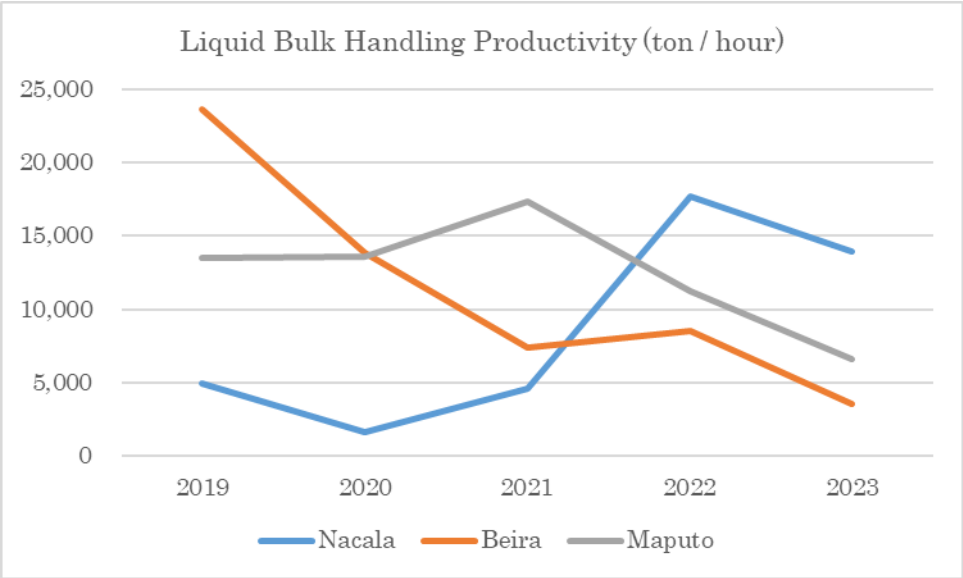
To compare the three ports from an efficiency perspective, we focus on liquid bulk/fuel, for which data is available for all three ports. Table A-24 using port stay time data and Figure 1-8 using cargo volume data by cargo type, we compare the liquid bulk cargo handling efficiency (cargo volume handled per hour) of the three ports. Table A-27, Figure A-32 These charts indicate that over the five-year period from 2019 to 2023, the cargo handling efficiency of the liquid bulk terminal at Nacala Port showed an increasing trend, while that of Beira Port and Maputo Port showed a decreasing trend. As of 2023, the ports ranked in order of efficiency from highest to lowest were Nacala Port, Maputo Port, and Beira Port.

Table A-27 Trends in Liquid Bulk Cargo Handling Efficiency at Maputo, Beira, and Nacala Ports (2019–2023)

(Unit: ton / hour)

	2019	2020	2021	2022	2023
Nacala	4,986	1,650	4,639	17,715	13,947
Beira	23,668	13,887	7,391	8,500	3,537
Maputo	13,475	13,630	17,341	11,254	6,621

Source: JST



Source: JST

Figure A-32 Trends in Liquid Bulk Cargo Handling Efficiency at Maputo, Beira, and Nacala Ports (2019–2023)

Supplement [3-1] <u>Phased Support Scenario for Promoting Corridor Utilization in Malawi</u>

As a direction for future project development in Malawi, the approach to project formation corresponding to the "corridor development stages" outlined in 3.1 has been organized into short-, medium-, and long-term phases.

(1) Short-Term Project Development

In the initial phase of the scenarios outlined in Section 3.1, enabling bulk transportation is crucial. From a bulk transportation perspective, trucks have limitations on transport volume, and recent fuel price increases have also had an impact. Consequently, producers and manufacturers engaged in bulk transportation have particularly high expectations for rail transport. Furthermore, since transportation costs impact product pricing, even companies currently using trucks for transport are likely to find rail transport increasingly valuable in the future. This is because rail transport offers price advantages if it becomes reliable (e.g., precise operation management, reduced time for procedures and customs clearance, temperature-controlled transport options). Therefore, fundamental improvements to enhance railway operational accuracy and convenience (such as developing dry ports at road-rail interchanges) can be considered measures contributing to addressing initial challenges.

Simplifying customs procedures at borders is also crucial for enhancing the Corridor of the South's competitiveness. The EU plans to construct an OSBP facility at Chiponde. However, as this involves only building construction, equipment is needed to make the OSBP operational.

Figure A-33 shows the locations of the aforementioned proposed measures.

Source: JST

Figure A-33 Policy Proposals Contributing to the Initial Phase

(2) Mid-Term Project Formation

During the mid-term development phase, it is anticipated that the transportation of higher value-added, internationally competitive goods will emerge, leading to increased imports and exports via the international corridor. To realize this, measures such as developing stations and roadside stations will be implemented.

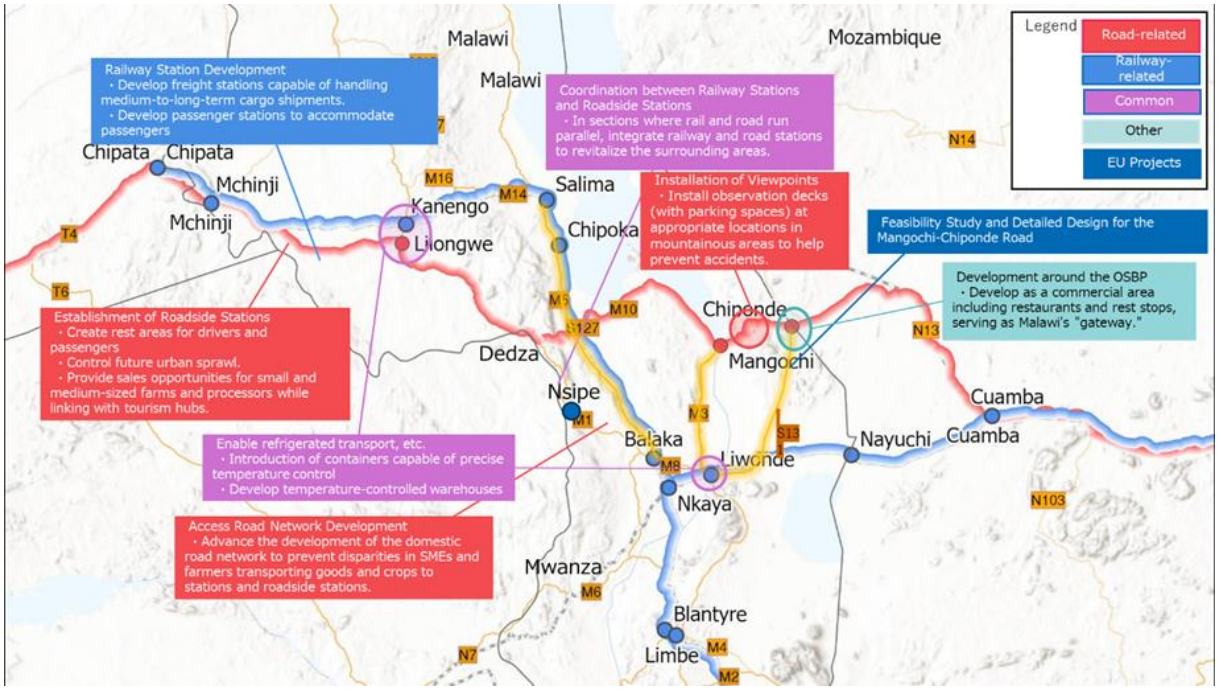
Regarding roads, at present, restaurants and gas stations in small towns along the route serve as rest areas and meal providers. Anticipating the Nacala Corridor's activation and increased traffic volume, it is necessary for the public sector to provide appropriate rest areas for drivers and passengers. Furthermore, consideration must be given to the fact that individual vendors conducting business at locations convenient for themselves can lead to disorderly competition and inappropriate development from the perspective of regional planning. Furthermore, the M3 mountain pass offers scenic overlooks overlooking Lake Malawi. Anticipating increased tourist traffic, establish viewing areas with parking facilities. Provide these appropriate locations proactively to prevent vehicles from obstructing traffic in hazardous areas.

Regarding railways, efforts should focus not only on high-capacity freight logistics but also on developing stations for medium and small-scale cargo handling and passenger services. Furthermore, introducing containers and warehouses capable of enabling temperature-sensitive transport, such as refrigerated shipping, will broaden the range of transportable goods.

Concurrently, domestic road network improvements are necessary to ensure small and medium-sized enterprises (SMEs) and small-scale farmers have equitable access to stations serving as transportation and sales hubs for their products and crops.

Furthermore, anticipating increased non-bulk transport and mobility in the medium-term development phase, the OSBP area will be developed to function as Chiponde's "gateway" to Malawi. This includes establishing it as the shortest route from Mozambique to Lilongwe and a tourist route to Lake Malawi. Development will focus on creating a rest stop in the route to the next destination, and potentially developing the area itself into a destination.

Figure A-34 shows the locations of the proposed measures mentioned above.



Source: JST

Figure A-34 Policy Proposals Contributing to the Mid-Term Development Phase

(3) Long-term project development

On the other hand, to reliably achieve the stage where the "business" of adding value to goods through new services and solutions for mobility and transportation itself, or through investment in more advanced transportation systems, can be sustainably developed, it is necessary as a prerequisite that "a certain level of economic development exists in the corridor region, and there is a flow of people and goods." Creating these conditions through the provision of facilities alone is difficult. Therefore, to generate the fundamental "demand" for revitalizing the Nacala Corridor, measures to create goods and people utilizing this corridor must be steadily advanced in parallel.

For example, if the future goal is to export large quantities of Malawi's agricultural and industrial products via rail, it is first necessary to achieve production levels exceeding domestic demand and to develop a road network sufficient for domestic distribution. However, this requires transforming agriculture, which currently relies almost entirely on rainwater, into irrigated agriculture; shifting from imported fertilizers to domestically produced alternatives; and developing access roads to enable the proper transportation of agricultural products in a fresh state (Currently, certain staple crops and other agricultural products cannot be exported unless processed).

Furthermore, to sustainably develop “businesses” it is necessary to process agricultural products for export to increase their value-added, and to process goods transiting through Malawi from Mozambique and Zambia locally to add value before exporting them. In such cases, preparations, such as improving processing technology capabilities, must begin now.

Regarding tourism, to attract inbound travelers to use the corridor in the future, the first step is to elevate the level of domestic travel (including business travel). This involves creating a stress-free domestic travel environment for domestic tourists, enhancing services like tourist buses and rail travel (including seamless connections from stations).

Furthermore, to anticipate tourism demand, Malawi's natural attractions - Lake Malawi, mountainous regions, waterfalls, etc. - must be preserved in pristine condition. However, increased population and tourism carry a high risk of pollution. Therefore, initiatives to reduce environmental impact must be advanced in anticipation of this. If beautiful nature ceases to function as a resource, it will impact tourism potential. Considering the situation confirmed in this survey - where Lake Malawi's declining water levels and soil erosion from deforestation have rendered water transport ports dysfunctional - it cannot be ruled out that the natural environment may have changed by the time this stage is reached.

Malawi's national development vision, Malawi's Vision MALAWI 2063 (MW2063), identifies three pillars: productive agriculture and commercialization, industrialization, and urbanization (Table A-28). Within this, the ATMM strategy centers on the Agriculture, Tourism, Mining, and Manufacturing sectors (Table A-29). These contents can be understood as covering the prerequisite conditions for revitalizing the Nacala Corridor.

Table A-28 Malawi’s Vision Three Pillars

Pillar	Content
Highly productive agriculture and commercialization	Produce and supply raw materials for industrial processing, and healthy, nutritious foods. The growth of agriculture-based industries related to job creation leads to economically securing the productivity of urban centers. Urban centers, including cities that are tourism hubs, function as consumers of agricultural products. This structure creates a competitive agricultural value chain and ensures an increase in young people engaged in agriculture.
Industrialization	Achieved by increasing investment to establish traditional and non-traditional manufacturing, technological innovation, mining, and other services. Manufacturing is essential for building a resilient, integrated, independent, and self-sufficient economy. Therefore, industrial growth generates many jobs, incomes, and opportunities. Above all, industrial growth implies the potential for a structured market for agricultural products, and thus the commercialization of agriculture is enhanced. At this point, it is thought that urban wage rates will begin to rise.
Urbanization	Provides capable opportunities to accelerate socio-economic transformation. There is a need to have smart, well-planned, and serviced secondary cities rooted in sustainable economic activities in agriculture, tourism, mining, and industry. Urbanization follows an integrated approach that includes spatial, economic, social, and environmental considerations.

Source: Southern Africa Regional Disaster Risk Reduction Project Research Final Report, March 2022

Table A-29 Overview of the ATMM Strategy

Field	Content
Agriculture	• Aiming for food security and job creation, enhance agricultural productivity. • Strengthen agricultural production by establishing mega farms and promoting irrigated agriculture. • Organize smallholder farmers into cooperatives and clubs to provide access to affordable inputs such as seeds and fertilizers.
Tourism	• Promote economic growth and job creation through tourism development. • Improve tourism infrastructure and relax visa requirements to attract tourists.
Mining	• Establish the Malawi Mining Company to promote mining development, aiming to create wealth and diversify the economy. • Promote mineral resource exploration and development, and establish legal and institutional frameworks.
Manufacturing	• The development of manufacturing is positioned as part of the industrialization goals of MW2063.

Source: Prepared by JST based on the National Planning Commission (NPC)'s MW2063- Malawi Vision 2063 and The Malawi 2063 First 10 Year Implementation Plan (MIP-1)

Therefore, anticipating the stage where "business" can be sustainably developed, the necessary conditions to maintain the corridor's attractiveness and the resulting stimulation of new demand for the three pillars of productive agriculture, commercialization, industrialization, and urbanization are organized as shown in Table A-30.

Table A-30 Measures Contributing to the Stage of Sustainable Business Development

Pillar	Maintaining appeal as a corridor	Stimulating new transportation demand
Highly productive agriculture and commercialization	• Through irrigation improvements and the introduction of new agricultural technologies, stable production in both quality and quantity becomes possible. • Access roads connecting to the corridor are developed, and delivery while maintaining freshness becomes possible through storage warehouses, refrigerated containers, refrigerated trucks, etc. • Tourists using the corridor can access Malawi's food culture.	• Increased production capacity generates surplus crops, enabling sales to other regions. • Maintaining freshness expands the delivery range.
Industrialization	• Industrial parks developed along the corridor will add value to agricultural products and imported raw materials for export. • The introduction of processing technology increases domestically produced daily necessities and food, reducing costs and invigorating domestic distribution.	• The advancement of the processing industry increases export products. • Increasing exports reduces empty return trips, lowering transportation costs.
Urbanization	• Bus terminals, railway stations, and urban public transportation systems are developed, making passenger movement via public buses and railways more efficient. • Urban sanitation and natural environments in city centers will be maintained to provide comfort for tourists, and the scenery along corridors will be attractively developed and preserved.	• Building a stress-free transfer system all the way to the last mile encourages people to actively travel. • Offering multiple transportation options for the same destination increases travel opportunities.

Source: JST

3. Minutes

Submitted separately to JICA