Ministry of Economy and Finance
The Republic of Mozambique

THE PROJECT FOR

NACALA CORRIDOR

ECONOMIC DEVELOPMENT STRATEGIES IN THE REPUBLIC OF MOZAMBIQUE

PEDEC-NACALA

Final Study Report

Main Text: Volume 1

April 2015

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.
RECS International Inc.
International Development Center of Japan
Kokusai Kogyo Co., Ltd.
Eight-Japan Engineering Consultants Inc.

EI
JR
15-079

Ministry of Economy and Finance
The Republic of Mozambique

THE PROJECT FOR

NACALA CORRIDOR

ECONOMIC DEVELOPMENT STRATEGIES
IN THE REPUBLIC OF MOZAMBIQUE

PEDEC-NACALA

Final Study Report

Main Text: Volume 1

April 2015

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.
RECS International Inc.
International Development Center of Japan
Kokusai Kogyo Co., Ltd.
Eight-Japan Engineering Consultants Inc.

Currency Exchange Rates

USD 1.00 = JPY 89.21
MT 1.00 = JPY 3.060
MT 1.00 = USD 0.034

Averages during the period between April 2012 and December 2013

The Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique

Final Study Report
Main Text

TABLE OF CONTENTS

Main Text: Volume 1

Main Text: Volume 2

LIST OF FIGURES

CHAPTER 6

CHAPTER 7

CHAPTER 8

LIST OF TABLES

LIST OF ABBREVIATION

ABS ····· Access and Benefit Sharing
ADCN ····· Agency for Nacala Corridor Development
ADM ····· Mozambique Airports
AFCAP ····· African Community Access Programme
AfDB ····· African Development Bank
AIAS ····· Management Infrastructure for Water Supply and Sanitation
AIDS ····· Acquired Immune Deficiency Syndrome
AIFM ····· Integrated Assessment of Forest in Mozambique
ANE ····· National Road Administration
AP ····· Administrative Post
APRAP ····· Action Plan for the Reduction of Absolute Poverty
ARA-CN ····· ARA-Centro Norte
ARA-N ····· ARA-Norte
ARA-Z ····· ARA-Zambeze
ASNANI ····· Integrated Water Supply and Sanitation Project for Niassa and Nampula
ASP ····· Application Service Provider
ASPS ····· Agriculture Sector Programme Support
ASTRA ····· Association of Transport
AU ····· African Union
AusAid ····· Australian Agency for International Development
CBD ····· Central Business District
CDM ····· Clean Development Mechanism
CDN ····· Northern Development Corridor
CENACARTA ··· National Remote Sensing & Cartography Centre
CEPAGRI ····· Agriculture Promotion Centre
CFM ····· Mozambique Ports and Railways
CFP ····· Vocational Training Centres
CFS ····· The Committee on World Food Security
CIDA ····· Canadian International Development Agency
CIQ ····· Customs, Immigration, and Quarantine
COMESA ····· Common Market for Eastern and Southern Africa
CNAM ····· National Council for the Adcancement of Women
CNG ····· Compressed Natural Gas
CPI ····· Investment Promotion Centre
CSR ····· Corporate Social Responsibility
DANIDA ····· Danish International Development Agency
DD ····· Detail Design
DfID ····· Department for International Development of United Kingdom
DICES ····· National Directorate of Higher Education
DIMAN ····· Directorate of Maintenance of ANE
DINAPOT ····· National Directorate of Territorial Planning
DINET ····· National Directorate for Primary Education
DGM ····· Discussion Group Meeting
DNEAP ····· National Directorate of Studies and Policy Analysis, Ministry of Planning and Development
DNA ····· National Water Directorate
DNTF ····· National Directorate of Land and Forestry
DPA ····· Provincial Directorate of Agriculture
DPANE ····· Provincial Directorate of ANE
DPCA ····· Provincial Directorates for the Condition of Environment
DPOT ····· Department of Territorial Planning
DTI ····· Department of Trade and Industry of South Africa
DUAT ····· Land Use Right
EAP ····· Economically Active Population
EDM ····· Mozambique Electricity Company
EFA ····· Education for All
EIA ····· Environmental Impact Assessment
EL ····· Dam Crest Elevation
EMP ····· Environmental Management Plan
ENDE ····· National Development Strategy
ENH ····· Mozambique National Hydrocarbons Company
EP ····· Primary Education
ES ····· Secondary Education
EU ····· European Union
EXIM Bank ····· Export-Import Bank
FAO ····· Food and Agriculture Organization
FARE ····· Economic Rehabilitation Support Fund
FDI ····· Foreign Direct Investment
FEED ····· front end engineering and design
FEMATRO ····· Mozambican Federation of Association of Road Transporters
FIPAG ····· Investment Fund and Water Supply Asset Holder
FS ····· Feasibility Study
FUNAE ····· Energy Fund
GAZEDA ····· Special Economic Zones Office
GDP ····· Gross Domestic Products
GER ····· Gross Enrolment Ratio
GIS ····· Geographic Information System
GMP ····· Gas Master Plan
GPS ····· Global Positioning System
GRDP ····· Gross Regional Domestic Product
GTL ····· gas to liquid
HCB ····· Cahora Bassa Hydro-Power Plant
HDI ····· Human Development Index
HDPE ····· High-Density Polyethylene
HIV ····· Human Immunodeficiency Virus
HIZA ····· Hanoi Authority for Industrial Parks and Export Processing Zones
ICD ····· Inland Container Depots
ICT ····· Information and Communication Technology
IEE ····· Initial Environmental Evaluation
IFAD ····· International Fund for Agricultural Development
IFC ····· International Finance Corporation
IFTRAB ····· Integrated Survey on the Labour Force
IFZ ····· Industrial Free Zone
IMF ····· International Monetary Fund
INAM ····· National Institute of Meteorology
INAV ····· National Institute of Transport
INATUR ····· National Institute of Tourism
INATTER ····· National Land Transport Institute
INCM ····· National Institute of Communications
INE ····· National Statistics Institute

INEFP……National Institute for Employment and Vocational Training
IP ……Internet Protocol
IPEME……Institution for the Promotion of Small and Medium Enterprise
IPP……Independent Power Producer
IPPF……Infrastructure Project Preparation Facility
ISP……Internet Service Providers
ITR ……Interim Report
ITU ……International Telecommunication Union
IUCN……International Union for Conservation of Nature and Natural Resources
IWRM……Integrated Water Resources Management
JICA……Japan International Cooperation Agency
LAN……Local Area Network
LDPE ……Low-Density Polyethylene
LNG……Liquified Natural Gas
MAE ……Ministry of State Administration
MAR ……Mean Annual Rainfall
MASA ……Ministry of Agriculture and Food Security
MCA ……Millennium Challenge Account
MCC ……Millennium Challenge Corporation
MCJI-TIZ……Matibane-Crusse-Jamail Island Tourism Interest Zone
MCTUR ……Ministry of Culture and Tourism
MDC ……Maputo Development Corridor
MDG……Millennium Development Goals
ME ……Ministry of Energy
MEF……Ministry of Economy and Finance
MIC ……Ministry of Industry and Commerce
MICE ……Meetings, Incentives, Conferences, and Exhibitions
MICOA……Ministry of Coordination of Environmental Affairs
MICS……Multiple Indicator Cluster Survey (UNICEF)
MILT……Ministry of Land, Infrastructure, Transport and Tourism of Japan
MINAG……Ministry of Agriculture
MINED……Ministry of Education
MINEDH……Ministry of Education and Human Development
MINTRAB ……Ministry of Labour
MIPAR……Rural Water Supply Manual
MIREM……Ministry of Mineral Resources
MIREME……Ministry of Mineral Resources and Energy
MISAU ……Ministry of Health
MITADER……Ministry of Land, Environmental and Rural Development
MITUR ……Ministry of Tourism
MoFA ……Ministry of Foreign Affairs of Japan
MOPH ……Ministry of Public Works, Housing and Water Resources (former Ministry of Public Works and Housing)
MPD ……Ministry of Planning and Development
MPI……Ministry of Planning and Investment of Vietmam
mt……Million tons
MT ……Metical
MTC ……Ministry of Transport and Communication
MTPA……Million Tons Per Annum
MW……Megawatt
NBIP ……Noi Bai Industrial Park
NEDO……New Energy and Industrial Technology Development Organisation
NEC ……National Environmental Commission
NEMP……National Environmental Management Programme
NEPAD ……New Economic Partnership for African Development
NER ……Net Enrolment Rate
NGN ……Next Generation Network
NGO ……Non-Government Organisation
NPO……Nonprofit Organisation
NRW ……Non-Revenue Water
NSO……National Statistical Office, Malawi
OD……Origin-Destination
OJT……On the Job Training
OSBP ……One Stop Border Post
PAEI……Agricultural Policy and Implementation Strategy
PAPA……Food Production Action Plan
PARP……Poverty Reduction Action Plan
PARPA……National Action Plan for the Reduction of Absolute Poverty
PATI……Priority Areas for Tourism Investment
PCD ……Cabo Delgado Ports
PECODA……Programme of Education for Environmental Development
PEDEC-Nacala ··The Project for Nacala Corridor Economic Development Strategies
PEDSA ……Strategic Plan for Development of the Agriculture Sector
PEI ……Poverty Environmental Initiative
PEP……Prvincial Strategic Plan
PEPIP ……Strategic Plan: Promotion of Private Investment in Mozambique
PES……Payment for Ecosystem Services
PESA-ASR……Strategic Plan for Rural Water Supply and Sanitation
PHC ……Primary Health Care
PII ……Integrated Investment Programme
PIREP……Integrated Programme for Education Reform
PLMN……Public Land Mobile Network
PPP……Policy, Plan and Programme
PPP……Public-Private Partnership
PR ……Progress Report
PRISE……Integrated Road Sector Programme
PROMER……Programme for Road Access to Agricultural Markets
ProPESCA ……Programme of Roads under the Promotion of Fishig Craft
ProSAVANA ……Triangular Cooperation for Agricultural Development of the Tropical Savannah in Mozambique
PSAA ……Small Water Supply System
PSTN……Public Switched Telephone Network
PVC ……Polyvinyl Chloride
rai……Responsible Investment in Agriculture and Food System
RD……Record of Discussion
REDD……Reducing Emissions from Deforestation and Forest Degradation
ROW ……Right of Way
RSA-DTI ……Department of Trade and Industry of South Africa

RSDIP ……Regional Spatial Development Initiative Programme
RSS……Road Sector Strategies
SADC……South African Development Community
SADCC……South African Development Coordination Conference
SAIDI……System Average Interruption Duration Index
SAIFI ……System Average Interruption Frequency Index
SACMEQ ……The Southern and Eastern Africa Consortium for Monitoring Educational Quality
SARI ……System Average Restoration time Index
SC ……Steering Committee
SCADA……Supervisory Control and Data Acquisition
SDC ……Swiss Agency for Development and Cooperation
SDCN……Nacala Corridor Development Company
SDI ……Spatial Development Initiatives
SDP ……Spatial Development Programme
SDPI ……District Planning and Infrastructure Service
SEA ……Strategic Environmental Assessment
SEZ……Special Economic Zone
SIDA ……Swedish International Development Cooperation
SME……Small and Medium-Sized Enterprises
SNS ……National Health Services
SPGC ……Provincial Service of Geography and Cadastral
SPFFB ……Provincial Service of Forest and Wildlife
SVC ……Static VAR (Volt-ampere ractive) Compensators
SWOT ……Strengths, Weaknesses, Opportunities and Threats
TAZARA ……Tanzania-Zambia Railway Authority
TcF ……Trillion Cubic Feet
TCTP……Third Country Training Programme
TIA ……National Agricultural Survey
TDM ……Telecommunications of Mozambique
TEU ……Twenty Foot Equivalent Unit
TFCA ……Trans Frontier Conservation Areas
TIZ ……Tourism Interest Zones
TLIP……Thang Long Industrial Park
TRL ……Transport Research Laboratory
TVE ……Technical and Vocational Education
TVET ……Technical and Vocational Education and Training
UAE……United Arab Emirates
UCODIN ……Coordinating Agency for Integrated Development of Nampula
UK……United Kingdom
UNDP……United Nations Development Program
UNEP ……United Nations Environment Program
UNESCO……United Nations Educational, Scientific and Cultural Organization
UN-HABITAT …The United Nations Human Settlements Programme
UNICEF ……United Nations Children's Fund
UNIDO ……United Nations Industrial Development Organisation
USA……United States of America
USAID……United States Agency for International Development
USD……United States Dollar
VGGT……Voluntary Guidelines on the Responsible Governance of Tenure in the Context of National Food Security
VSIP ……Vietnam-Singapore Industrial Park
WASIS……Additional Financing of the Water Services and Institutional Support
WB ……World Bank
WG……Working Group
WHO……World Health Organisation
WWW ……World Wide Web
ZAE ……Zonamento Agro-Eocologico National
ZMM-GT……Zambia-Malawi-Mozambique Growth Triangle

EXECUTIVE SUMMARY

Executive Summary

1. Introduction

1.1 Background of PEDEC-Nacala

Historically, the Nacala Corridor was an international transport corridor consisting of Nacala Port, the Northern Railway and the Malawian Railway system. Although the Nacala Corridor Region has various natural resources and development potentials, it has been difficult to utilize them for economic development, especially in vast inland areas, due to the poor condition of the roads and railways.

Since the late 2000s, the Nacala Corridor has begun to attract attention, and road upgrading projects connecting inland towns with seaports, as well as projects for Nacala Port were started. In 2009, the first SEZ in Mozambique was established in Nacala Municipality and Nacala-a-Velha District. Private investments in the agriculture and tree planting sectors have also increased in the provinces of Nampula, Niassa and Zambezia.

The large-scale coal exploitation projects in Tete Province also became a factor to bring development to one of the most promising routes, namely the Nacala Corridor, which runs from Moatize of Tete Province through Malawi and the Nacala Corridor up to Nacala Port. The coal transport through the Nacala Corridor requires upgrading of the railway of the Nacala Corridor, as well as construction of new railway sections. Tete's coal mining and export is expected to revitalise the Northern Railway so as to transport not only coal but also general cargo and containers. This is considered a very important factor to create development opportunities and potentials to initiate and promote regional development. The new Northern Railway will also become an opportunity for the transit cargos from and to Malawi and Zambia, the neighbouring landlocked countries.

A large reservoir of natural gas in the offshore Rovuma basin in northern Mozambique was discovered in 2009. Recoverable reserves in Areas 1 and 4 are estimated as 75 trillion cubic feet (Tcf). This could offer an opportunity for the Nacala Corridor Region to acquire a new energy source and to generate new chemical industries, such as those for GTL, ammonia and methanol, resulting in widening the industrial base of the Nacala Corridor Region.

Unless proper measures are taken by the government to guide and coordinate development activities, such development opportunities and potential of the Nacala Corridor Region may be underutilised. Moreover, it is necessary to prepare measures to prevent or mitigate various environmental and social problems including urban environmental deterioration, industry-related pollution, land conflicts and depletion of environmental resources. Furthermore, it would be inevitable to cope with vulnerable groups of people and those in less accessible areas, who might not be able to participate in emerging development opportunities.

1.2 Objectives of PEDEC-Nacala

The objective of PEDEC-Nacala is "to formulate development strategies to guide appropriate development and investment in the Nacala Corridor." The development strategies of PEDEC-Nacala are selective and integrated in the coverage of economic sectors, infrastructure sectors and social service sectors.

1.3 Goals of PEDEC-Nacala

- To enhance social capacity and economic growth in the Nacala Corridor Region
- To effectively guide appropriate development in the Nacala Corridor Region
- To promote private investment in an appropriate manner in the Nacala Corridor Region
- To appropriately manage resources of the Nacala Corridor Region

1.4 Study Area (Nacala Corridor Region)

The target area (study area) of PEDEC-Nacala comprises the four provinces of Nampula, Cabo Delgado, Niassa, Tete and the seven northern districts of Zambezia Province, which are the districts of Alto Molocue, Gile, Gurue, Ile, Lugela, Milange and Namarroi. The provinces and districts that are related to the Nacala Corridor are defined as the Nacala Corridor Region.

1.5 PEDEC-Nacala

PEDEC-Nacala (the Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique) is a study project for formulating "Integrated Development Strategies" for the Nacala Corridor Region which consists of the following:

- Vision
- Socioeconomic Framework
- Spatial Structure
- Development Scenario
- Long-Term Overall Development Strategies
- Short-Term and Medium-Term Essential Development Strategies
- Sector Development Strategies
  - Economic Sectors Development Strategies
  - Infrastructure Sectors Development Strategies
  - Urban Development Strategies
  - Environmental Management Strategies
  - Social Development Strategies
  - Institutional Development Strategies
- Action Plan with Short-Term and Medium-Term High Priority Projects

1.6 Strategic Environmental Assessment for PEDEC-Nacala

A strategic environmental assessment (SEA) was done in parallel with strategy formulation in PEDEC-Nacala. Evaluation and selection of development scenarios was conducted by looking at their environmental and social impacts, as well as other aspects. Furthermore, for development strategies proposed by PEDEC-Nacala, a set of analyses were conducted for the SEA including an environmental risk and opportunity matrix analysis, compatibility matrix analysis and compound matrix analysis.

In the first three phases for strategy formulation, a series of steering committee and working group meetings were organised. In the fourth phase, stakeholder meetings were held in the five provinces of the Nacala Corridor Region in order to get different views and opinions from a wide range of stakeholders including government sectors, civil societies, business sectors and universities. Implications from stakeholder meetings were reflected in the proposed strategies.

1.7 Project Framework and Organisations

The Ministry of Planning and Development (MPD, currently part of the Ministry of Economy and Finance) was the executing agency for PEDEC-Nacala. The Special Economic Zones Office (GAZEDA) under MPD was functioning as the secretariat for the Project. The governments of the five provinces of Nampula, Niassa, Cabo Delgado, Tete and Zambezia were counterpart organisations at the provincial level. A variety of ministries and government agencies are members of the steering committee and working group for PEDEC-Nacala.

2. Vision for the Nacala Corridor Region

The vision for the future of the Nacala Corridor Region is defined as:

A peaceful, prosperous, equitable and sustainable region free from poverty in harmony with the environment.

The four key values of "peace", "prosperity", "equality" and "sustainability" are integrated into this phrase.

3. Overall Issues

3.1 Poor Transportation Conditions and Difficulties in Promoting Regional Development

Due to poor transportation conditions, economic sector development has been stagnant. As a result, it was not possible to generate a large enough transport demand so as to support rehabilitation of transport infrastructure including roads, railways and seaports.

3.2 Upgrading of Transport Corridors by Utilising Private-Sector Initiatives and Promotion of Further Economic Development

In relation to the issue mentioned above, finding a way to assure the start-ups and sustainability of the operation of the upgraded railway for coal transport from Tete to Nacala Port are the most important issues. Since the upgraded railway for coal transport might have negative environmental and social impacts along the railway line, it is necessary to implement effective mitigation measures on the environmental and social problems.

Taking advantage of the upgraded railway transport, as well as upgraded trunk roads, transporting non-coal cargoes for the purpose of supporting regional development is another key issue. The establishment of multi-modal integration in cargo transport could contribute to creation of development opportunities and potential for diversified economic sectors in the Nacala Corridor Region.

However, the upgraded multi-modal transport corridor is not enough to improve the business environment for various economic sectors. It is necessary to improve other infrastructures, such as electricity and water supply, for promoting diversified economic sectors.

3.3 Region-Wide Transport Corridor and Regional Development

One of the basic issues is how to develop an extensive region-wide transport network, which widely integrates seaports with inland areas, as well as with major urban centres. In order to develop and maintain such an extensive region-wide transport corridor network, it is necessary to promote

regional development and to create transport demand large enough to support the region-wide transport network.

3.4 Inclusive Development to Support Dynamic Development

It is necessary to respond to the following particular issues to promote "Dynamic and Inclusive Development":

- Environmental and social problems to be caused by the upgrading of the railways and the provision of economic infrastructure, such as electricity and water supply
- Land disputes between investors and small-scale farmers, as well as those among rural community members, in the situation of increasing land-based investments
- Increasing necessity to provide prospective economic sectors with more educated and trained human resources
- Social and environmental problems which might arise in the course of rapid and large-scale development in the Nacala Corridor Region
- Necessity for an institutional mechanism for coordination between different sectors and different actors in promoting regional development

3.5 Inclusive Development Considering Socially Vulnerable People and Geographically Less Accessible Areas

Prospective economic development does not automatically bring opportunities to socially vulnerable groups of people in the Nacala Corridor Region. Underdevelopment of inland areas has been serious in the Nacala Corridor Region. Therefore, one of the most difficult and fundamental issues is how to tackle such underdevelopment problems of vulnerable people and less accessible areas, which might continue to remain even after the successful upgrading of the transport corridors and related regional development.

3.6 Development of Urban Centres

Urban centres play an important role in economic development not only as the distribution centres of goods and services for the surrounding areas but also as the bases for manufacturing production. It is necessary to designate and develop appropriate functions in different urban centres of the Nacala Corridor Region for promoting well-balanced region-wide development.

3.7 Environmental Protection and Environmental Management

The main issue regarding the environment is how to promote environmental protection and environmental management in the context of increasing economic and development activities. Enforcement of environmental laws and regulations is essential, and proactive implementation of mitigation measures for expected environmental impacts is also important.

3.8 Promotion of Agricultural Development across Wide Areas

Since the Nacala Corridor Region covers a huge area, the accessibility to major roads and urban centres are not good in many areas. The majority of the region's populations live on agriculture in rural areas. How to provide support to small-scale farmers not only in agricultural production but also in protection of their land rights, and how to create a value chain for agriculture in these wide areas are both critical issues.

3.9 Long-Term Sustainability of the Transport Corridor

It is necessary to promote diversified regional economies and to generate transport demand large enough to sustain the function of the international and regional transport corridors when looking at a very long-term sustainability. For this purpose, regional economic development should be promoted widely not only in inland areas of Northern Mozambique, but also Malawi and the Eastern and Central Provinces of Zambia.

4. Development Scenario for the Nacala Corridor Region

In order to consider future development, three types of alternative development scenarios have been developed using two key factors; major economic sectors and spatial patterns of development.

- Scenario A-1: Strong Mining Sector Orientation and Three Enclaves of Tete, Palma and Nacala
- Scenario B-2: Diversified Economic Sector Development based on the Tete-Nacala Single Corridor
- Scenario B-3 (selected) : Diversified Economic Sector Development based on a Region-Wide Corridor Network Selection of a Development Scenario: Scenario B-3

The three alternative development scenarios were comparatively evaluated by considering economic and spatial impacts/benefits, social impacts and environmental impacts.

In the medium and long terms, Scenario B-3 is better than the other scenarios from the viewpoints of economic and social impacts. The intensity of the environmental impacts in Scenario B-3 would be lower than those of Scenarios A-1 and B-2. In this respect, environmental impacts in Scenario B-3 are easier to control or manage than those of Scenarios A-1 and B-2.

In broader terms, Scenario B-3 could bring about development benefits to wider areas, enabling more and various groups of people to participate in regional development by utilising various potentials available in a wide region. In this scenario B-3, a region-wide corridor network is developed by extending sub-corridors and feeder lines from the main corridor. Wide development will take place along the extensive corridor network.

5. Future Socioeconomic Framework for the Nacala Corridor Region

5.1 Target Years and Parameters of the Framework

The future socioeconomic framework for the Nacala Corridor Regions is set for the target years 2017, 2025 and 2035 considering the following three parameters:

- Population by Province
- Gross Regional Domestic Product (GRDP)
- Labour Force by Province

5.2 Future Socioeconomic Framework

The population of the Nacala Corridor Region was 10,548 thousand in 2007 according to the last General Population and Housing Census and is expected to increase to 17,707 thousand and 22,129 thousand by 2025 and 2035 respectively with an annual growth rate of 2.7% for the period of 2007 to 2035 which is larger than that of the national average 2.5%. With the increasing number of young

population, the labour force is expected to increase at an average annual growth rate of 3.3% for the period of 2007 to 2035. In 2035, the labour force in Nacala Corridor Region is expected to be 9,635 thousand. The share of the primary sector will still be the highest with 77% of the labour force in 2035.

The future GRDP of Mozambique and the Nacala Corridor Region is shown in the following table.

	GRDP (million MT at 2003 constant prices)				**Annual Growth Rate** (%)	
	2011	**2017**	**2025**	**2035**	**2011-25**	**2011-35**
GRDP of Mozambique	177,772	275,304	506,526	1,149,171	7.8%	8.1%
GRDP of the Nacala Corridor Region	57,628	90,300	181,000	450,300	8.6%	8.9%
Agriculture, Livestock, Fishery and Forestry Sector	23,242	34,800	60,200	107,800	7.0%	6.6%
Mining Sector	85	2,000	23,300	124,700	49.3%	35.5%
Manufacturing, Construction and Utilities Sector	11,109	18,000	34,900	88,200	8.5%	9.0%
Service Sector	23,192	35,500	63,300	129,600	7.4%	7.4%

6. Spatial Structure of the Nacala Corridor Region

6.1 Transport Corridor Network for the Nacala Corridor Region

The future spatial structure of the Nacala Corridor Region is composed of a transport corridor network and a hierarchy of urban centres.

The transport corridor network is composed of major corridors, sub-corridors and feeder lines. The main corridors are the backbones of the region, which are supported by both railways and trunk roads. The main corridors go through primary urban centres and secondary urban centres. The sub-corridors are extended from the main corridors to tertiary urban centres. Feeder lines are to connect main corridors and sub-corridors to wide areas and quaternary urban centres and other minor urban centres.

(1) Main Corridors

The main corridors are to be served both by railways and trunk roads.

- **[M-1]** Nacala-Nampula-Cuamba-Lilongwe (Malawi)-Lusaka (Zambia)
- **[M-2]** Cuamba-Tete
- **[M-3]** Cuamba-Lichinga

(2) Sub-Corridors

The sub-corridors are to be served with trunk roads.

- **[S-1]** Lichinga-Pemba
- **[S-2]** Nacala-Pemba-Palma
- **[S-3]** Chipoka-Metangula-Mbamba Bay-Itsungi Port

(3) Feeder Lines

- **[F-1]** Nacaroa-Nacala Feeder Line
- **[F-2]** Nampula-Angoche Feeder Line
- **[F-3]** Cuamba-Marrupa Feeder Line
- **[F-4]** Cuamba-Gurue-Alto Molocue Feeder Line

- **[F-5]** Lichinga-Metangula Feeder Line
- **[F-6]** Nampula-Montepuez Feeder Line
- **[F-7]** Tete-Fingoe-Zumbu Feeder Line

6.2 Hierarchical System of Urban Centres

In consideration of the Overall Development Strategies and Future Spatial Structure of the Nacala Corridor Region, the following urban centres are designated for the future:

Hierarchy of Urban Centres	Urban Centres (Population in 2035) and Designated Roles
Primary Urban Centre (International)	• Nacala Bay Area (927,000): The First-class International City for Business, Industry and Tourism: A New Gateway for Africa
Secondary Urban Centres (National and Regional)	• Greater Nampula (1,329,000): Regional Growth Pole for the Northern Region • Cuamba City (267,000): Inland Regional Logistics and Industrial Centre • Tete City with Moatize (567,000): Inland Regional Administrative and Business Centre with Support Base for Coal Mining
Tertiary Urban Centres (Provincial)	• Lichinga City (467,000): Provincial Growth Pole and Service Centre with Academic-Scientific Centre and Wood Processing Base • Pemba City (470,000): Provincial Growth Pole and Service Centre with Support Base for Natural Gas Exploitation, as well as Tourism Base
Quaternary Urban Centres (Sub-Provincial)	• Angoche: Commercial and Service Centre • Gurue: Comercial and Service Centre • Mocuba: Commercial, Service and Industrial Centre with Industrial Production Base • Palma: Commercial, Service and Industrial Centre for Natural Gas Exploitation and Chemical Industrial Base

7. Overall Development Strategies and Essential Development Strategies for the Nacala Corridor Region

7.1 Overall Development Strategies and Essential Development Strategies

PEDEC-Nacala formulates "Overall Development Strategies" to provide solutions covering a wide range of overall issues. In order to start up regional development so as to lead to region-wide dynamic and inclusive development, "Essential Development Strategies" are formulated and recommended for short and medium-term implementation in line with the Overall Development Strategies.

7.2 Overall Development Strategies for the Nacala Corridor Region

(1) Creation of Effective Region-Wide Transport and Logistics Systems by ensuring that key transport projects could come into operation, the railway could be used for general cargoes, containers and passengers, not be limited to coal transport, and inter-modal cargo transhipment could be secured among sea transport, rail transport and road transport.

(2) Strengthening of the Foundation for Manufacturing Sectors in Major Urban Centres in addition to commercial and logistics functions.

(3) Promotion of Agriculture and Other Economic Sector Development oriented toward Non-Mineral Resources by implementing support measures in addition to upgrading of the transport corridors.

(4) Strengthening of Environmental Management and Land Management by capacity development for enforcement of environmental regulations and monitoring of environmental management and by

assuring "Principles for Responsible Investment in Agriculture and Food System (rai Principles)" and Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) of Land, Fisheries and Forests in the Context of National Food Security

(5) Strengthening of Human Resources Development by improving both basic education and technical and vocational education and training (TVET)

(6) Coordination and Promotion of Integrated Regional Development by establishment of an institutional framework and implementation of capacity development

(7) Seeking of Region-Wide Inclusive Development by coping with emerging social problems, socially vulnerable people and geographically less accessible areas for promoting inclusive development widely in the region

7.3 Essential Development Strategies

(1) Securing of the Multi-Modal Transport Function of the Nacala Corridor

For long-term effort at establishment of a region-wide corridor network, it is necessary to start with the securing of the multi-modal transport function of the Main Corridors by the following actions:

- Assuring Coal Railway Transport from Moatize to Nacala Port
- Assuring Non-Coal Railway Transport for the Nacala Corridor
- Port-Railway Integration at Nacala Port
- Port-Road Integration in Nacala Bay Area
- Securing the Upgraded Road Function of the Nacala Corridor
- Capacity Development of Railway Regulatory Function of INATTER

(2) Development of the Foundation for Economic Development in Nacala Bay Area, Greater Nampula and Palma

For developing diversified economic sectors, it is essential to take advantage of emerging development potential due to the upgraded transport corridor. Such development potential will arise significantly in Nacala Bay Area and Greater Nampula. Moreover, by taking advantage of prospective natural gas exploitation in northern Cabo Delgado, it is possible to develop chemical industries using natural gas (including methanol and ammonia) in Palma.

Therefore, it is necessary to start with the development of the foundation for economic sector development in Nacala Bay Area, Greater Nampula and Palma by taking the following actions:

- Development of the Foundation (Investment Promotion, Roads, Electricity Distribution and Water Supply, along with Other Urban Infrastructure and Services) for Manufacturing Sectors in Nacala Bay Area, Greater Nampula and Palma
- Water Resource Development and Urban Water Supply for Nacala Bay Area, Greater Nampula and Palma
- Securing of Electricity Supply in Nacala Bay Area, Greater Nampula and Palma

(3) Promotion of Sustainable Agricultural Development by 1) Promoting Development of Small-Scale Farmers and 2) Promoting Effective Utilisation of the Private Sectors' Vitality and Funds for Assisting Small-Scale Farmers

Agricultural strategies are prepared for achieving the following objectives:

1) For development of small scale farmers

- To protect the rights of small-scale farmers and communities on land and other natural resources and their sustainable use, and the prevention of conflicts
- To increase agricultural production and its diversification, and improvement of the productivity of small-scale farmers
- To establish supply chains for agricultural products and to generate added value
- To enhance governance of the agricultural sector
- To develop a social infrastructure to assist community improvement

2) For effective use of the private sector's vitality and funds for assisting small-scale farmers

- To increase agricultural production and its diversification, and improvement of productivity
- To establish supply chains for agricultural products and to generate added value
- To realise appropriate private investment applying "Principles for Responsible Investment in Agriculture and Food System (rai Principles)" and Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) of Land, Fisheries and Forests in the Context of National Food Security

(4) Strengthening of Implementation System and Capacity for Environmental Management and Land Management

In order to cope with increasing environmental problems and land disputes due to increasing economic activities, development activities and investments, it is essential to start with the strengthening of implementation systems and capacity development for environmental management and land/forest management as follows:

- Strengthening of Implementation System for Environmental Management including Environment Monitoring
- Establishment of Environmental Laboratories (Maputo, Tete, and Nacala)
- Capacity Development of Technical Personnel for Environmental Laboratories
- Capacity Development for Monitoring of Conformity with rai Principle
- Capacity Development for Appropriate Operation of DUAT System in accordance with Land/Forest Management Policies

(5) Strengthening of Basic Education and Industrial Human Resources Development

For enriching people's lives and preparing them for employment, it is essential to start with the strengthening of basic education. At the same time, it is also essential to establish and improve technical and vocational education and training institutions.

- Increase of Government Budgets for Improving the Quality of Basic Education
- Encouragement of Community Participation in Improvement of Quality of Primary Schools in Communities
- Strengthening of Secondary Education through Focus on Science and Mathematics Education
- Establishment of TVET Institutions

(6) Establishment and Capacity Development of an Institutional Framework for Coordinating and Promoting Integrated Regional Development

In order to effectively start up and efficiently promote multi-sectoral development covering huge areas, it is essential to establish an effective coordinating mechanism by implementing the

following actions:

- Establishment of an Institutional Framework for Promoting and Coordinating Integrated Development in the Nacala Corridor Region
- Capacity Development of the Special Organisation for Promoting and Coordinating Integrated Development in the Nacala Corridor Region

(7) Taking Care of Emerging Social Problems, Vulnerable People and Less Accessible Areas

For achieving "Inclusive Development", it is essential to cope with a variety of social and environmental problems that could emerge in the course of promoting dynamic development in the Region. Special attention should also be paid to socially vulnerable people and to geographically less accessible areas. For this kind of effort, the following actions are among the starting points required by allocating more government budgets:

- Paying Attention to and Preparation for Emerging Social and Environmental Problems
- Conducting Dialogues with Groups of Vulnerable People and Remote Area People
- Upgrading of Health Services Capacity in Major Urban Centres
- Strengthening of Primary Health Care System in Rural Areas

8. Action Plan for Short and Medium-Term High Priority Projects

8.1 Selection of Short and Medium-Term High Priority Projects

A total of 93 "priority projects" covering various sectors were selected to be implemented between now and 2035. Out of these priority projects, a total of 48 projects were selected as "high priority projects". The high priority projects should be initiated by 2017 and completed by 2025 in the short and medium terms.

8.2 Short and Medium-Term High Priority Projects

The 48 high priority projects are grouped into 4 area programmes and 8 sector programmes.

Area Programmes	
Nacala International Gateway Programme	• Nacala Industrial Park Project • Nacala Industrial Belt Area Development Project • Nacala Port Access Road Project • Nacala Multi-Modal Terminal and Railway Shunting Yard Project • Project for Urgent Installation of Thermal Power Generator with Capacity of 30-40MW in Nacala Bay Area • Nacala Thermal Power Plant Project • Nacala Urban Water Supply Expansion Project • SEZ/IFZ Management Improvement Project
Nampula Regional Growth Centre Programme	• Nampula Southern Road Bypass Project • Nampula Railway Bypass Project • Nampula Multi-Modal Terminal and Railway Shunting Yard Relocation Project • Railway Crossings Improvement Project
Cuamba Logistics and Industrial Centre Programme	• Cuamba Road Bypass Project • Cuamba Industrial Park Project • Cuamba-Marrupa Road Upgrade projects
Palma Natural Gas Exploitation and Chemical Industrial Centre Programme	• Palma Port Project • Palma Thermal Power Plant Project • Palma Urban Water Supply Project • Palma Urban Expansion Project • Bridge Replacement Project for Pemba-Palma-Negomane Roads

Sector Programmes	
Logistics Modernization Sector Programme	• Malawi Central Inland Container Depot Project (Malawi) • Chipata Inland Container Depot Project (Zambia) • N-13 Highway Service Stations and Truck Terminals Establishment • Mandimba One Stop Border Post Project • Logistics Improvement Project for Mocuba SEZ • Railway Regulator Capacity Development Project
Water Resources Development Sector Programme	• Meteorological and Hydrological Observation Network System and Capacity Development Project • Sanhute Dam Project (for Urban Water Supply to Nacala) • Project for Study on Integrated Water Resources Management of River Basins surrounding Nacala Bay Area and Lurio River Basin • Monte Tiza Dam Project (for Urban Water Supply to Nampula)
Power and Energy Sector Programme	• Nampula-Nacala Power Substation Reinforcement Project • Chimuara-Namialo-Nacala Transmission Line Project • Palma-Pemba-Nacala Transmission Line Project • Tete Coal Briquette Project
Social and Environmental Management Sector Programme	• Environmental Management Capacity Development Project • Project for Strengthening the DUAT Acquisition Process • Project for Capacity Development for the Resettlement Process
Human Resources Development Programme	• Community-Based School Management Programme • Programme for Strengthening of Secondary Education with Focus on Science and Mathematics Education • Nacala Medium-Level Technical and Vocational School Project • Cabo Delgado Medium-Level Technical and Vocational School Project • Nacala Superior Polytechnic Project • Cabo Delgado Superior Polytechnic Project
Coordination and Promotion of Integrated Development Programme	• Nacala Corridor Regional Development Management Reinforcement Project
Investment Promotion Sector Programme	• Large-Scale Projects and Local Industry Linkage Project
Support Programme for Less Accessible Areas	• Support Programme for DUAT Acquisition for Small-Scale Farmers in Less Accessible Areas • Programme for Primary School Development in Less Accessible Areas • Programme for Health Centre Development in Less Accessible Areas

9. Recommendations

(1) Coordination for Integrated Development Strategies

PEDEC-Nacala is a set of integrated development strategies which are composed of strategies for various sectors. Therefore, it is necessary for related ministries and agencies as well as provincial governments to coordinate with each other for implementing the development strategies in an integrated manner.

(2) Monitoring and Information Sharing

In order to coordinate the promotion of integrated development, it is necessary to monitor not only the preparation for strategy implementation, but also actual implementation status. Such monitoring should cover the social, economic and environmental aspects. These monitoring results should be shared among relevant government institutions and other stakeholders for proactive and effective coordination.

(3) New Agency for Nacala Corridor Development

To pursue integrated development by coordination among different sectors and actors and to implement PEDEC-Nacala Development Strategies, a new coordination mechanism is required. Creation of a new agency that is in charge of coordination and driving integrated development forward is one of the solutions for the problems that could arise. In the case of establishing a new agency for PEDEC-Nacala, a clear authority should be given to the new agency so as to effectively coordinate and promote the implementation of PEDEC-Nacala development strategies for integrated development.

(4) Essential Development Strategies for Short-Term and Medium-Term Implementation

PEDEC-Nacala formulated Essential Development Strategies which should be primarily implemented in the short and medium-terms. PEDEC-Nacala provided ideas on high priority projects which are in line with the Essential Development Strategies. By preparing and implementing such high priority projects, regional development will start and lead to dynamic and inclusive development in the wider region.

(5) Coping with Emerging Social, Environmental and Economic Issues

Social and environmental problems that may be caused by rapid and large-scale development, as well as changes in needs for social services in the Nacala Corridor Region, should be attended to in a timely manner. Measures for solving some of these problems have already been included in the PEDEC-Nacala development strategies. However, some of them are not covered by the PEDEC-Nacala. Therefore, flexible response to emerging economic, social and environmental problems and needs is necessary through monitoring the situation of social, economic and environmental changes.

(6) Formulation and Preparation of Projects for Implementing Development Strategies

PEDEC-Nacala provided ideas regarding high priority projects in order to implement the proposed Essential Development Strategies covering various sectors. For actual implementation, it is necessary to formulate and prepare projects that are feasible technically, economically, socially and financially, for actual implementation.

(7) Participation and Involvement of Stakeholders

At the stage of project planning and implementation, a wide range of stakeholders (government agencies, civil societies, private business sectors and universities) should be involved. Their participation and contribution is essential for sustainable development.

(8) Community Participation and Gender Consideration

At the implementation stage of PEDEC-Nacala development strategies, community participation and gender mainstreaming should be promoted.

PEDEC-Nacala development strategies are intended to diversify economic activities and development opportunities by taking advantage of large-scale development of coal and natural gas, the logistics industry and manufacturing industry. However, benefits to communities and opportunities for women are not automatically secured in the rapid economic development and increasing development opportunities. Therefore, efforts at community participation and gender mainstreaming are important in order to ensure that communities can gain substantial benefits from

that development and that both women and men get equal opportunities to participate in the development.

(9) Communication Strategies

Since once the PEDEC-Nacala development strategies are implemented, a large number of people, groups and businesses would be affected by changes in the economy, society and environment, PEDEC-Nacala development strategies, approaches and activities should be well and widely understood. At the stage of strategy implementation, it will also be necessary to share information on monitoring results of the status of projects and development activities. It is necessary to formulate and implement communication strategies in order to have appropriate communications with a wide range of many stakeholders.

(10) Land Use Policy and Land Use Plan for Forest Land

An overall land use policy and plan in respect of forest protection, forest development and forest utilization needs to be formulated. The expansion of agricultural land and protection of forestry should be regulated by using this kind of land use policy and plan. Mozambique currently has neither such a policy nor a land use plan, and due to this situation, land use changes have been decided by case-by-case review whenever DUATs or mineral resource concessions are requested.

(11) Allocation of Government Revenues through Royalty and Corporate Taxes from Mining Businesses

Royalties and taxes should be collected appropriately from businesses in mining and other large-scale developments in the Nacala Corridor Region. Such government revenues should be allocated in a balanced manner to measures that will solve the foreseeable social and environmental problems, as well as increase the quantity and improve the quality of social services.

PART I
INTRODUCTION

Chapter 1 Introduction

1.1 PEDEC-Nacala

PEDEC-Nacala (the Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique) is a study project for formulating "Integrated Development Strategies" for the Nacala Corridor and its surrounding areas including five provinces related to the Nacala Corridor (hereinafter referred to as the Nacala Corridor Region).

The improvement of the transport capacity of the Nacala Corridor is expected to become an important trigger to initiate regional development. Development strategies of PEDEC are formulated to take advantage of development opportunities and potentials to emerge due to the upgraded transport function of the Nacala Corridor.

PEDEC-Nacala seeks to promote "Dynamic and Inclusive Development" by paying attention not only to the dynamic relation between mineral resources development, transport corridor development and other economic sector development, but also to the inclusive need for environmental management, human resources development and institutional development. Furthermore, PEDEC-Nacala is also concerned about socially vulnerable people and people in less accessible area who might not be able to participate in development opportunities to emerge due to such mineral resources development, transport corridor development and other economic sector development.

PEDEC-Nacala provides a "Long-Term Vision and Spatial Structure" for the Nacala Corridor Region. PEDEC-Nacala recommends "Essential Development Strategies" that are required for triggering/initiating development and leading the initiated development to a further development so that development can be continuously realised leading to a region-wide development in the Nacala Corridor Region.

1.2 Background of PEDEC-Nacala

Historically, the Nacala Corridor was an international transport corridor consisting of Nacala Port, the Northern Railway and the Malawian Railway system. The Nacala Corridor used to be the most important export route for Malawi. However, the rail transport was disrupted by Mozambique's prolonged civil war (1977-1992).

In the 1990s, the deteriorated rail facilities and rolling stock of the Northern Railway were rehabilitated with international assistance. However, the railway rehabilitation could not so strongly drive economic development in the areas along the Nacala Corridor. Moreover, road connection was poor between the inland areas and Nampula/Nacala. Although there are a variety of resources

and potentials for development in the Northern Region, considering the malfunctioning cargo rail and road transportation, it had been difficult to envision future development in the areas along the Nacala Corridor and its surrounding areas by recent years.

In the late 1990s and 2000s, for international corridor development in southern Africa, private sector initiatives got considerable attention for their possibility to promote development including infrastructure. In fact, the operation of the Northern Railway and that of Nacala Port have been privatised since 2005. However, the private operator had not been able to secure sufficient funds to rehabilitate the rail facilities and rolling stock due to low demand for cargo transport in the Northern Region. This is because railways and roads were still in poor condition and private investments did not come into the region in those years, including for infrastructure development. As a result, private sector development did not get enough momentum built up to be able to lead regional development in the Northern Region.

This situation has changed since the late 2000s, when the Nacala Corridor began to attract attention from people and businesses. In fact oceangoing liners to Asia started to visit Nacala Port. The hinterlands of Nacala Port have also begun to attract private investments partly due to the establishment of Nacala Special Economic Zone (SEZ) in December 2007. On the infrastructure side, road upgrading projects including the road sections between Nampula–Cuamba and Lichinga–Montepuez have been going on with the co-financing from Japan International Cooperation Agency (JICA), the African Development Bank (AfDB) and other banks. They have also decided to finance upgrading projects of the road sections of Cuamba-Mandimba-Lichinga. In addition to these road upgrading projects connecting inland towns with seaports, projects for Nacala Port were started. As a result, private investments in the agriculture and tree planting sectors have also increased in the provinces of Nampula, Niassa and Zambezia.

Furthermore, another factor has arisen to bring development in the Nacala Corridor and its surrounding areas. The factor is the large-scale coal exploitation projects in Tete Province. The coal reserve found in Tete Province is huge and of high quality. The expected coal production in Tete Province amounts to over 50 million tons/year by 2016 and 75 million tons/year by 2020. At present, several coal mines are operating and several others will start their operation within five years.

This massive coal production requires at least three export routes consisting of railways and seaports. The export of coal from Tete through Sena Railway and Beira Port was started in 2012. The capacity of Sena Line and Beria Port, however, is limited and will not be able to accommodate the increasing coal production in Tete. In addition to the Sena Line and Beira Port, there are currently three more alternative export routes. One of the most promising routes is the route using the Nacala Corridor, which runs from Moatize of Tete Province through Malawi and the Nacala Corridor up to Nacala Port.

The coal transport through the Nacala Corridor requires upgrading of the railway of the Nacala Corridor, as well as the construction of new railway sections. Although Tete and Malawi are not part of the conventional route of the Nacala Corridor, Tete's coal mining and export is expected to revitalise the Northern Railway (Lichinga-Cuamba-Nampula-Nacala Port) so as to transport not only coal but also general cargo and containers. This is considered a very important factor to create development opportunities and potentials to initiate and promote regional development along the Nacala Corridor and its surrounding areas. In this context, it is very critical to take proper actions to

take advantage of these emerging development opportunities and potential for effectively promoting the development of the Nacala Corridor Region. While such an increase in private and public investments is considered good for development of the Nacala Corridor Region, there are growing concerns about unplanned and uncoordinated development. The concerns include how to enhance the effectiveness of ongoing and planned projects. Unless proper measures are taken by the government to guide and coordinate development activities, a variety of development opportunities and potential of the Nacala Corridor Region may be underutilised. Moreover, it is necessary to prepare measures to prevent or mitigate various environmental and social problems including urban environmental deterioration, industry-related pollution, land conflicts and depletion of environmental resources. Furthermore, it would become inevitable to cope with vulnerable groups of people and those in less accessible areas, who might not be able to participate in emerging development opportunities.

Under these circumstances, the Government of Mozambique recognised the importance and necessity of preparing a set of strategies for the entire Nacala Corridor Region. The Government of Mozambique requested that the Government of Japan provide technical assistance to the Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique (hereinafter referred to as "PEDEC-Nacala"), and both governments have agreed to implement the Project.

1.3 Goals and Objectives of PEDEC-Nacala

The Record of Discussions (RD) between Mozambique's Ministry of Planning and Development (MPD)[1] and Japanese International Cooperation Agency (JICA) for the Project defines the goals and objectives of PEDEC-Nacala as follows.

The objective of PEDEC-Nacala is defined as "to formulate development strategies to guide appropriate development and investment in the Nacala Corridor." The development strategies of PEDEC-Nacala are selective and integrated in the coverage of economic sectors, infrastructure sectors and social service sectors. PEDEC Strategies are prepared raising valid points at the regional level. However, PEDEC Strategies do not compose a comprehensive development plan.

The goals to be attained by utilising the development strategies of PEDEC are defined as follows:

- To enhance social capacity and economic growth in the Nacala Corridor Region
- To effectively guide appropriate development in the Nacala Corridor Region
- To promote private investment in an appropriate manner in the Nacala Corridor Region
- To appropriately manage resources of the Nacala Corridor Region

By following the defined goals, PEDEC-Nacala is to seek dynamic and inclusive development widely in the Nacala Corridor Region. PEDEC-Nacala pursues economic growth by creating dynamic relations between economic sectors and the transport development of the Nacala Corridor. PEDEC-Nacala recommends strategies for mitigating social and environmental problems, as well as institutional frameworks for effective and efficient regional development.

The RD defines the outputs of PEDEC-Nacala as follows:

- Integrated development strategies for the Nacala Corridor Region

[1] In January 2015, central government ministries of Mozambique were reorganized and MPD has become part of the Ministry of Economy and Finance.

- Database on socio-economy and various sectors in the Nacala Corridor Region, including GIS data
- Topographic maps (at a scale of 1: 10,000) for Nampula Area and Nacala Area

1.4 Guiding Principles of PEDEC-Nacala

Guiding principles for PEDEC-Nacala are a set of statements on "values" that have been developed and used for considering the future of the Nacala Corridor Region and for formulating strategies of PEDEC-Nacala. The guiding principles are influenced by the vision statement for the Nacala Corridor Region, "A peaceful, prosperous, equitable and sustainable region free from poverty in harmony with the environment". The guiding principles are also based on the understanding of the present situation and past development of the Nacala Corridor Region.

(1) Sustainability

PEDEC concerns itself with "Sustainable Development." PEDEC addresses the concept of "Sustainable Development" for the Nacala Corridor Region should have a multifaceted feature as follows:

- Maintaining the peace and social order
- Conserving the natural environment
- Maintaining traditional and cultural norms
- Developing diversified economic sectors

(2) Diversification

PEDEC emphasises the importance of diversification in the regional economy, rather than heavily depending on the mining sector. This diversification in development of economic sectors could create various opportunities in which more people could participate. Moreover, a diversified regional economy has remarkable resilience to external shocks compared to an economy more dependent on a single sector.

(3) Benefits to a Wide Region

PEDEC concerns itself with development to bring "benefits to a wide region" and "benefits to a wide range of societies." PEDEC does not aim to bring benefits just along the corridors. Corridor development should be a means to bring benefits to a wide region.

(4) Dynamic Development

PEDEC seeks "dynamicity" in development. Dynamic development is interrelated or integrated development between different economic sectors, different infrastructure and different groups of people. In dynamic development, furthermore, it is expected that one development induces another development, one sector development is conducive to development of another sector, or one area development is related to another area development. PEDEC concerns itself with ways to promote "dynamic relationship" in development.

(5) Inclusive Development

Dynamic development for the Nacala Corridor Region should be promoted not only by strategies

designed for economic and infrastructure development, but also by strategies designed for environmental management, social development and capacity development. PEDEC concerns itself with this way of "inclusiveness" in development. PEDEC is aware that both "dynamicity" and "inclusiveness" in development are required for sustainable development. PEDEC is also aware that economic development with dynamic features is not always almighty or capable of bringing sufficient benefits to a wide region, as well as to a wide range of societies.

PEDEC understands that economic development based on the upgraded transport corridor cannot always solve various social and environmental problems to arise in the Nacala Corridor Region. Moreover, such economic development based on corridor development might cause many problems. Therefore, PEDEC is required to pursue a wide range of development goals, namely those of capacity development (individual, institutional and social capacity), environmental management, social development, economic development and spatial development. This is a way to seek "Inclusive Development".

(6) Gender Mainstreaming

PEDEC-Nacala recognises the importance of gender issues and gender mainstreaming. Social and economic opportunities should not be unequally given due to gender. In the Nacala Corridor Region, a majority of the population is engaged in agriculture, where the burden for women is heavier and they are often asked to stay at home. In order to respond to this gender situation, PEDEC-Nacala pays attention to the structural disparity between men and women in the following areas: education, health, poverty, employment and food security in accordance with the National Plan for the Advancement of Women (PNAM 2010-2014). PEDEC-Nacala adheres to the need for gender mainstreaming in different sectors in planning and implementation of development strategies.

(7) Exogenous Development and Endogenous Development

PEDEC understands the importance of both endogenous development (development based on internal potential and effort) and exogenous development (development to be driven by external factors).

Since the economy and society of the Nacala Corridor Region started transformation of its economy and society by getting foreign investments, especially in the mining sector, it is necessary to cope with impacts and changes due to such exogenous development. It is also necessary to take advantage of development opportunities arising due to exogenous development.

On the other hand, PEDEC concerns itself with the necessity and importance of promoting endogenous development utilising a variety of inherent potential in the Nacala Corridor Region. It is partly because foreign investments and corridor development cannot necessarily solve problems of vulnerable people and less accessible areas[2].

As for investments in agricultural and forestry development, PEDEC concerns itself with not only how to protect existing people's rights (including those of small-scale farmers) from influences of incoming investments and how to maintain good relationships between investments from outside and existing people's livelihood/their land use, but also how to utilise development opportunities to arise due to private sector development in agriculture and forestry sectors.

[2] Less accessible areas are defined by PEDEC-Nacala as those areas which are 30 km away or farther from the main corridors, sub-corridors and feeder links of the proposed long-term spatial structure of the Nacala Corridor Region.

(8) Beyond Geographical Distances: Ports and Corridors

For promoting development to benefit a wide region and going beyond geographical distances, PEDEC seeks ways to promote development by upgrading and utilising transport corridors. PEDEC considers how to extend transport corridors for organising a network to efficiently and effectively cover a wide region. To go beyond geographical distances, PEDEC also sees the importance of dynamic ports with efficient hinterland connections.

(9) Mining Development as the Initial Driving Force for Regional Development

PEDEC sees the exploitation of mineral resources as the initial driving force toward a wide regional development in the Nacala Corridor Region. PEDEC understands the importance of taking advantage of the following opportunities to arise due to coal and natural gas exploitation for regional development:

- Possibility to upgrade railways in order to transport coal from Tete to Nacala Port
- Possibility to develop chemical industries by utilising natural gas

Therefore, the sustainability of mining operations for coal and natural gas is essential for sustainable development for the Nacala Corridor Region.

(10) Sustainability of Mining Operations

Mining operation always has risks of damaging the environment. Coal exploitation and coal transport, as well as natural gas exploitation and LNG production might also have negative impacts on the environment. Therefore, it is necessary to take measures to mitigate negative impacts on the environment and societies, including the expected negative impacts of the railway transport of coal on the social environment in Nampula and other cities whose central areas are disturbed by trains transporting coal. Moreover, such negative impacts to the environment and societies might substantially jeopardise sustainability in that the mining operations could be reduced, suspended or terminated due to the negative environmental and social impacts.

1.5 Approach of PEDEC-Nacala

PEDEC-Nacala used a set of approach to formulate development strategies for the Nacala Corridor Region. This section describes the key features of the approach adopted by PEDEC-Nacala.

(1) Sectoral and Regional Perspectives

For development planning and implementation, there are two types of approach. One is sector approach, by which situational analysis, planning and implementation are vertically conducted within a sector. The other is regional approach, by which situational analysis and planning are horizontally conducted for a particular area from different sectors.

In the early phases, sector approach was adopted in this Project. This is because existing activities and plans are mostly based on the sector approach and it is easier to understand the present situation using the sector approach. On the other hand, at the planning stage for development strategies, the regional approach was emphasised. The recommended development scenario and overall development strategies were formulated by using the regional approach.

The priority for implementing sectoral strategies/measures was adjusted by considering selected development scenarios and overall development strategies which were formulated using the regional approach. Sector strategies/measures are important to be formulated because in actuality, most programmes and projects are implemented within their individual sectors.

(2) Strategic Environmental Assessment (SEA)[3]

A strategic environmental assessment (SEA) was done in parallel with strategy formulation in PEDEC-Nacala. Evaluation and selection of development scenarios was conducted by looking at their environmental and social impacts, as well as other aspects. Furthermore, for development strategies proposed by PEDEC-Nacala, a set of analyses were conducted for the SEA including an environmental risk and opportunity matrix analysis, compatibility matrix analysis and compound matrix analysis.

In the first three phases for strategy formulation, a series of Steering Committee and Working Group meetings were organised. In the fourth phase, stakeholder meetings were held in the five provinces of the Nacala Corridor Region in order to get different views and opinions from a wide range of stakeholders including government sectors, civil societies, business sectors and universities.

Implications from stakeholder meetings were reflected in the proposed strategies.

(3) Enforcement of Systems for Environmental Protection and Environmental Management

In strategy formation, development strategies that have risks of causing negative environmental and social impacts, as well as positive benefits, are not rejected simply because they have risks of negative impacts. For strategy formulation, it is assumed that enforcement of existing systems for environmental protection, environmental impact assessment (EIA) and environmental management is done properly to prevent environmental impacts through necessary capacity development of government officers for such enforcement activities.

PEDEC-Nacala seeks ways to prevent environmental and social impacts both by regulation enforcement (including implementation of EIA) and to mitigate negative impacts by implementing adequate measures against negative impacts.

(4) Consideration of Socially Vulnerable People and Geographically Less Accessible Areas

PEDEC-Nacala Study Team is aware of the difficulties of bringing benefits to vulnerable people and less accessible areas by encouraging them to take advantage of emerging development opportunities due to the corridor development and other economic sector development. Therefore, special attention was paid to such vulnerable people and less accessible areas in the present situational analysis and strategy formulation.

1.6 Study Area (Nacala Corridor Region)

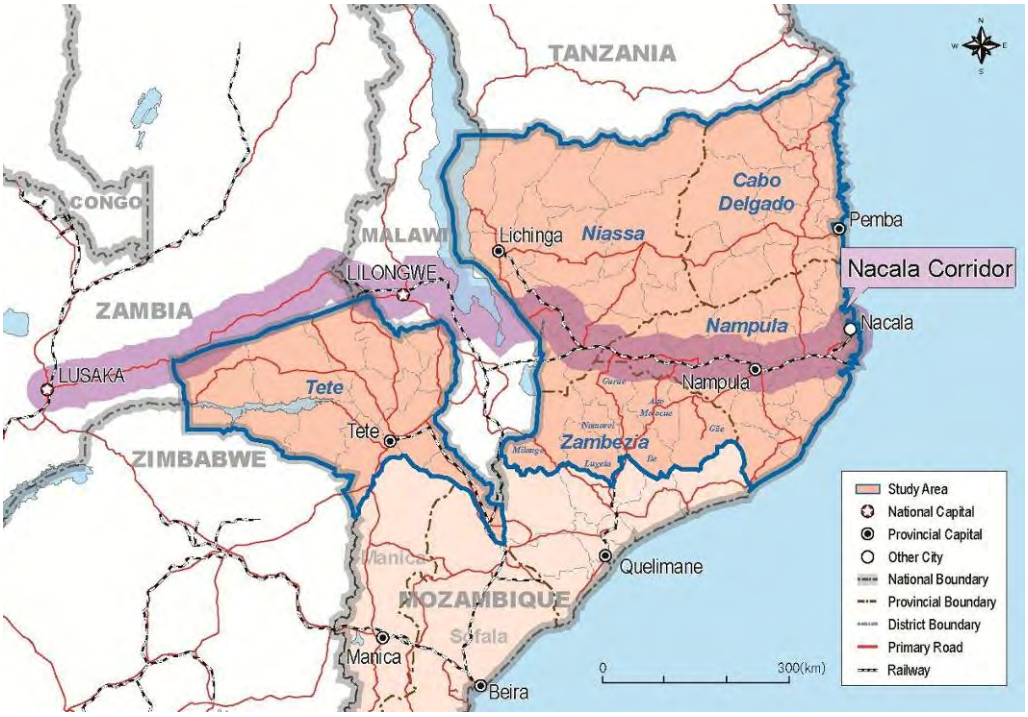
The target area (study area) of PEDEC-Nacala comprises the four provinces of Nampula, Cabo

[3] In Mozambique, several SEAs have been done on a trial basis by MICOA. The official SEA framework in Mozambique is yet to be established and approved. In PEDEC-Nacala, SEA has been done in the course of strategy formulation. However, the result and process of the SEA for PEDEC-Nacala are not official. The methodology and process for SEA is shown in Chapter 21.

Delgado, Niassa, Tete and the seven northern districts of Zambezia Province, which are districts of Alto Molocue, Gile, Gurue, Ile, Lugela, Milange and Namarroi. See Figure 1.6.1.

These areas have been selected for formulating a set of integrated regional development strategies (PEDEC Strategies). It is because these areas are expected to receive substantial impacts of the upgrading of the transport function and capacity of the Nacala Corridor and these areas can take advantage of development opportunities and potential to arise due to the upgraded Nacala Corridor.

The provinces and districts that are related to the Nacala Corridor are defined as the Nacala Corridor Region.



Source: JICA Study Team

Figure 1.6.1 Target Area (Study Area) of PEDEC-Nacala: Nacala Corridor Region

1.7 Project Framework and Organisations[4]

The Ministry of Planning and Development (MPD, currently part of the Ministry of Economy and Finance) was the executing agency for PEDEC-Nacala. The Special Economic Zones Office (GAZEDA) under MPD was functioning as the secretariat for the Project. The governments of the five provinces of Nampula, Niassa, Cabo Delgado, Tete and Zambezia were counterpart organisations at the provincial level. Other organisations participated in PEDEC-Nacala included the following:

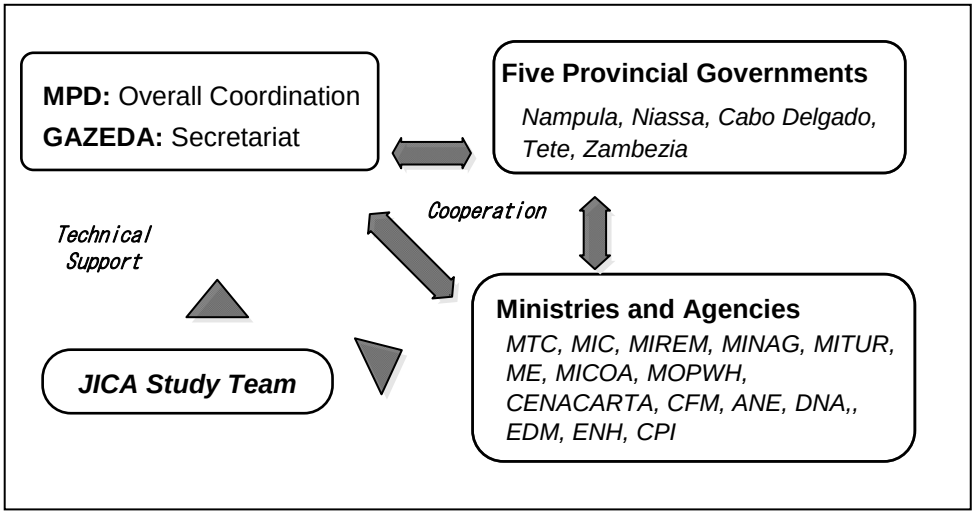
- Ministry of Transport and Communication (MTC)
- Ministry of Industry and Commerce (MIC)
- Ministry of Mineral Resources (MIREM) (currently Ministry of Mineral Resources and Energy)
- Ministry of Agriculture (MINAG) (currently Ministry of Agriculture and Food Security)

[4] In this section, the names of ministries and other government agencies are those under the previous government, because most activities for PEDEC-Nacala were conducted under the previous government.

- Ministry of Tourism (MITUR) (currently Ministry of Culture and Tourism)
- Ministry of Energy (ME) (currently Ministry of Mineral Resources and Energy)
- Ministry of Coordination of Environmental Affair (MICOA) (currently Ministry of Land, Environmental and Rural Development)
- Ministry of Public Works and Housing (MOPH) (currently Ministry of Public Works, Housing and Water Resources)
- National Remote Sensing & Cartography Centre (CENACARTA)
- Mozambique Ports and Railways (CFM)
- National Road Administration (ANE)
- National Water Directorate (DNA)
- Mozambique Electricity Company (EDM)
- Mozambique National Hydrocarbons Company (ENH)
- Investment Promotion Centre (CPI)

These organisations were the members of the steering committee and working group for the Project.

JICA signed a contract with a team of consulting firms, which is represented by Oriental Consultants Co., Ltd. (currently known as Oriental Consultants Global Co., Ltd.) and joined by RECS International Inc., International Development Centre of Japan, Kokusai Kogyo Co., Ltd., and Eight-Japan Engineering Consultants Inc. (hereinafter "JICA Study Team") to give technical assistance to the Mozambican counterpart agencies for PEDEC-Nacala.



Note: The names of ministries and agencies are as of December 2014.
Source: JICA Study Team

Figure 1.7.1 Project Organisations

1.8 Process and Schedule for Formulating PEDEC-Nacala Strategies

1.8.1 Phases of PEDEC-Nacala

PEDEC-Nacala was initiated in April 2012. For the purpose of formulating development strategies, the following five phases were implemented:

Phase 1: Analysis of Present Situation including that of Potential and Constraints

Phase 2: Formulation of Draft Short-Term Development Strategies

Phase 3: Formulation of Draft Integrated Development Strategies (Short-Term and Mid and Long-Term Strategies) and Possible Measures (Ideas on Programmes/Projects)

Phase 4: Stakeholder Consultation to Get Feedbacks on the Draft Integrated Development Strategies and Possible Measures

Phase 5: Finalisation of Integrated Development Strategies and Ideas on Priority Programmes/Projects

In Phases 1 through 3, a draft PEDEC Strategies Report was prepared by compiling the future directions of development and the possibility of implementing the proposed development strategies which were identified. In Phase 4, the draft PEDEC Strategies Report was presented to stakeholders (including civil societies, private business groups and universities) for consultation. By incorporating the views and proposals of the stakeholders, integrated development strategies for the Nacala Corridor Region was finalised in Phase 5.

1.8.2 Steering Committee Meetings and Working Group Meetings

A Steering Committee was established for PEDEC-Nacala for providing high-level guidance to the JICA Study Team and project activities under MPD and GAZEDA. Steering Committee meetings were organised for the timing of reviewing study reports (Progress Report, Interim Report, Draft PEDEC Strategies Report and Draft Final Report). Members of the Steering Committee were national directors of counterpart ministries/agencies and permanent secretaries of provincial governments.

A Working Group was established for PEDEC-Nacala for technically guiding the JICA Study Team and project activities under MPD and GAZEDA. Working Group meetings were organised occasionally including before the preparation of study reports. Members of the Working Group were technical staff of counterpart ministries/agencies and provincial directors of provincial governments.

The Steering Committee meetings and Working Group meetings actually held are listed in the Appendix D. The Steering Committee has held 5 meetings. The Working Group has held 14 meetings.

1.9 Organisation of the Final Report

The Final Study Report was prepared based on the findings of data analyses and field investigations and integrates the views of the Mozambican counterparts expressed at Working Group meetings, Steering Committee meetings and occasional meetings with the JICA Study Team. Views of the representatives from Malawi and Zambia were also duly considered. The Final Study Report was prepared by revising the Draft Final Report based on the Third Integrated Working Group Meeting and the Fifth Steering Committee Meeting conducted in December 2014.

The Final Study Report is composed of the following volumes:

Summary

Main Text: Volume 1

Main Text: Volume 2

GIS Atlas

Sector Supporting Document

The Main Text of the Final Study Report is composed of 21 chapters under the following 7 parts and 5 appendices:

Main Text: Volume 1

Executive Summary

Part I: Introduction

Part II: Present Conditions

Main Text: Volume 2

Part III: Vision, Development Goals and Overall Issues

Part IV: Development Framework

Part V: Development Strategies

Part VI: Implementation Plan

Part VII: Strategic Environmental Assessment

Conclusions and Recommendations

Appendix A: Supporting Works

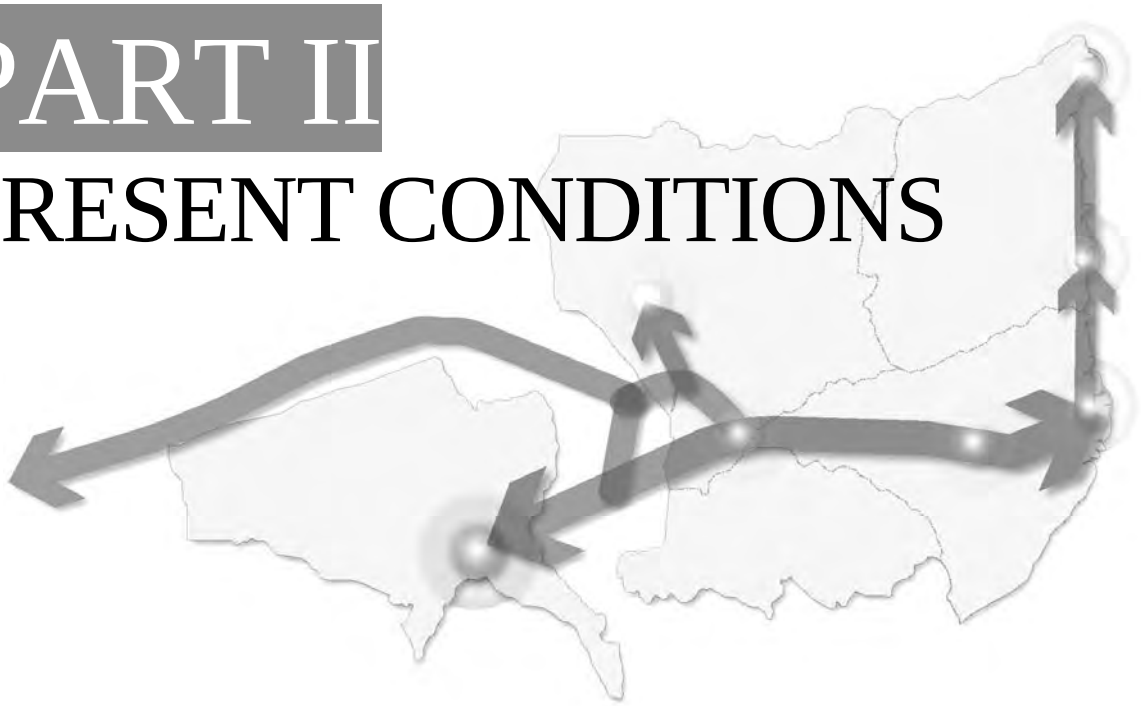
Appendix B: Capacity Development Activities

Appendix C: International Seminars

Appendix D: Records of Meetings

Appendix E: Understanding of Comments from Stakeholder Meetings and Responses to Stakeholder's Comments

PART II
PRESENT CONDITIONS



Chapter 2 Existing Conditions of Mozambique and Neighbouring Countries

2.1 Existing Conditions of Mozambique

2.1.1 Socioeconomy

(1) Population

The population of Mozambique amounted to 20.63 million, based on the General Census of Population and Housing in 2007. It has rapidly increased with an annual growth rate of approximately 2.5% between 1997 and 2007. However between 1980 and 1997, the annual growth rate dropped by almost one per cent from 2.57% per annum to 1.67% per annum. This is due to the civil war. The past population trend is described in Table 2.1.1. In 2011, the population of Mozambique is estimated to be 23.05 million.

Table 2.1.1 Past Population Trend in Mozambique

	1950	1960	1970	1980	1997	2007
Population (Million)	6.47	7.60	9.41	12.13	16.08	20.63
Growth Rate (Annual %)	-	1.62	2.16	2.57	1.69	2.53

Source: INE, 1997 and 2007, General Census of Population and Housing and INE HP

(2) GDP and GDP per Capita

Since the end of the civil war in 1992, gross domestic product (GDP) of Mozambique has had a high growth rate of over 7 % per annum up to 2012. GDP per capita has also increased to 652.0 USD in 2012, which is equal to almost five times of the value in 1992. Table 2.1.2 shows the trend of GDP and GDP per capita in Mozambique.

Table 2.1.2 GDP and GDP per Capita in Mozambique

	1992	1997	2002	2007	2012
GDP (Current, USD Billion)	1.9	3.8	4.2	8.1	14.6
Real GDP Growth (Annual %)	-5.2	11.1	9.2	7.3	7.5
GDP per Capita (Current, USD)	130.9	229.1	228.0	399.3	652.0
Growth Rate of GDP per Capita (Annual %)	-7.0	8.4	7.1	5.2	5.4

Source: IMF, 2012, World Economic Outlook (http://mozambique.opendataforafrica.org/tyjuuvg/mozambique-gdp-per-capita)

(3) GDP Structure

The GDP structure by broad sector in 2011 was 27% agriculture, 23% industry and 50% services. Agriculture and services grew steadily during the period between 2000 and 2011 more or less in parallel with GDP growth, while industry grew more rapidly during 1995–2005. The expansion of the industrial sector is attributable to the aluminium refining plant, which was constructed in the latter part of the 1990s (See Table 2.1.3 and Table 2.1.4).

The share of the agricultural sector slightly decreased from 34.3% in 1995 to 27% in 2011. The manufacturing sector and electricity and water supply sector, on the contrary, grew sharply during 1995–2005. As a result the share of industry sector increased from 11.3% in 1995 to 23.3% in 2011 (See Table 2.1.3 and Table 2.1.4) .

Table 2.1.3 Annual Growth Rate of GDP by Economic Sector (%)

	1995	2000	2005	2010	2011
Agriculture	3.2 %	3.5 %	7.5 %	8.0 %	7.7 %
Industry	0.2 %	22.7 %	13.2 %	5.1 %	6.5 %
Services	4.0 %	6.5 %	8.2 %	7.9 %	5.9 %
Total	2.8 %	9.4 %	8.8 %	7.2 %	7.3 %

Source: Instituto Nacional de Estatistica (INE)

Table 2.1.4 Share of Economic Sectors (%)

	1995	2000	2005	2010	2011
Agriculture	34.3 %	27.9 %	25.8 %	26.7 %	27.0 %
Industry	11.3 %	21.5 %	25.7 %	23.3 %	23.3 %
Services	54.3 %	50.7 %	48.5 %	50.0 %	49.7 %
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

Source: Instituto Nacional de Estatistica (INE)

(4) Economically Active Population (EAP)

As shown in Table 2.1.5, among the number of economically active population (EAP), the share of the agriculture sector is dominant although it decreased from 80.9% in 1997 to 75.2% in 2007. On the other hand, the shares of industry and services increased from 1997 to 2007.

Table 2.1.5 Number of Economically Active Population (EAP) in 1997 and 2007

	1997		2007	
	Persons	%	Persons	%
Agriculture	4,742,508	80.9 %	5,543,928	75.2 %
Industry	334,007	5.7 %	489,298	6.6 %
Service	788,905	13.5 %	1,337,733	18.1 %
Total	5,865,420	100.0 %	7,370,959	100.0 %

Source: Instituto Nacional de Estatistica (INE), General Census of Population and Housing 1997 and 2007

(5) Unemployment Rate, Poverty and Inequality

While Mozambique has succeeded in maintaining steady macro-economic growth, the official unemployment rate in the country was 18.7% in 2004/05, with unemployment rate of 31% in urban areas and 13% in rural areas. This is due to the extremely high unemployment rate of the age group between 15-24.

The poverty ratio based on consumption declined significantly from 69% to 54% between 1997 and 2003, while the level of poverty in 2009 remained essentially the same as in 2003. The Gini coefficient, an indicator for measuring income disparity, increased from 0.40 in 1997 to 0.415 in 2003, indicating widening disparity, and remained at almost the same level until 2009 (0.414).

2.1.2 Existing Development Plans at National Level

There are a number of development plans and goals at the national level as follows:

National Development Strategies and Plans

- National Development Strategy 2015–2035[1]
- Millennium Development Goals by 2015
- Government Five Year Programme 2011–2014
- Poverty Reduction Strategy Paper 2011–2014

Economic Sector Policies, Development Strategies and Plans

- Agriculture: Strategic Plan for Development of the Agriculture Sector 2011-2020 (PEDSA), MINAG
- Forestry: Strategies for Reforestation, 2009-2030, DNTF of MINAG
- Industry: Industrial Policy and Strategy 2007, MIC
- Natural Gas: Natural Gas Master Plan, MIREM[2]
- Coal: Coal Master Plan (Draft)[3]
- Tourism: Strategic Plan for Development of Tourism in Mozambique, 2004-2013, MITUR
- Investment Promotion: Strategic Plan: Promotion of Private Investment in Mozambique (PEPIP 2014-2016), CPI

Infrastructure and Social Services Sector Policies, Development Strategies and Plans

- Transport: Strategies for the Integrated Development of the Transport System, 2009, MTC
- Road: Road Sector Strategies 2007-2014 (RSS), ANE
- Electricity: Network Development Master Plan Update, 2012-2027, EDM
- Telecommunications: National ICT Policy in 2000, INCM
- Telecommunications: ICT Implementation Strategy, 2002, INCM
- Education: Education Strategic Plan 2012-2016, MINED

In PEDEC-Nacala, one of the important aspects of the future vision for the Nacala Corridor Region is poverty reduction. In this sense, the Five-Year Development Plan 2011–2014 and Poverty Reduction Strategy Paper 2011-2014 are of high relevance to PEDEC-Nacala.

On the other hand, the National Development Strategy (ENDE) for 2015-2035 prepared by the Ministry of Development and Planning (MDP) is an official policy paper indicating the overall direction of development for Mozambique in the long term. The ENDE emphasises the importance of industrialization by calling for the structural transformation of the economy (including agriculture), institutions, physical basis and human capital. In this sense, PEDEC Strategies are in line with the ENDE 2015-2035.

PEDEC-Nacala is expected to serve as the implementation tool of the ENDE for the Nacala Corridor Region.

[1] National Development Strategy 2015-2035 was approved in June 2014 by the Government of Mozambique.
[2] Natural Gas Master Plan (Plano Director do Gás Natural), December 2013 (this Master Plan has been approved by the Cabinet in June 2014)
[3] Preliminary Mozambique Coal Master Plan, Final Report, 27 May 2013

2.2 Mozambique and Neighbouring Countries

Mozambique and some of the surrounding countries are compared by selected indices in Table 2.2.1.

Table 2.2.1 Condition of Mozambique and Surrounding Countries

Indicator	Unit	Mozambi-que	Malawi	Zambia	Zimba-bwe	Tanzania	South Africa
Population[1]							
Population (2010)	million	23.4	14.9	12.9	12.6	44.8	50.0
Population Growth Rate (2004-2010)	% per annum	2.4	3.0	2.4	0.0	2.9	1.1
Surface Area	thousand km^2	799.4	118.5	752.6	390.8	947.3	1,219.1
Population Density (2010)	person/km^2	29.3	125.7	17.2	32.2	47.3	41.0
Rate of Urban Population	%	38	20	36	38	26	62
Economy[1]							
GDP in 2010	billion US$	9.6	5.1	16.2	7.5	22.9	363.9
GDP Growth 2000-2010	% per annum	7.8	5.2	5.6	-6.3	7.1	3.9
GDP per Capita 2010	US$	394	339	1,253	595	527	7,272
Human Development							
HDI in 2012[2]	index	0.327	0.418	0.448	0.397	0.476	0.629
HDI Rank in 2012[2]	rank out of 187 countries	185	170	163	172	152	121
Literacy Rate in 2009[3]	%	55.1	73.7	70.9	91.9	72.9	88.7
Infant Mortality Rate[3]	Number of deaths under 5 years old per 1,000 births	135.0	92.1	111.0	79.8	92.4	56.6

Source 1: World Bank, World Development Indicators
Source 2: UNDP, International Human Development Indicators
Source 3: UNESCO Institute for Statistics

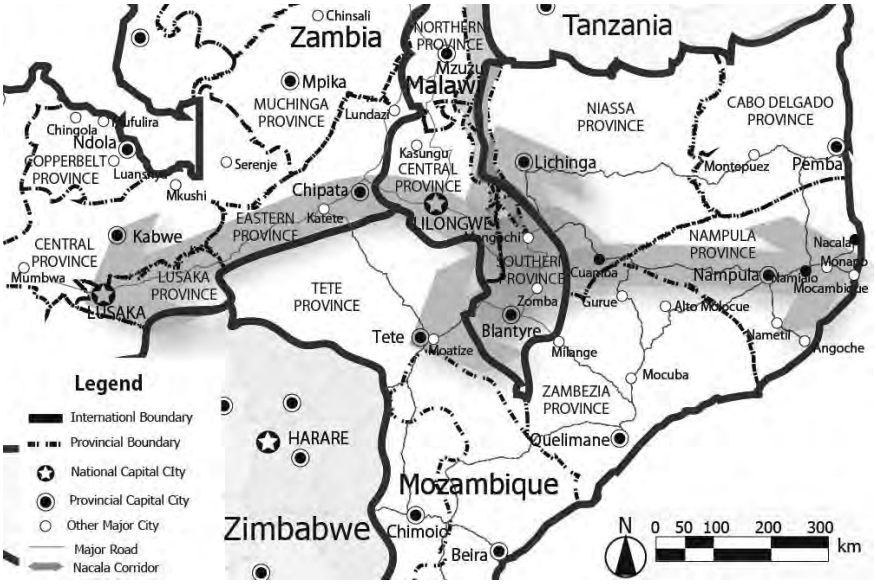
The population of Mozambique at 23.4 million is larger than those of Malawi (14.9 million), Zambia (12.9 million) and Zimbabwe (12.6 million), but more or less half of those of Tanzania (44.8 million) and South Africa (50.0 million). The surface area of Mozambique at 799 thousand km^2 is comparable to that of Zambia (752 thousand km^2) and almost seven times larger than Malawi (119 thousand km^2). Population density of Malawi at 125 persons per km^2 is much higher than the other countries including Mozambique at 29 persons per km^2. Urbanization in South Africa is relatively high at 62%.

South Africa is outstanding in the size of its economy with its GDP at US$ 363 billion in 2010, about 38 times that of Mozambique at US$ 9.6 billion. Mozambique experienced the highest GDP growth among the seven countries at 7.8 % per year between 2000 and 2010. GDP per capita of Mozambique at US$ 394 in 2010 is the second lowest, next to Malawi at US$ 339.

The human development index (HDI) of Mozambique was the lowest at 0.327, with its position at 185th among 187 countries in the world. Literacy rate at 55% and the mortality rate of children under 5 years of age at 135 deaths per 1,000 births were also the worst among the seven countries.

2.3 Spatial Characteristics of Mozambique, Malawi and Zambia along the Nacala Corridor

This section looks further into the current spatial situation of the areas along the Nacala Corridor in Mozambique, Malawi and Zambia.



Source: JICA Study Team

Figure 2.3.1 Mozambique, Malawi and Zambia along the Nacala Corridor

2.3.1 Malawi and the Nacala Corridor

Malawi' GDP has been growing (5.0 % in 2013 and 6.1% in 2014) mainly with increase of tobacco exports and continued growth in agriculture, manufacturing and services. On the other hand, Malawi relies highly on imported products.

Malawi's export and import currently depends on Beira Port, Durban Port, Dar es Salam Port and Nacala Port. Beira Port is the closest port from Malawi and also handles the most transit cargo to and from Malawi. However, Beira Port will be reaching its capacity soon. Under these circumstances, Nacala Port which is the second closest port is expected to take over much of the future increasing cargo demand of Malawi. Since Malawi's major trading partners, besides Europe, North America and the African countries, are India, China and Korea, ports on the eastern Africa side have a great potential for international trading with these countries. This would happen due to the upgrading of the Nacala Corridor Railway connecting Malawi to Nacala Port.

2.3.2 Zambia and the Nacala Corridor

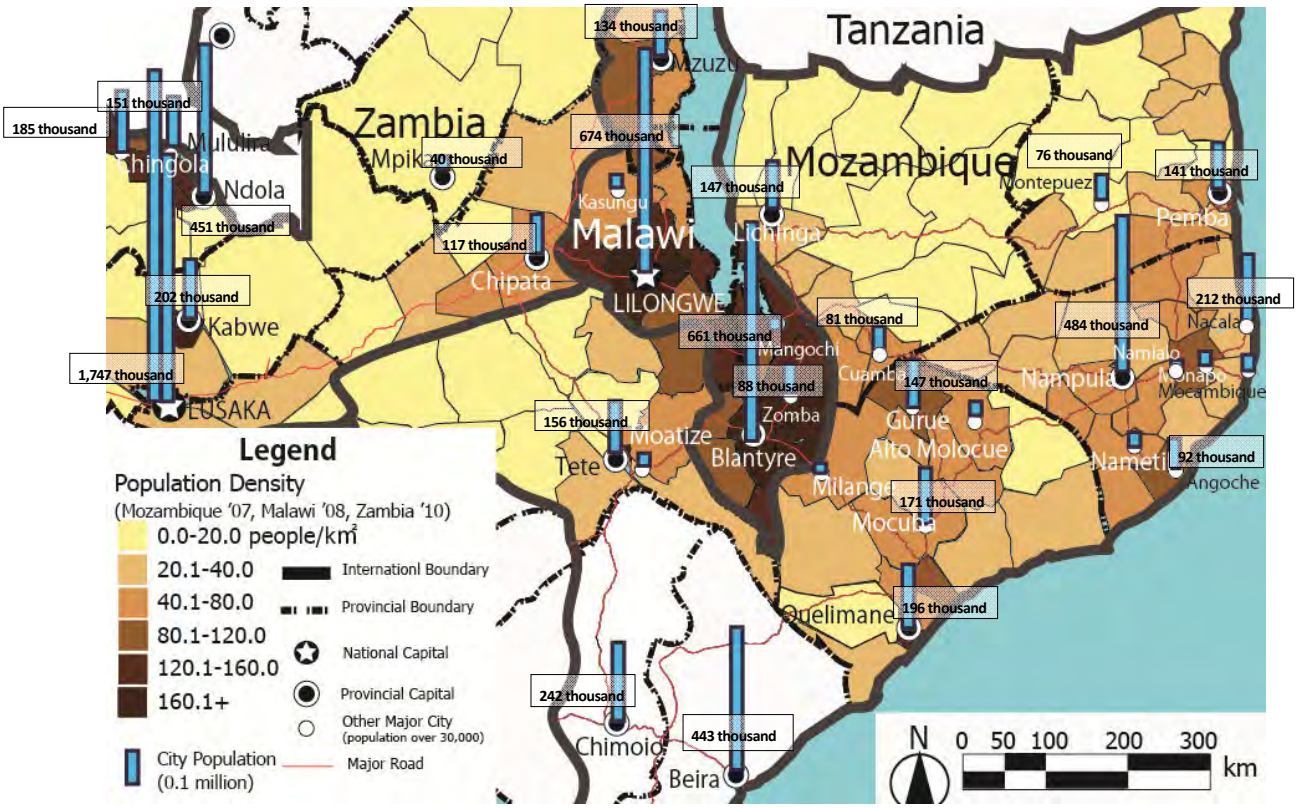
With a larger urban population and GDP than Malawi, Zambia has an even larger potential impact on the development of transport corridor of Nacala. The economy of Zambia has been heavily relying on copper mining and trading, mainly to Europe and China. Some of the major export products of Zambia are copper, metal processing products, sugar, chemicals, cement. Approximately one third of exports from Zambia go to Europe (mostly to Switzerland), another third to African countries and the rest to China and other countries such as in the Middle East. The ports that Zambia currently uses include Dar es Salam Port, Durban Port and Beira Port. Zambia

has a strategy to diversify routes and ports for cargo transit by using Walvis Bay Port and Nacala Port. As part of this strategy, a railway section was constructed from Chipata and connected with Malawi railway line. Chipata is the capital city and commercial centre of Eastern Province, which is an agricultural province with tobacco, cotton and pig farming. This railway was launched in May 2014 by operating a trial train between Chipata and Nacala Port. Located on the eastern coast of Africa, Nacala Port has a possibility to become an important gateway to Middle-East and Asia for Zambia, too.

The Government of Zambia has a plan to increase agro-processed products, which includes the plan of transforming Chipata into an agriculture processing centre of Zambia. In addition to the development of Chipata as the agro-processing centre, Zambia also has a plan to extend the railway from Chipata to Serenje, which will connect the Nacala Railway line to the Tazara Railway. This railway extension and connection could serve to export copper from Copperbelt Province and DR Congo via Nacala Port as an alternative route to Dar es Salaam Port.

2.3.3 Urban Centres along the Nacala Corridor

The largest city along the Nacala Corridor is Lusaka, with over 1.7 million inhabitants as of 2010. Other large cities are Lilongwe and Blantyre in Malawi, and Nampula and Nacala in Mozambique. There are also several smaller cities along the corridor. The cities and district centres closer to the Nacala Corridor in Mozambique are relatively more populated than the other areas in the Nacala Corridor Region. The population densities in central and southern Malawi are high at more than 100 person per square kilometre (See Figure 2.3.2). The actual number of each cities' population of Malawi and Zambia are shown in Table 2.4.2 and Table 2.5.2 respectively.



Source: JICA Study Team based on "2010 Census of Population and Housing" for Zambia, "2008 Population and Housing Census" for Malawi and "General Census of Population and Housing 2007" for Mozambique

Figure 2.3.2 Population Density by District and Population of Major Cities around the Nacala Corridor

2.4 Existing Conditions of Malawi along the Nacala Corridor

(1) Population Trend of Malawi

In the past decades the population of Malawi has been increasing, especially in the Northern Region and the Central Region with the annual population growth rate of over two per cent. On the other hand population density of the Southern Region is higher than that of the other two regions with 184.7 person/km^2. The Northern Region's population density is much below the country's average.

Table 2.4.1 Population Trend of Malawi by Region

Region	Population			Annual Population Growth Rate		Surface Area (km^2)	Population Density (person/km^2)
	1987	1998	2008	1987-1998	1998-2008		2008
Northern	911,787	1,233,560	1,708,930	2.8%	3.3%	26,931	63.5
Central	3,110,986	4,066,340	5,510,195	2.5%	3.1%	35,592	154.8
Southern	3,965,734	4,633,968	5,858,035	1.4%	2.4%	31,753	184.7
Malawi	7,988,507	9,933,868	13,077,160	2.0%	2.8%	94,276	138.7

Source: : National Statistical Office of Malawi, 2008 Population and Housing Census

The major cities of Malawi are also mostly located in the Central and Southern Regions including Lilongwe and Blantyre which have much larger population than all other cities in Malawi. However, Mzuzu, the capital city of Northern Region has been growing its population rapidly for over two decades.

Table 2.4.2 Population of Major Cities in Malawi along the Nacala Corridor

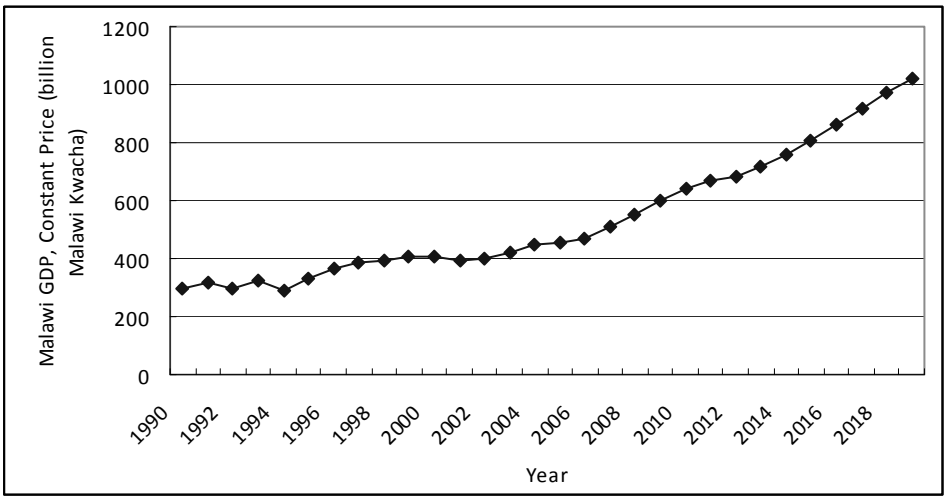
City	Region	Population			Annual Population Growth Rate	
		1987	1998	2008	1987-1998	1998-2008
Lilongwe	Central	223,318	440,471	674,448	6.4%	4.4%
Blantyre	Southern	333,120	502,053	661,256	3.8%	2.8%
Mzuzu	Northern	51,904	86,980	133,968	4.8%	4.4%
Zomba	Southern	43,250	65,915	88,314	3.9%	3.0%
Kasungu	Central	11,591	27,754	39,640	8.3%	3.6%
Mangochi	Southern	14,758	26,570	39,575	5.5%	4.1%

Source: National Statistical Office of Malawi, 2008 Population and Housing Census

(2) GDP Trend of Malawi

Malawi has been growing its GDP mainly with tobacco exports. The country's economy also relies on tea and sugarcane production. Due to its agriculture dependent economy, the economy of Malawi is very vulnerable. In addition to the natural condition, the antismoking trend around the world is said to have had a negative impact on the economy.

The GDP of Malawi was growing slowly including years with some decline until the beginning of the 2000s. From the middle of the 2000s the GDP has been growing steadily and is projected to keep growing.



Source: IMF, World Economic Outlook Database, April 2014 Edition
Note: Estimated figures from 2009

Figure 2.4.1 GDP Trend of Malawi

(3) Major Industries and Potentials of Malawi

As mentioned before, the major industry of Malawi is tobacco. Other major items exported from Malawi are sugar, tea, coffee and uranium. On the other hand, Malawi depends highly on imported products, such as fuel and fertiliser from South Africa. Recently the import route for fuel has been mainly via Beira Port. Other ports in Tanzania, as well as land transport via South Africa and Zambia, are also used. The international trading of Malawi, which needs to rely on land transport through a third country, is a great potential for the Nacala Corridor.

Currently, most of the products such as tobacco and tea are transported to South Africa for containerization along with other products exported to Europe and the United States via Durban in South Africa; goods are transported by land, to and from Durban, through Mozambique and Zimbabwe. However, prior to the independence war in Mozambique, Malawi's main international trading ports were Nacala and Beira. These routes would be a much more economical choice for Malawi if Malawi was connected with these ports by railway. Other major trading partners of Malawi besides Europe, North America and the African countries are India, China and Korea. Ports on the eastern African side have a great potential for international trading with these countries.

(4) Development Plans for Malawi

The following plans are development plans which are preferable for Malawi within Nacala Corridor:

- **Railway Rehabilitation by Vale (Cuamba-Nayuchi):** It is preferable for Malawi to secure the transportation route to the sea by the rehabilitation. Through this chance, Malawi is thinking about industrial development as part of the development of Malawi.
- **Utilizing Water Transportation of Malawi Lake:** It can also be considered to develop the multi-modal transport node of roads, rail and water transport (Logistics Centre).

2.5 Existing Conditions of Zambia on the Nacala Corridor

(1) Population Trend of Zambia

Lusaka Province which has the capital city of Zambia, Lusaka has been increasing its population rapidly in the past decades. Other provinces, except Copperbelt Province, have also increased in population at over 2.5% per annum in the past two decades.

Table 2.5.1 Population Trend of Zambia along the Nacala Corridor by Province

Province	Population			Annual Population Growth Rate		Surface Area (km^2)	Population Density (person/km^2)
	1990	2000	2010	1990-2000	2000-2010		2010
Central	771,818	1,012,257	1,307,111	2.7%	2.6%	94,394	13.8
Copperbelt	1,458,459	1,581,221	1,972,317	0.8%	2.2%	31,328	63.0
Eastern	949,521	1,231,283	1,592,661	2.6%	2.6%	51,476	30.9
Lusaka	991,226	1,391,329	2,191,225	3.4%	4.6%	21,896	100.1
Muchinga	400,492	524,186	711,657	2.7%	3.1%	87,806	8.1
Zambia	7,759,117	9,960,481	13,092,666	2.0%	2.8%	752,612	17.3

Source: Central Statistical Office of Zambia, 2010 Census of Population and Housing, 2012

Like most counties around the world, urbanization is also occurring in Zambia and Lusaka the capital city is not an exception. The population of Lusaka has been growing rapidly at almost five per cent per annum during the last decade and its population reached 1,747,152 in 2010. Other cities which have been growing rapidly in the past decade are cities mainly in Eastern Province and Muchinga Province. However the population of these cities are still relatively small when compared with the largest city in Eastern Province, Chipata with a population of 116,627.

On the other hand cities in Copperbelt Province, which is the centre of the mining industry, have been increasing their populations steadily with growth around two percent per annum.

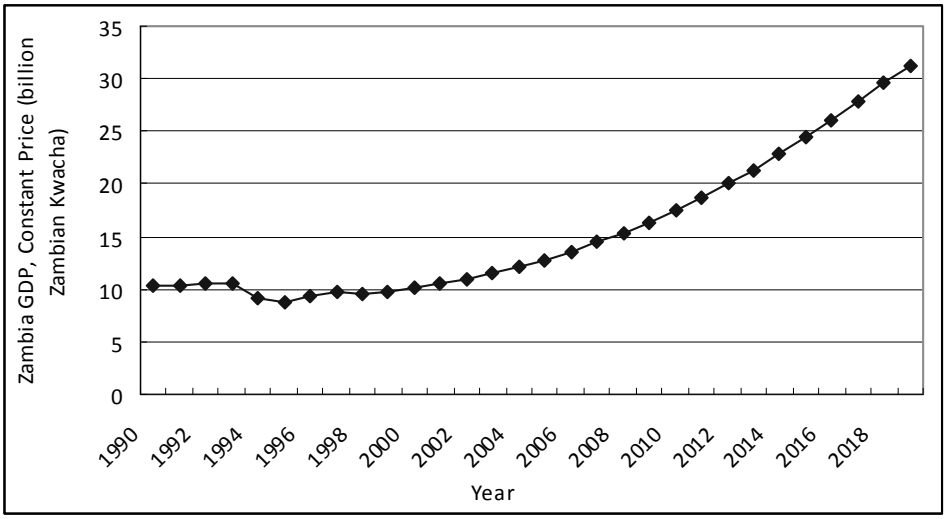
Table 2.5.2 Population of Major Cities in the Provinces along the Nacala Corridor in Zambia

Major City	Province	Population			Annual Population Growth Rate	
		1990	2000	2010	1990-2000	2000-2010
Lusaka	Lusaka	769,353	1,084,703	1,747,152	3.5%	4.9%
Ndola	Copperbelt	329,228	374,757	451,248	1.3%	1.9%
Kabwe	Central	154,318	176,758	202,360	1.4%	1.4%
Chingola	Copperbelt	142,383	147,448	185,246	0.4%	2.3%
Mufulira	Copperbelt	123,936	122,336	151,309	-0.1%	2.1%
Chipata	Eastern	52,213	73,110	116,627	3.4%	4.8%
Mpika	Muchinga	20,950	25,856	39,724	2.1%	4.4%
Katete	Eastern	7,165	10,413	21,459	3.8%	7.5%
Mumbwa	Central	11,015	15,949	20,390	3.8%	2.5%
Mkushi	Central	7,804	10,597	19,196	3.1%	6.1%
Serenje	Central	8,265	8,577	17,754	0.4%	7.5%
Lundazi	Central	5,590	9,159	15,902	5.1%	5.7%
Chinsali	Muchinga	7,509	11,507	15,198	4.4%	2.8%

Source: Central Statistical Office of Zambia, 2010 Census of Population and Housing, 2012

(2) GDP Trend of Zambia

The economy of Zambia has long been relying on copper-mining. The decline in the copper output and the low copper price had caused Zambia's economy to stagnate in the 1990's. From 2004 the increase in the copper price pushed the GDP of Zambia to increase steadily and is also projected to continue to keep its growth.



Source: IMF, World Economic Outlook Database, April 2014 Edition
Note: Estimated figures from 2013

Figure 2.5.1 GDP Trend of Zambia

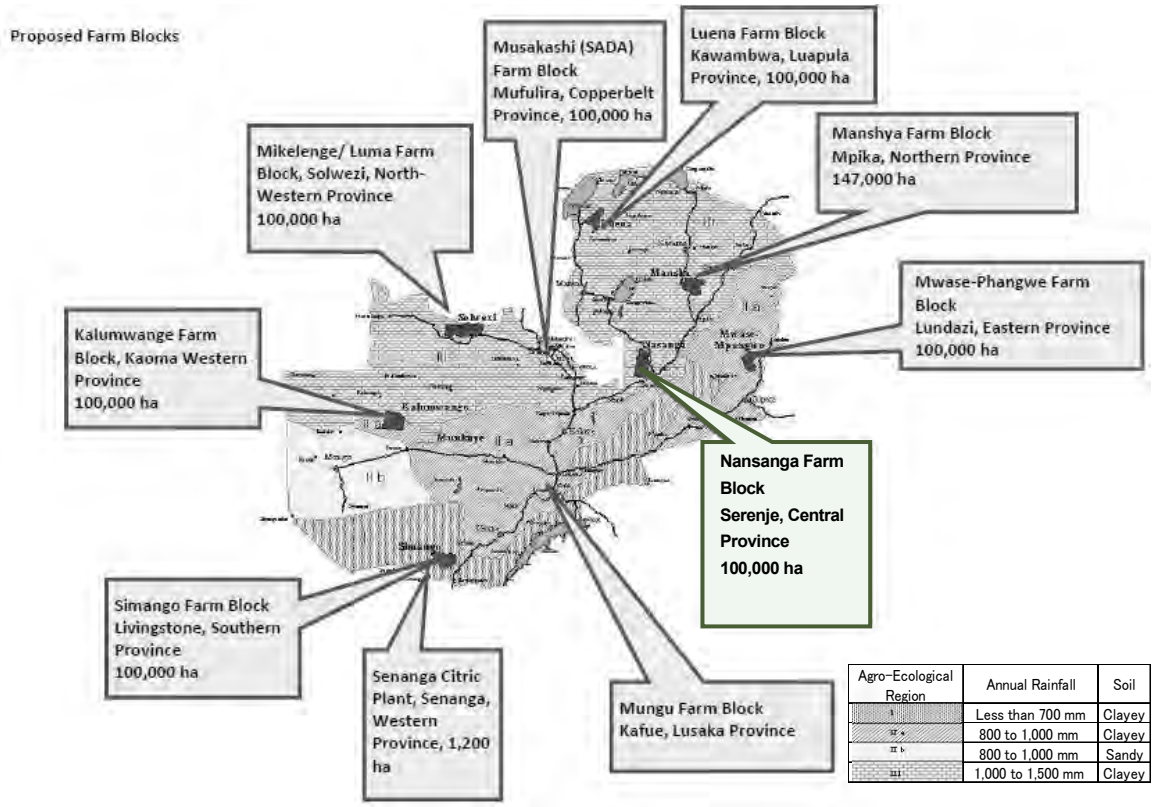
(3) Major Industries and Potential of Zambia

With a larger urban population and GDP than Malawi, Zambia has an even larger potential for the development of Nacala Corridor. The economy of Zambia has been heavily relying on copper mining and trading, mainly with Europe and China. However, having eight neighbouring countries in Africa, Zambia has a slogan, "From Landlocked Country to Land-Linked Country," for trying to increase export of other products besides copper and related products to the neighbouring African countries.

Some of the major export products of Zambia are copper, metal processing products, sugar, chemicals, and cement. Approximately one third of exports from Zambia go to Europe (mostly to Switzerland which imports copper), another third to African countries and the rest to China and other countries such as in the Middle East. Originally, export to China was transported by the Tazara Railway line, which was developed by China, to Dar es Salam Port in Tanzania. However, currently, due to the condition of Tazara Railway, most international trading is done via Durban Port in South Africa. Although Tazara Railway has a plan for rehabilitation, Nacala Corridor will have a chance to capture some share of the transport market during such period when Tazara Railway is not functioning.

Although the share of export of agricultural products is much smaller compared with that of the metal industry, which amounts to about 77% in dollar value, Zambia is currently exporting various agriculture products, such as tobacco, sugar, wheat and flowers mainly to China, African counties and European countries. The Government of Zambia also has a plan to increase agro-processed products, which includes the plan for transforming Chipata, the capital city of Eastern Province into an agricultural processing centre of Zambia. Eastern Province in Zambia is an agricultural province

with tobacco, cotton and pig farming being some of its major industries. As part of the plan to develop agriculture, the government has embarked on a land development programme which involves opening up new farming blocks for commercial development and expansion of the agriculture sector. Mwase-Phangwe Farm Block at Lundazi District in Eastern Province is one of the proposed farm blocks.[4]



Source: Zambia Development Agency, 2011, Agriculture, Livestock and Fisheries Sector Profile

Figure 2.5.2 Proposed Farm Blocks in Zambia

In addition to the development of Chipata as the agro-processing centre, Zambia also has a plan to extend the railway from Chipata to Serenje, which will connect the Nacala Railway line to the Tazara Railway. There is also a plan to develop Chipata Dry Port and the railway freight cars will also be purchased soon for the railway transport between Chipata and Mchinji in Malawi.

(4) Development Plans for Zambia

Some of the major development plans in Zambia are as follows:

- **Railway Development (Serenje-Chipata):** Railway connection from Serenje on the Tazara Rail to Chipata in the Eastern Province on the Nacala Corridor is currently planned along with the development of the processing industry centring in the Eastern Province (Chipata).
- **One Stop Border Post (OSBP):** Efforts at OSBPs are currently taking place in Zambia.
- **Farm Block:** Large-scale farm programme embarked on by the government for commercial development and expansion of the agriculture sector.

[4] "Farm Blocks" are a tool for inviting investors for commercial agriculture. The government of Zambia started a land development programme which provides potential investors with new farming blocks for commercial agriculture. Each farm block is designed to have at least one large-scale farm around 10,000ha.

2.6 Development of International Corridors

Initiatives of several international corridors have been discussed in Southern Africa since the 1980s including the South African Development Coordination Conference (SADCC), which later changed its name to South Africa Development Community (SADC), Spatial Development Initiatives (SDI) and New Partnership for Africa's Development (NEPAD).

This section summarizes these initiatives on international corridors in Southern Africa.

(1) Transport Corridors by South Africa Development Community (SADC)

In the 1980s, the Southern African Development Coordination Conference (SADCC) designated major transportation routes connecting land-locked counties with major ports by railways, roads and pipelines as corridors and gave high priority to implementing necessary infrastructure for forming the corridors. The objectives for developing the transport corridors are to provide efficient access to inland countries, to reduce prices of consumer goods and intermediate goods, and to integrate neighbouring countries into a larger economy.

The South Africa Development Community (SADC) was established in 1992 to promote sustainable and equitable economic growth and socioeconomic development. In 1997, the SADC identified the following seven corridors which focus on transport in the region:

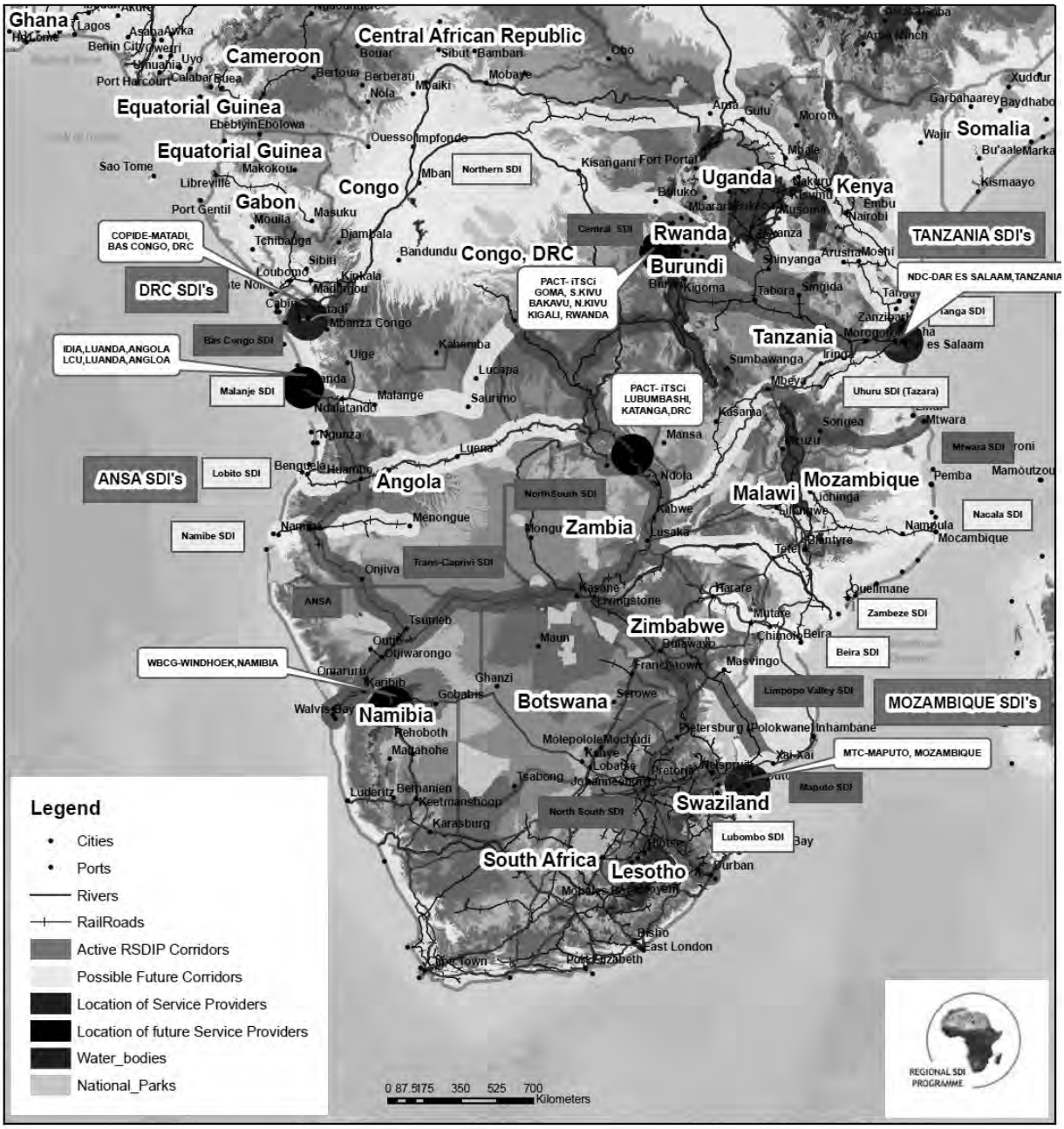
- Southern Corridor (South Africa-Botswana-Zimbabwe-Zambia-Congo)
- Maputo Corridor (Mozambique-South Africa)
- Walvis Bay Corridor (Botswana-Karahari-Cabribi)
- Beira Corridor (Mozambique-Zimbabwe)
- Nacala Corridor (Mozambique-Malawi-Zambia)
- Tazara Corridor (Tanzania-Zambia)
- Liboto Corridor (Angola-Congo-Zambia)

These corridors were regionally integrated initiatives focusing mainly on traffic and transport. The governments and international donors focused on the development of transport infrastructure, such as ports, railways and roads rather than facilitating the private sector's economic development.

(2) Development Corridors by Spatial Development Initiative (SDI)

The Spatial Development Initiatives (SDI) Programme was launched by the Department of Trade and Industry (DTI) of South Africa in 1996. Unlike the traditional comprehensive development strategy approach promoted based on government programmes and projects, in the SDI Programme the government provides a flexible technical assistance facility to establish a series of measures designed to attract private investors and to promote PPPs into a bundle of financially bankable projects. The Regional SDI Programme (RSDIP) started the "Maputo Development Corridor" between South Africa and Mozambique in 1996.

In southern Africa, there are as many as 19 development corridors that were identified in the RSDIP. However only eight out of these are currently identified as active RSDIP corridors (Figure 2.6.1). Out of the 19 corridors, Mozambique is part of eight SDIs including Nacala Corridor which is currently categorised as a "possible future corridor" along with Beira Corridor and Zambeze Corridor.



Source: Regional SDI Programme

Figure 2.6.1 Current Regional SDI Corridors

(3) Development Corridors by NEPAD Spatial Development Programme (SDP)

In 2002, the New Partnership for Africa's Development (NEPAD) was ratified by the African Union (AU) to address Africa's development problems including poverty reduction and sustainable development of Africa. The aim of NEPAD is to promote regional economic integration by bridging Africa's infrastructure gap. In order to achieve its aim, the NEPAD Framework was developed which also includes NEPAD Spatial Development Programme. The objectives of this Programme are as follows:

- Stimulate investment-led economic growth and development;
- Catalyse other (sustainable) sectors;
- Facilitate intra-and extra-African trade;

- Promote regional economic cooperation and integration;
- Optimize the provision and utilization of infrastructure;
- Encourage beneficiation and economic diversification;
- Enhance competitiveness of African economies; and
- Stimulate employment and wealth creation.

(4) From Transport Corridors to Development Corridors

With the defined approach of SDI as well as the success of Maputo Corridor, SDI has succeeded in changing the attitudes and policies of governments and international development partners toward private sector initiatives. Unlike the traditional development approach of national governments, the approach of SDI is rather feasible when bankable packages[4] and government programmes for strategic infrastructure implementation are both brought together.

However, even in a developing country like Mozambique, private sectors are always facing global competition. Therefore, it is not easy for private sectors to mobilize sufficient funds for rehabilitating railways or ports for corridor development. In fact, no other corridors besides the Maputo Corridor have been able to achieve the formulation of a "development corridor". In other words, all other corridors except Maputo Corridor still remain underdeveloped and they are not functioning even as "transport corridors".

(5) Development of Nacala Corridor

In order to promote the formulation of "development corridors" in Africa, private sector projects should play a significant role as an initial driving force for developing "transport corridors" and at the same time, private economic investors should be able to make profits along the transport corridors. In this way, transport corridors will be transformed to become development corridors.

In order to establish "development corridors", the following conditions are required for making a private sector project become the initial driving force for formulating "transport corridors" in the beginning:

- There is a relatively large demand for transport in the beginning phase just after transport infrastructure, such as railways, roads, and ports, is completed. In other words, transportation needs a large demand from the beginning of the corridor development. (ex. Maputo Corridor had a relatively large demand for transport, including steel, aluminium, ferro-alloys, coal, wood and granite from South Africa)
- It is possible for private sectors to own or mobilize sufficient funds to fulfil infrastructure construction, maintenance and operation necessary for starting-up a transport corridor.
- The financial gains from economic development to be enabled by the formation of a transport corridor must be large enough to fund transport infrastructure development for the transport corridor.

Nacala Corridor is one of the few development corridors which can satisfy the requirements mentioned above. It will be made possible by coal mining in Tete and their need to transport the coal from Tete to Nacala Port in addition to Beira Port.

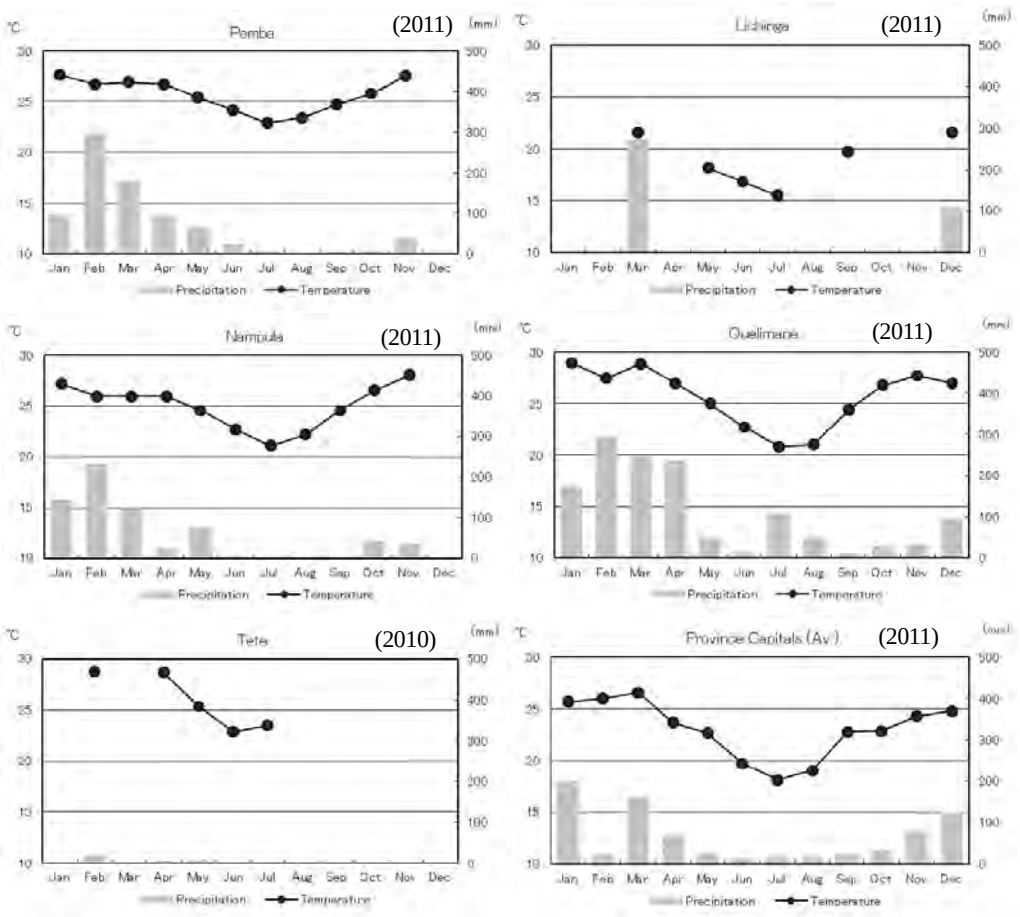
[4] Bankable package is a package of economic sector projects and infrastructure projects which can be financed by banks.

Chapter 3 Existing Conditions and Emerging Opportunities of the Nacala Corridor Region

3.1 Natural Conditions and Water Resources of the Nacala Corridor Region

Mozambique is a long country stretching between the latitudes of 10°27' and 26°52' south and longitudes 30°12' and 40°51' east with a surface land area of 786,380 km^2. The Nacala Corridor Region is located in the northern part of the country and covers 444,458 km^2 with a maximum length of approximately 900 km in the north–south direction and approximately 1,100 km in the east–west direction.

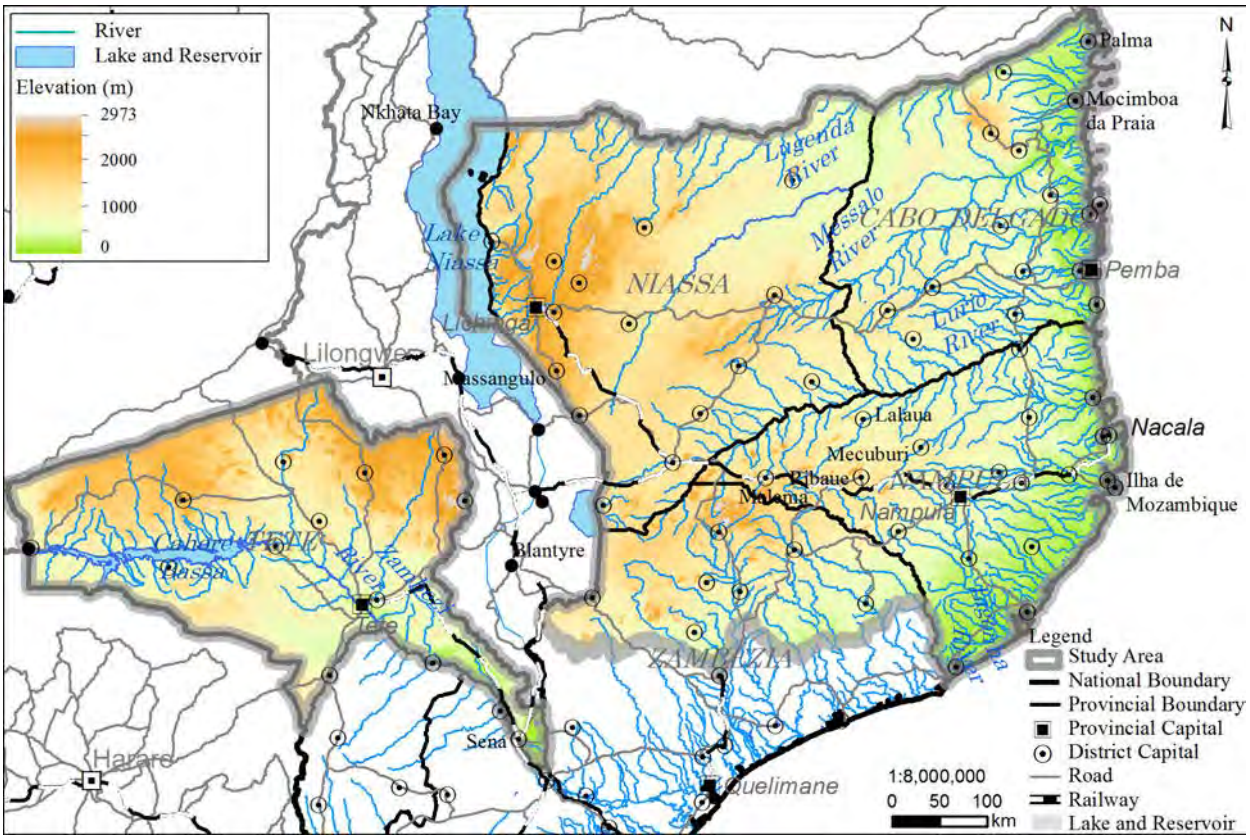
There are two distinct seasons, a warm and wet season from November to April, and a cool, dry season from May to October. Figure 3.1.1 below shows the monthly average temperatures and monthly total precipitation of the provincial capitals in the five provinces, and for comparison, the average of all provincial capitals in the country.



Source: National Methodology Institute, 2010 for Tete, 2011 for other cities

Figure 3.1.1 Monthly Average Temperature/Monthly Total Precipitation of the Provincial Capitals

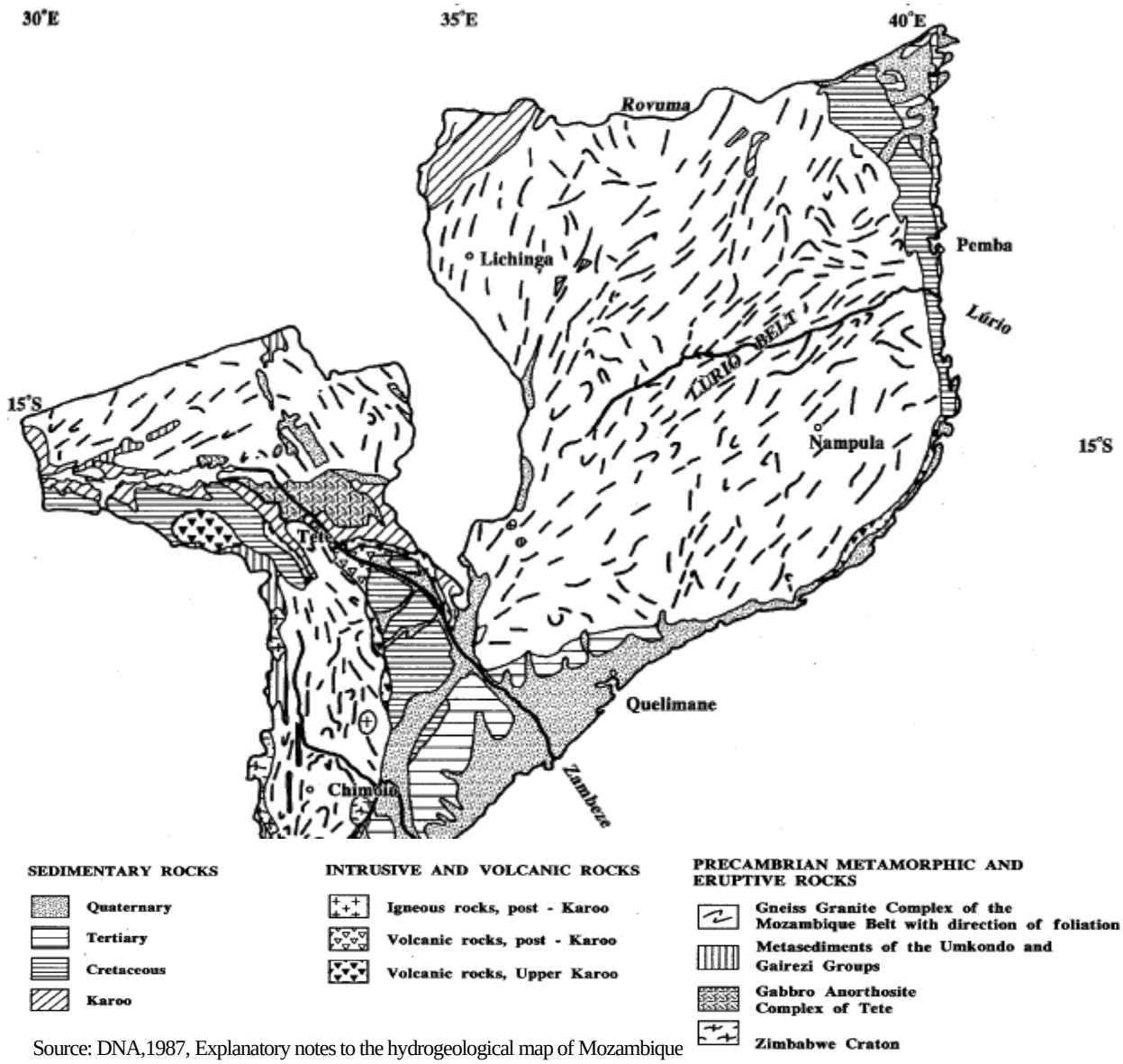
The Nacala Corridor Region is generally low-lying in the coastal areas of Cabo Delgado and Nampula Provinces. Highlands ranging from 1,000 m and above are found inland in the west of Niassa, and in the northern parts of Zambézia and Tete Provinces as shown in Figure 3.1.2. The highest altitudes in the provinces are 1,219 m in Cabo Delgado, 1,848 m in Niassa, 1,801 m in Nampula, 2,419 m in Zambézia and 2,095 m in Tete.



Source: JICA Study Team

Figure 3.1.2 Altitude of the Nacala Corridor Region

The Nacala Corridor Region is almost completely covered by the Gneiss Granite Complex of the Pre-Cambrian Period, Proterozoic Era as shown in Figure 3.1.3. The younger sedimentary rocks and sediments of the Quaternary and Tertiary Periods, Cenozoic Era are widely distributed in the downstream part of the Zambezi River and along the seacoast that has become a good intergranular aquifer in the Nacala Corridor Region.



Source: DNA,1987, Explanatory notes to the hydrogeological map of Mozambique

Figure 3.1.3 Schematic Geological Map in and around the Nacala Corridor Region

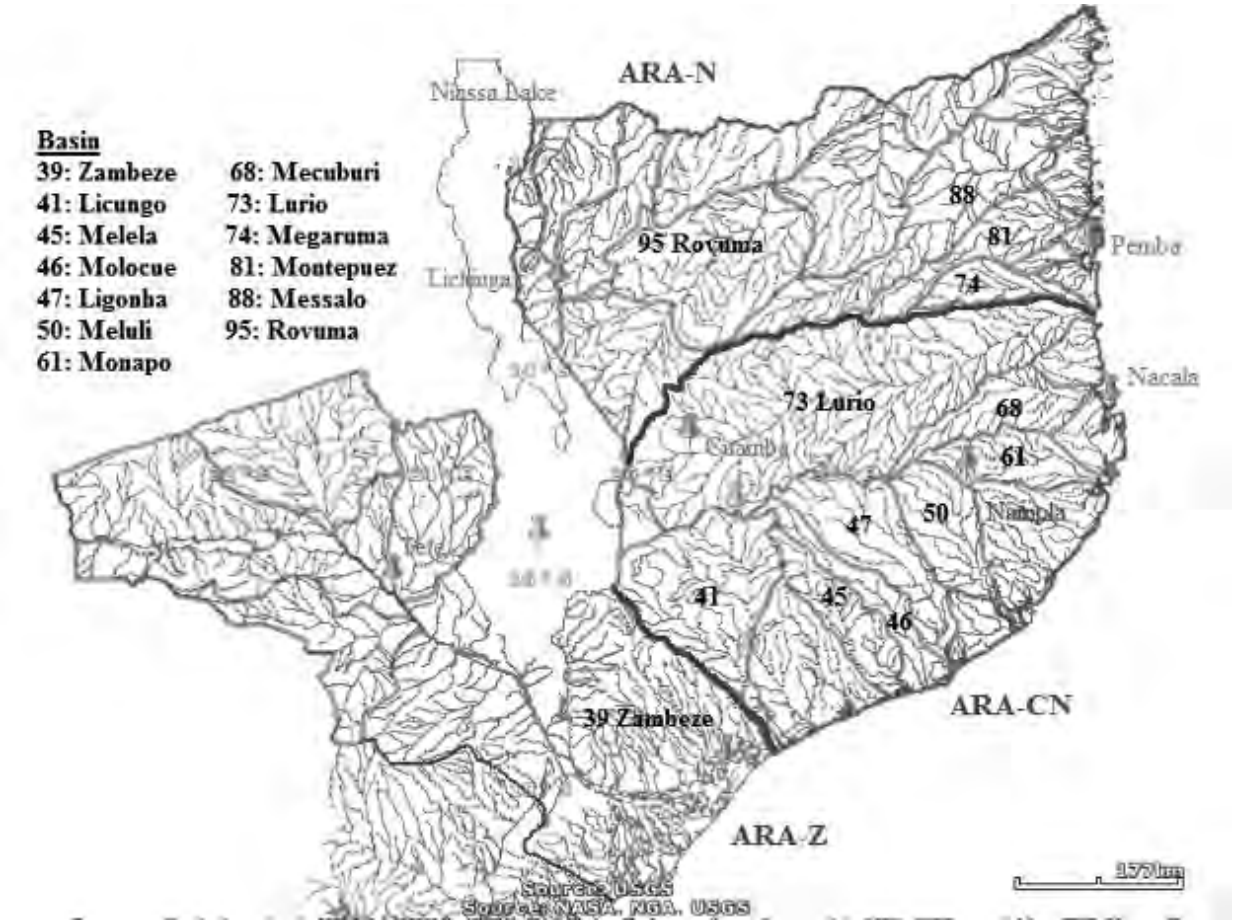
Limited data on meteorology of the Nacala Corridor Region indicates that mean annual precipitation ranges from 900 to 1,100 mm in the Rovuma River basin, whereas precipitation ranges from 1,030 mm in the Lúrio River basin to 1,400 mm in the Licungo River basin. The amount of precipitation of Luia sub-basin, which is located in the upper part of the Zambeze basin, is less than the other basins with an average of 615 to 753 mm per year excluding the yearly maximum of 1,110 mm recorded in 2007.

The following major rivers and lakes of Mozambique are located in the Nacala Corridor Region.

- Zambezi River: catchment area of 1,390,000 km^2 and average runoff of 107,979 million m^3 per year or 3,424 m^3 per second
- Rovuma River: catchment area of 155,500 km^2 and average runoff of 14,980 million m^3 per year or 475 m^3 per second
- Lúrio River: catchment area of 61,423 km^2 and average runoff of 8,722 million m^3 per year or 277 m^3 per second

- Niassa Lake: surface area of 29,600 km^2 and water volume of 8,400 km^3
- Cahora Bassa: surface area of 2,600 km^2 and water volume of 55.8 km^3

River basins in Mozambique are managed by five administrations established by the Water Law in 1991. Those in the Nacala Corridor Region are ARA-Norte (ARA-N), ARA-Centro Norte (ARA-CN) and ARA-Zambeze (ARA-Z). Figure 3.1.4 shows the boundaries of the river basins and these three ARAs.



Source: DNA ,1987, Explanatory notes to the hydrogeological map of Mozambique

Figure 3.1.4 ARA Management Areas and Main Basins in the Nacala Corridor Region

3.2 Socioeconomy of the Nacala Corridor Region

3.2.1 Population

(1) Past Trend of Population Growth

According to the result of the General Census of Population and Housing conducted in 2007, the total population in Mozambique amounted to 20,632 thousand. On the other hand, the population in the Nacala Corridor Region amounted to 10,548 thousand. The share of population in the Nacala Corridor Region accounted for 51% of the national population in 2007.

Among the five provinces related to the Nacala Corridor Region, the population of Nampula Province is the largest at 4,085 thousand, followed by Zambézia Province, Tete Province, Cabo Delgado Province, and Niassa Province. In terms of annual growth rate of population, Niassa Province marked the highest at 4.14 %, followed by Tete Province, Nampula Province, Zambézia Province, and Cabo Delgado Province between 1997 and 2007(See in Table 3.2.1).

Table 3.2.1 Population and Growth Rate by Province in Mozambique

	Population		Annual Growth Rate (%)
	1997	2007	1997-2007
Niassa Province	808,572	1,213,398	4.14
Cabo Delgado Province	1,380,202	1,634,162	1.70
Nampula Province	3,063,456	4,084,656	2.92
Zambézia Province	3,096,400	3,890,453	2.31
Only 7 districts in Zambézia Province	1,360,831	1,808,220	2.88
Tete Province	1,226,008	1,807,485	3.96
Manica Province	1,039,463	1,438,386	3.30
Sofala Province	1,368,671	1,685,663	2.11
Inhambane Province	1,157,182	1,304,820	1.21
Gaza Province	1,116,903	1,236,284	1.02
Maputo Province	830,908	1,225,489	3.96
Maputo City	987,943	1,111,638	1.19
Sub Total (5 Provinces)	9,574,638	12,630,154	2.81
Sub Total (Nacala Corridor Region)	7,839,069	10,547,921	3.01
Sub Total of Other Area	8,236,639	10,084,513	2.04
Mozambique	16,075,708	20,632,434	2.53

Source: INE, General Census of Population and Housing, 1997 and 2007

(2) Urban Population in Five Provinces

The urbanization ratio in the five provinces was 21% as opposed to 30% in Mozambique in 2007. It ranged between 14% in Zambézia Province to 29% in Nampula Province.

The urbanization ratios in Zambézia and Tete were quite low compared with other provinces. Provinces in the northern part of Mozambique is less urbanized than other provinces (See Table 3.2.2).

Table 3.2.2 Urban and Rural Population by Province in Mozambique, 2007

	Unit: Persons			Unit: %		
	Urban	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Niassa Province	277,838	935,560	1,213,398	23%	77%	100%
Cabo Delgado Province	340,707	1,293,455	1,634,162	21%	79%	100%
Nampula Province	1,167,813	2,916,843	4,084,656	29%	71%	100%
Zambézia Province	679,073	3,211,380	3,890,453	17%	83%	100%
Tete Province	247,178	1,560,307	1,807,485	14%	86%	100%
Manica Province	363,844	1,074,542	1,438,386	25%	75%	100%
Sofala Province	645,413	1,040,250	1,685,663	38%	62%	100%
Inhambane Province	289,458	1,015,362	1,304,820	22%	78%	100%
Gaza Province	314,471	921,813	1,236,284	25%	75%	100%
Maputo Province	832,188	393,301	1,225,489	68%	32%	101%
Maputo City	1,111,638	0	1,111,638	100%	0%	100%
Sub Total (5 Provinces)	2,712,609	9,917,545	12,630,154	21%	79%	100%
Sub Total of Other Province	3,557,012	4,445,268	8,002,280	44%	56%	100%
Mozambique	6,269,621	14,362,813	20,632,434	30%	70%	100%

Source: INE, General Census of Population and Housing 2007

3.2.2 Past Trend of Economic Growth

(1) GRDP

The total GRDP in the five provinces amounted to MT 74,248 million in 2011 (2003 constant prices), which accounted for 38% of the GDP in Mozambique. The proportions of the GRDP of each province in Mozambique were 14.8% for Nampula, followed by Zambézia (9.4%), Tete (5.7%), Cabo Delgado (4.7%) and Niassa (3.0%).

The economic growth rates for three periods (1997-2000, 2000-2007, 2007-2011) are shown in Table 3.2.3. As seen in the table, most province have marked steady high growth rates at 7-8% since 2000, which is the same trend as Mozambique as a whole.

Table 3.2.3 GRDP and Growth Rate of GRDP by Province in Mozambique

	GRDP (Million MT, 2003 Constant Prices)				**Annual Growth Rate (%)**		
	1997	**2000**	**2007**	**2011**	**1997-2000**	**2000-2007**	**2007-2011**
Niassa Province	2,368.3	2,651.9	4,587.0	5,930.7	3.8	8.1	6.6
Cabo Delgado Province	3,518.2	4,038.1	6,904.0	9,198.6	4.7	8.0	7.4
Nampula Province	10,634.7	13,118.0	22,192.3	29,321.3	7.2	7.8	7.2
Zambézia Province	7,250.0	8,102.3	13,977.4	18,505.8	3.8	8.1	7.3
Tete Province	3,552.6	5,730.6	9,218.0	11,291.3	17.3	7.0	5.2
Manica Province	2,826.8	3,285.0	5,538.4	7,490.5	5.1	7.7	7.8
Sofala Province	7,456.5	9,077.9	15,852.5	20,875.1	6.8	8.3	7.1
Inhambane Province	4,607.7	5,290.5	11,735.4	15,223.0	4.7	12.1	6.7
Gaza Province	3,684.4	3,745.4	7,039.1	9,420.3	0.5	9.4	7.6
Maputo Province	10,283.5	13,046.5	26,182.7	33,020.4	8.3	10.5	6.0
Maputo City	12,890.9	16,903.0	28,073.0	37,247.5	9.5	7.5	7.3
Sub Total (5 Provinces)	27,323.8	33,640.9	56,878.7	74,247.6	7.2	7.8	6.9
Other Provinces	41,749.9	51,348.4	94,421.2	123,276.8	7.1	9.1	6.9
Mozambique	69,073.7	84,989.3	151,299.9	197,524.4	7.2	8.6	6.9

Source: INE

Table 3.2.4 Proportion by Province in Mozambique's GRDP in Mozambique (1997-2011)

	Proportion in Mozambique's GRDP (%)			
	1997	**2000**	**2007**	**2011**
Niassa Province	3.4%	3.1%	3.0%	3.0%
Cabo Delgado Province	5.1%	4.8%	4.6%	4.7%
Nampula Province	15.4%	15.4%	14.7%	14.8%
Zambézia Province	10.5%	9.5%	9.2%	9.4%
Tete Province	5.1%	6.7%	6.1%	5.7%
Manica Province	4.1%	3.9%	3.7%	3.8%
Sofala Province	10.8%	10.7%	10.5%	10.6%
Inhambane Province	6.7%	6.2%	7.8%	7.7%
Gaza Province	5.3%	4.4%	4.7%	4.8%
Maputo Province	14.9%	15.4%	17.3%	16.7%
Maputo City	18.7%	19.9%	18.6%	18.9%
Sub Total (5 Provinces)	39.6%	39.6%	37.6%	37.6%
Other Provinces	60.4%	60.4%	62.4%	62.4%
Mozambique	100.0%	100.0%	100.0%	100.0%

Source: INE

(2) GDP per Capita

As shown in Table 3.2.5, the GRDP per capita in the five provinces was MT 4,503 in 2007, which is far below the national average of approximately MT 7,333. It indicates that the economic activity per person in the northern part of Mozambique is rather small than other southern provinces.

Table 3.2.5 GRDP per Capita by Province

	GRDP per Capita (MT at 2003 Constant Prices)		Proportion of GRDP to the Whole Country		Annual Growth Rate (%)
	1997	**2007**	**1997**	**2007**	**1997-2007**
Niassa Province	2,929	3,780	0.68	0.52	2.6
Cabo Delgado Province	2,549	4,225	0.59	0.58	5.2
Nampula Province	3,471	5,433	0.81	0.74	4.6
Zambézia Province	2,341	3,593	0.54	0.49	4.4
Tete Province	2,898	5,100	0.67	0.70	5.8
Manica Province	2,719	3,850	0.63	0.53	3.5
Sofala Province	5,448	9,404	1.27	1.28	5.6
Inhambane Province	3,982	8,994	0.93	1.23	8.5
Gaza Province	3,299	5,694	0.77	0.78	5.6
Maputo Province	12,376	21,365	2.88	2.91	5.6
Maputo City	13,048	25,254	3.04	3.44	6.8
5 Provinces	2,854	**4,503**	0.66	0.61	4.7
Other Provinces	6,422	11,799	1.49	1.61	6.3
Mozambique	4,297	**7,333**	1.00	1.00	5.5

Source: JICA Study Team, based on data from INE

(3) Share of Economic Sector

The five provinces are relatively more specialised in agriculture in terms of value added generation, accounting for 42% of the total GRDP of these five provinces. Nampula and Tete, however, are different from the other three provinces with Nampula and Tete's economic structure characterised by its lower proportion of agriculture (approximately 40% and 20% of each province's GRDP respectively). Additionally, Tete's electricity and water account for 37% of the province's GRDP.

This situation for Tete stems from the power supplied to all of Mozambique by Cahora Bassa. This structure of economic sector have not changed significantly for over a decade in the five provinces (See Table 3.2.6) .

Table 3.2.6 Share of GRDP by Economic Sector by Province in 2000 and 2011

	2000				2011			
	Agriculture	**Industry**	**Service**	**Total**	**Agriculture**	**Industry**	**Service**	**Total**
Niassa Province	47.6%	10.2%	42.2%	100.0%	49.5%	7.2%	43.4%	100.0%
Cabo Delgado Province	49.5%	12.2%	38.3%	100.0%	51.2%	12.5%	36.3%	100.0%
Nampula Province	38.7%	15.4%	45.9%	100.0%	39.9%	17.0%	43.1%	100.0%
Zambézia Province	49.8%	11.4%	38.8%	100.0%	50.8%	12.3%	36.9%	100.0%
Tete Province	25.9%	40.2%	33.9%	100.0%	20.0%	43.3%	36.7%	100.0%
Manica Province	36.1%	22.0%	41.9%	100.0%	37.0%	21.7%	41.3%	100.0%
Sofala Province	22.8%	19.5%	57.7%	100.0%	22.7%	20.0%	57.3%	100.0%
Inhambane Province	41.2%	15.8%	43.0%	100.0%	31.7%	37.0%	31.3%	100.0%
Gaza Province	50.2%	12.3%	37.5%	100.0%	48.5%	13.2%	38.3%	100.0%
Maputo Province	15.2%	43.9%	40.9%	100.0%	17.5%	47.5%	35.0%	100.0%
Maputo City	2.5%	15.8%	81.7%	100.0%	2.7%	11.7%	85.6%	100.0%
5 Provinces	41.1%	18.0%	40.9%	100.0%	41.7%	18.5%	39.8%	100.0%
Other Provinces	19.1%	23.8%	57.1%	100.0%	19.3%	26.9%	53.8%	100.0%
Mozambique	27.9%	21.5%	50.7%	100.0%	27.7%	23.7%	48.6%	100.0%

Source: INE

3.2.3 Labour Force

(1) Economically Active Population (EAP)

The economically active population (EAP) of the five provinces was 4,586 thousand in 2007. The agriculture sector employed the highest portion at 85% with a small variation among provinces, between 82.9% in Nampula Province and 87.5% in Zambézia Province, while that for all of Mozambique was 75.2% (See Table 3.2.7).

Table 3.2.7 EAP by Economic Sector by Province in 2007

	Agricul -ture	**Industry**	**Service**	**Total**	**Agricul -ture**	**Industry**	**Service**	**Total**
Niassa Province	337,235	15,288	53,080	405,603	83.1%	3.8%	13.1%	100.0%
Cabo Delgado Province	584,853	22,489	62,908	670,250	87.3%	3.4%	9.4%	100.0%
Nampula Province	1,219,450	65,872	185,191	1,470,513	82.9%	4.5%	12.6%	100.0%
Zambézia Province	1,218,809	54,721	120,106	1,393,636	87.5%	3.9%	8.6%	100.0%
Tete Province	546,888	26,468	72,829	646,185	84.6%	4.1%	11.3%	100.0%
5 Provinces	3,907,235	184,838	494,114	**4,586,187**	**85.2%**	4.0%	10.8%	100.0%
Other Provinces	1,636,693	304,460	843,619	2,784,772	58.8%	10.9%	30.3%	100.0%
Mozambique	5,543,928	489,298	1,337,733	7,370,959	**75.2%**	6.6%	18.1%	100.0%

Source: INE

(2) Unemployment Ratio

The unemployment rates by province in 2004/05 are shown in Table 3.2.8. The rates in all the

provinces related to the Nacala Corridor Region except for Niassa Province are below the national average of 18.7%. The rate of Niassa Province (31.7%) is significantly high compared to the other provinces.

Table 3.2.8 Unemployment Rate by Provinces in 2004/5

	Unemployment Ratio(%)
Niassa Province	**31.7**
Cabo Delgado Province	10.9
Nampula Province	15.7
Zambézia Province	11.2
Tete Province	16.5
5 Provinces	17.2
Sub Total of Other Provinces	20.2
Mozambique	**18.7**

Source: INE , 2006, Integrated Survey on the Labour Force (IFTRAB) 2004/05

3.2.4 Poverty and Inequality

(1) Poverty Ratio

The poverty rate decreased significantly between 1997 and 2009 except in Zambézia: 71% to 32% in Niassa, 57% to 37% in Cabo Delgado, 69% to 55% in Nampula and 82% to 42% in Tete. That in Zambézia rose from 68% in 1997 to 71% in 2009.

Table 3.2.9 Poverty Rate by Province in Mozambique

	Poverty Ratio (%)			Gap of Poverty Ratio		
	1997	2003	2009	1997-2003	2003-2009	1997-2009
Niassa Province	70.6	52.1	31.9	-18.5	-20.2	-38.7
Cabo Delgado Province	57.4	63.2	37.4	**+5.8**	-25.8	-20.0
Nampula Province	68.9	52.6	54.7	-16.3	**+2.1**	-14.2
Zambézia Province	68.1	44.6	**70.5**	-23.5	**+25.9**	**+2.4**
Tete Province	82.3	59.8	42.0	-22.5	-17.8	-40.3
Manica Province	62.6	43.6	55.1	-19.0	**+11.5**	-7.5
Sofala Province	87.9	36.1	58.0	-51.8	**+21.9**	-29.9
Inhambane Province	82.6	80.7	57.9	-1.9	-22.8	-24.7
Gaza Province	64.6	60.1	62.5	-4.5	**+2.4**	-2.1
Maputo Province	65.6	69.3	67.4	**+3.7**	-1.9	**+1.8**
Maputo City	47.8	53.6	36.2	**+5.8**	-17.4	-11.6
5 Provinces	69.5	54.5	**53.3**	-15.0	-1.2	-13.2
Other Provinces	69.3	53.7	**57.0**	-15.6	**+3.3**	-12.3
Mozambique	69.4	54.1	54.7	-15.3	**+0.6**	-14.7

Source: MPD/DNEAP, based on IOF96, IAF02 and IOF08

(2) Inequality

The Gini[1] coefficient, an indicator for measuring the distribution of income, showed mixed trends of expanding and narrowing disparity. In the provinces of Niassa, Nampula and Zambézia, the Gini coefficients rose, indicating widening income disparity, while those in Cabo Delgado and Tete declined, indicating narrowing income disparity.

[1] Gini index of 0 represents perfect equality, while an index of 1 implies perfect inequality

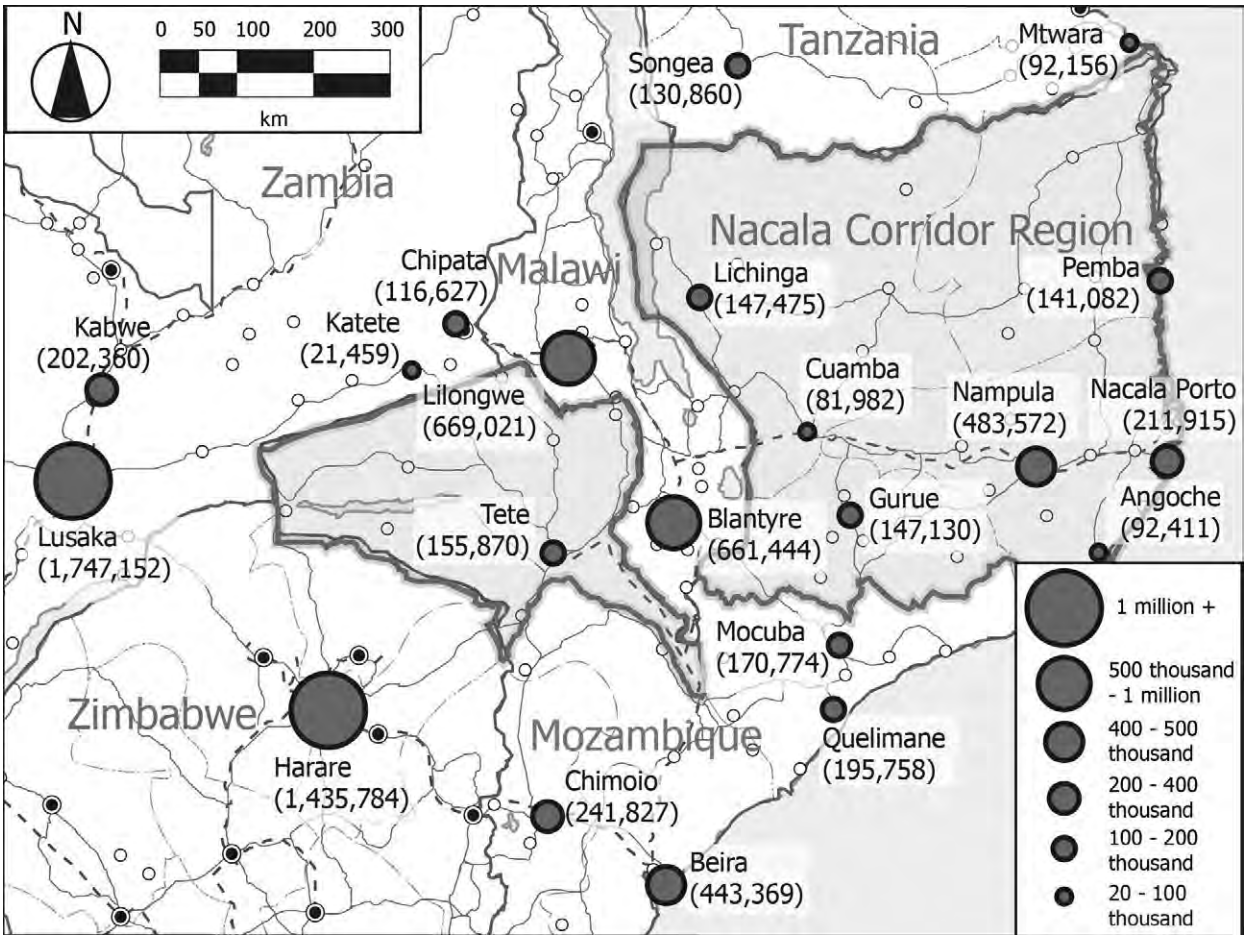
Table 3.2.10 Gini Coefficient by Province in Mozambique

	2003	2008	Changes (2003-2008)
Niassa Province	0.357	0.427	**+0.070**
Cabo Delgado Province	0.445	0.347	-0.098
Nampula Province	0.361	0.419	**+0.058**
Zambézia Province	0.351	0.365	**+0.014**
Tete Province	0.399	0.323	-0.076
Manica Province	0.400	0.345	-0.055
Sofala Province	0.427	0.456	**+0.029**
Inhambane Province	0.443	0.383	-0.060
Gaza Province	0.406	0.427	**+0.021**
Maputo Province	0.433	0.387	-0.046
Maputo City	0.524	0.512	-0.012
5 Provinces	0.383	0.376	-0.006
Other Province	0.439	0.418	-0.021
Mozambique	0.415	0.414	-0.001

Source: DNEAP, 2010, "Understanding. Poverty and Well-being Mozambique: Third National Poverty Assessment", MPD

3.3 Urban Centres in the Nacala Corridor Region

The largest city in the Nacala Corridor Region is Nampula with a population of 484 thousand in 2007, followed by Nacala City at 212 thousand and Tete City with 158 thousand. In the inland neighbouring countries adjacent to the Nacala Corridor Region, there are also a number of large towns with a population of more than 500 thousand. Figure 3.3.1 shows the populations of Blantyre at 661 thousand, Lilongwe at 669 thousand, Lusaka at 1.7 million and Harare at 1.4 million. Chipata of Zambia, located close to the border with Malawi, has a population of 117 thousand.



Source: Cities in Mozambique; General Census of Population and Housing 2007 of Mozambique, INE
Cities in Malawi; 2008 Population and Housing Census of Malawi, NSO
Cities in Zambia; 2010 Population and Housing Census of Zambia, Central Statistical Office
Cities in Zimbabwe; Zimbabwe National Population Census 2012, Zimbabwe National Statistical Office
Cities in Tanzania; 2012 Population and Housing Census, National Bureau of Statistics

Figure 3.3.1 Major Urban Centres in the Nacala Corridor Region and Neighbouring Countries

As shown in Table 3.3.1, the total urban population in the five provinces increased from 1.2 million in 1997 to 1.9 million in 2007, a growth rate of 4.8% per year on average. Since the growth rate of the rural population in the same period was 3.2 % per year, urbanization rate rose from 20.3% in 1997 to 21.6% in 2007.

The highest growth rate of urban population took place in Nacala-a-Velha District at 12.6 % per year between 1997 and 2007. This was followed by the growth in Mocuba District in Zambézia Province at 12.0% per year. The growth of urban population in other areas was milder with a range between 2.7% and 5.6% per year.

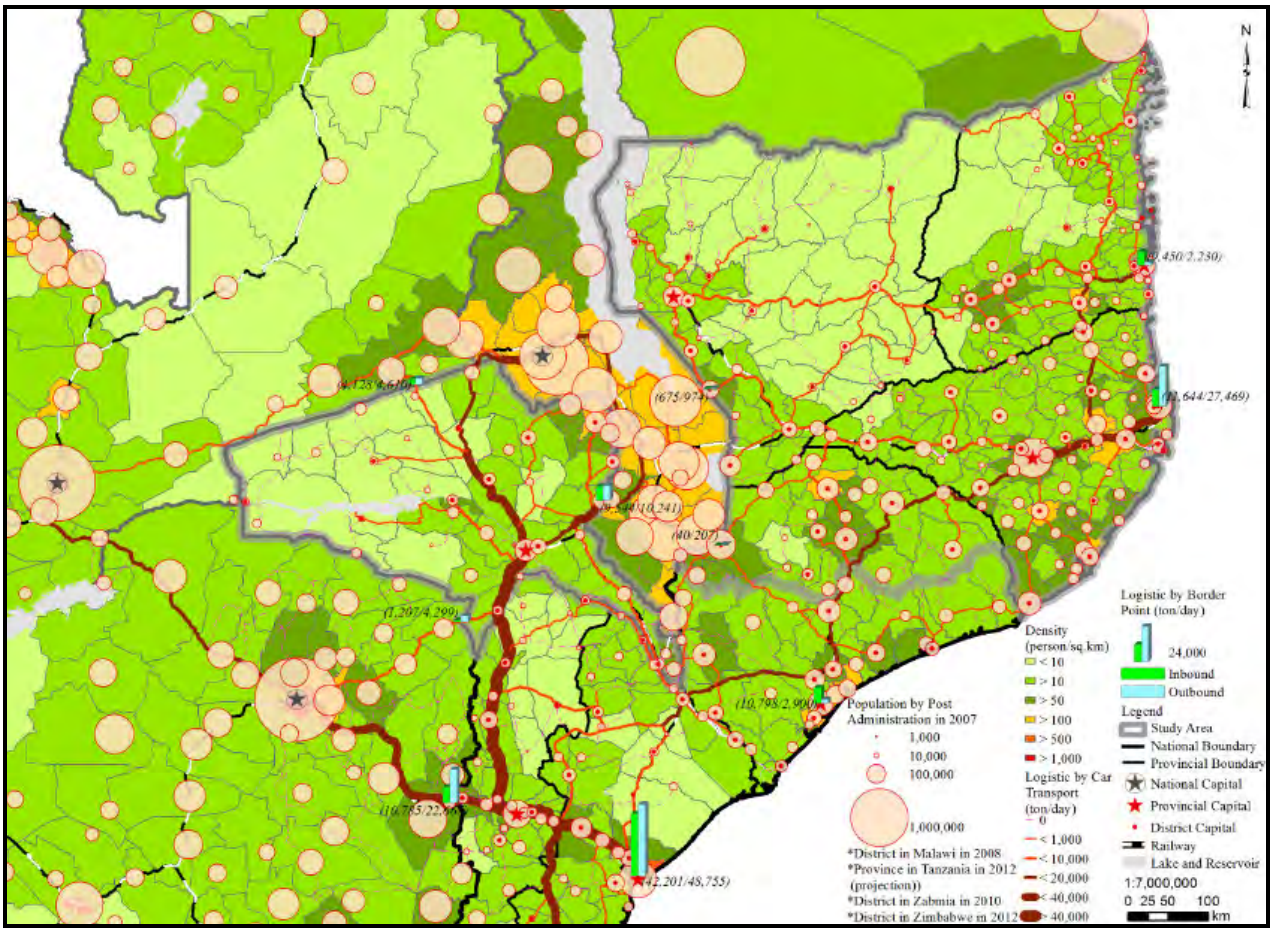
Table 3.3.1 Urban Populations of Major Cities and Districts in the Five Provinces related to the Nacala Corridor Region

Province	City / District	1997			2007			Annual Growth Rate (% per annum)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Cabo Delgado	Cidade de Pemba	84,897	0	84,897	141,082	0	141,082	5.2%	-	5.2%
Nampula	Cidade de Nacala	158,248	0	158,248	211,915	0	211,915	3.0%	-	3.0%
	Distrito de Nacala-a-Velha	4,899	73,019	77,918	15,993	74,998	90,991	12.6%	0.3%	1.6%
	Cidade de Nampula	303,346	0	303,346	483,572	0	483,572	4.8%	0.0%	4.8%
	Distrito de Angoche	58,263	170,263	228,526	92,411	191,109	283,520	4.7%	1.2%	2.2%
Niassa	Cidade de Lichinga	85,758	0	85,758	147,475	0	147,475	5.6%	-	5.6%
	Distrito de Cuamba	57,205	69,175	126,380	81,982	109,600	191,582	3.7%	4.7%	4.2%
Tete	Cidade de Tete	101,984	0	101,984	155,870	0	155,870	4.3%	-	4.3%
	Distrito de Moatize	26,560	82,543	109,103	39,468	178,140	217,608	4.0%	8.0%	7.1%
Zambezia	Distrito de Gurue	99,335	97,844	197,179	147,130	153,904	301,034	4.0%	4.6%	4.3%
	Cidade de Quelimane	150,116	0	150,116	195,758	0	195,758	2.7%	-	2.7%
	Distrito de Mocuba	54,802	159,946	214,748	170,774	133,199	303,973	12.0%	-1.8%	3.5%

Source: INE, General Census of Population and Housing 1997 and 2007

Figure 3.2.2 presents population densities by district and size of population of administrative posts in the Nacala Corridor Region and neighbouring countries. It shows relatively higher population densities in most areas of Nampula Province and Zambézia Province, the areas along the coast and those bordering Nampula Province in Cabo Delgado Province, and the areas bordering Malawi in Tete Province and Niassa Province. Most of the areas in Niassa Province, the north-western part of Cabo Delgado Province and the western part of Tete Province have lower population densities of less than 10 persons per square kilometre.

Higher concentrations of population in administrative posts are observed in the southern half of Nampula Province and along the north-south axis in the middle of Zambézia Province. There are some concentrations in the southern part and northern part of Cabo Delgado Province. Concentration of population is limited to capital cities and nearby administrative posts in Niassa Province and Tete Province.



Source: JICA Study Team based on General Census of Population and Housing (INE)

Figure 3.3.2 Population Density and Population of Administrative Posts in the Nacala Corridor Region and Neighbouring Countries

3.4 Spatial Pattern of the Nacala Corridor Region

3.4.1 Land Use

The distribution of land uses in the Nacala Corridor Region is classified as shown Table 3.4.1 and Figure 3.4.1. Land covered with dense forests and open forests accounts for 58%. This estimate is subject to elaboration based on the results of the "Zoneamento Agro-Eocológico Nacional (ZAE)" project conducted by Mozambique's Ministry of Agriculture.

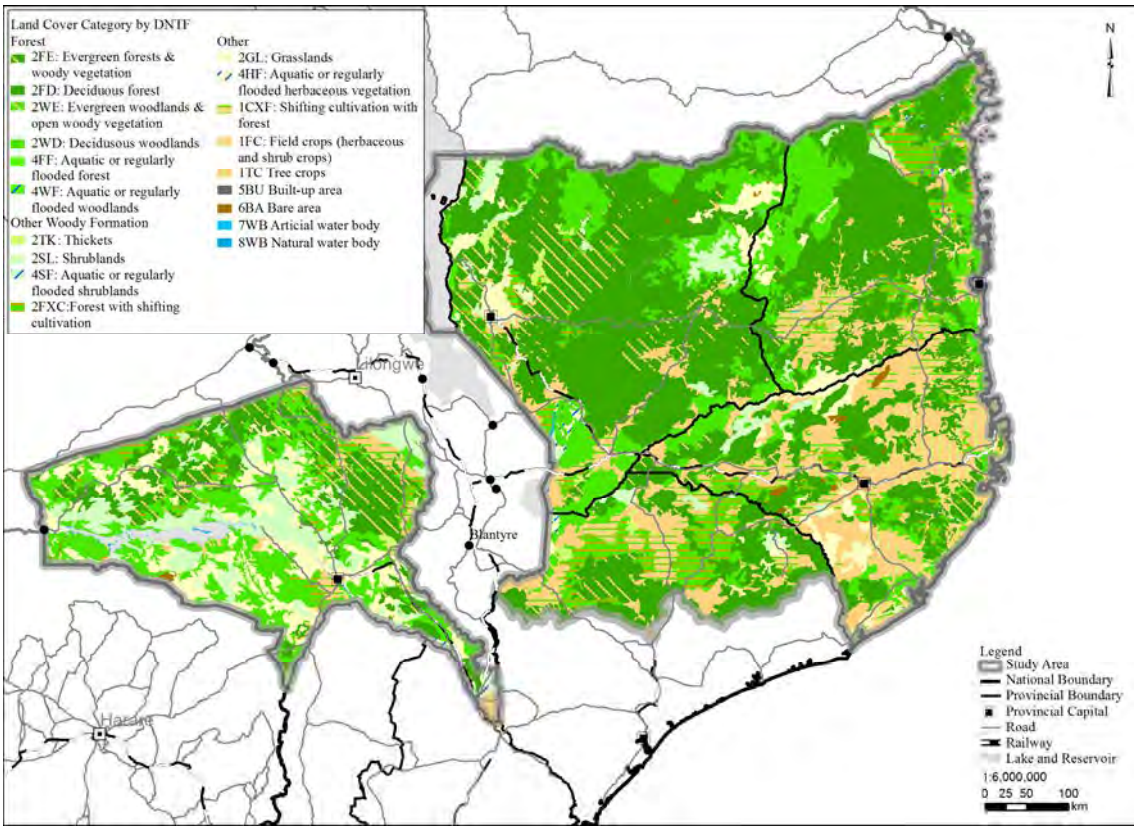
Table 3.4.1 Land Use Pattern in the Nacala Corridor Region

Classification	Area in km^2	%
Dense Forest	58,836	13.6%
Open Forest	192,809	44.5%
Prairies	43,911	10.1%
Aquatic or Regularly Flooded Woodlands and Bushes, and Mangrove	1,647	0.4%
Forest with Shifting Cultivation	52,648	12.2%
Agriculture	65,425	15.1%
Built-up Area & Bare Area	5,514	1.2%
Water	12,285	2.8%
Total	433,072	100%

Source: JICA Study Team based on AIFM Land Cover GIS data in 2007 and ZAE Land Cover GIS data in 2009

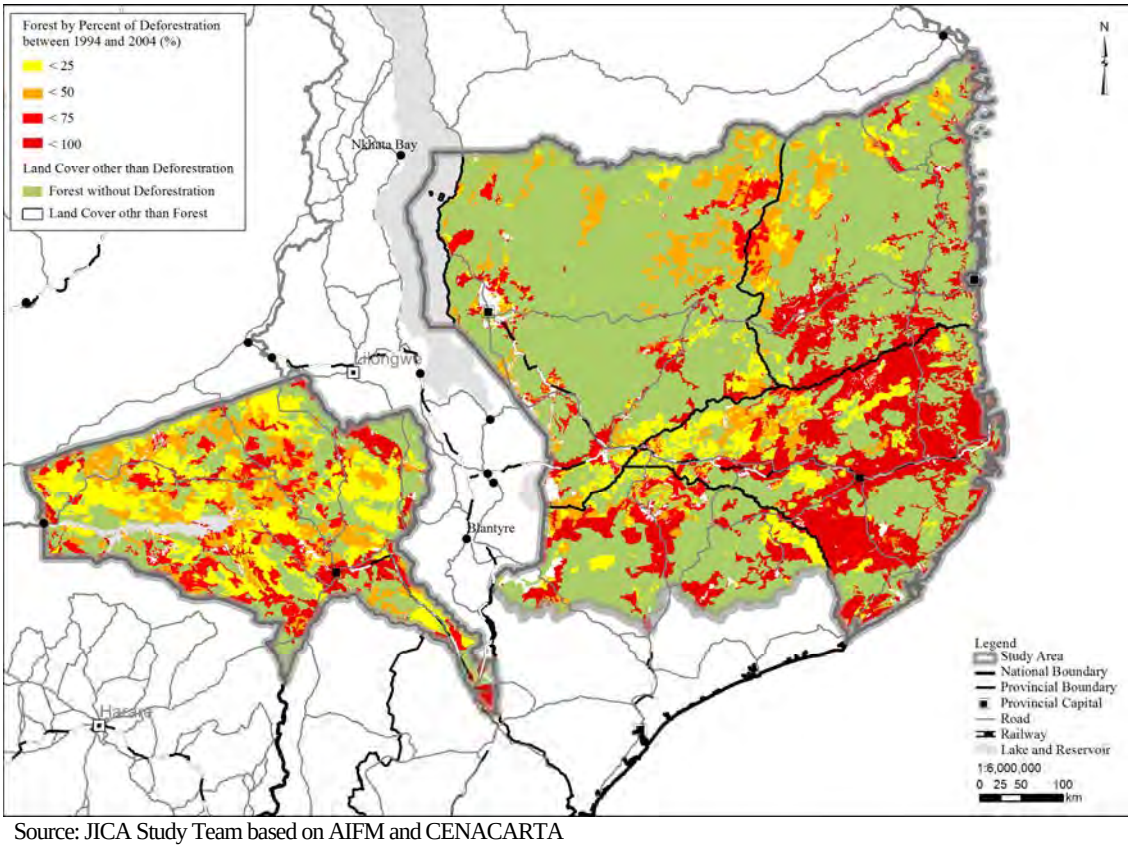
Figure 3.4.2 presents the land use changes in the Nacala Corridor Region between 1994–95 and 2004–2005. These figures, although not reflecting the latest situation, illustrate the change that took place in this period as summarised below:

- Deforestation occurred along the principal roads, especially in Nampula Province and the Lúrio River basin
- While the land in Nampula was converted to tree or crop planting areas, tree cutting for sales seems to have occurred in Tete
- Despite the progress of deforestation in the Lúrio River basin, most of the land remained as forest area



Source: JICA Study Team based on LANDSAT 2004/2005

Figure 3.4.1 Present Land Use in the Nacala Corridor Region



Source: JICA Study Team based on AIFM and CENACARTA

Figure 3.4.2 Land Use Changes in the Nacala Corridor Region between 1994/95 and 2004/05

3.4.2 Settlement Distribution

Figure 3.4.3 presents the settlement distribution pattern of the Nacala Corridor Region. The following characteristics are observed:

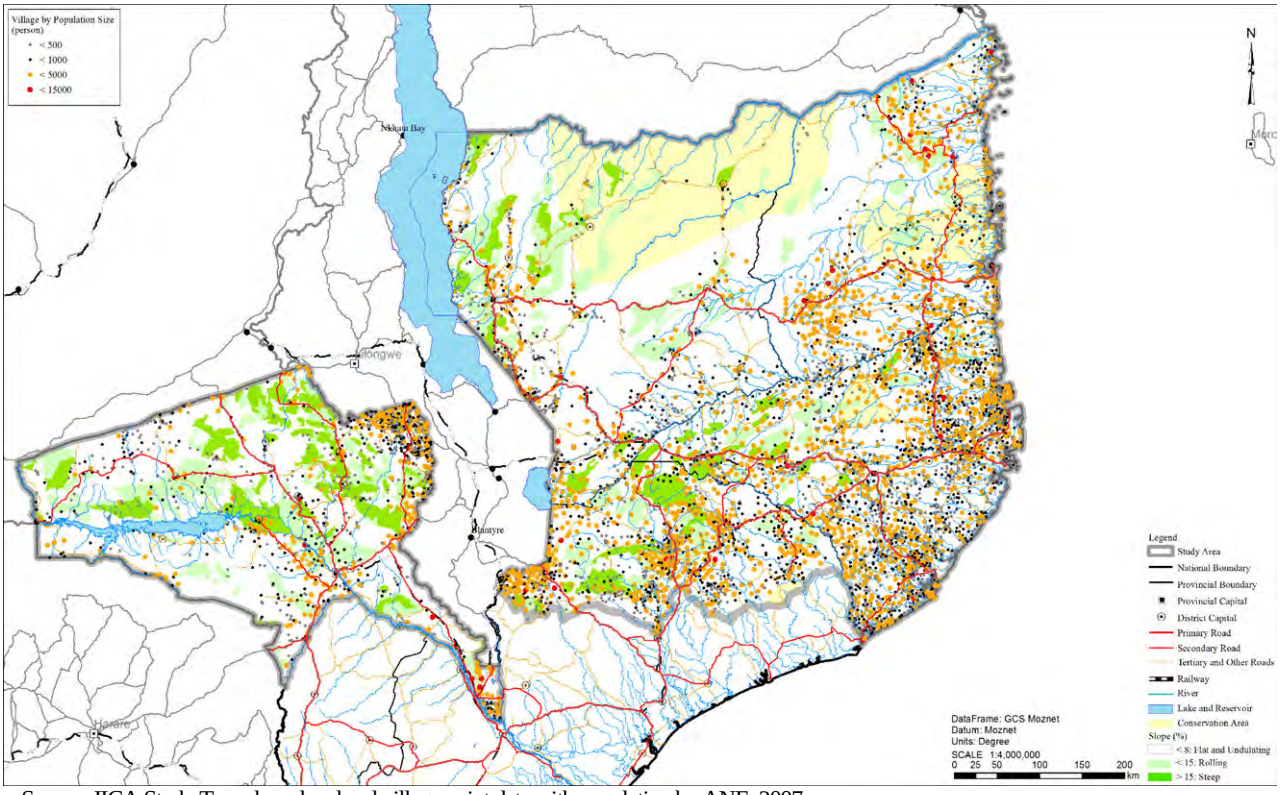
- Villages are located mainly along the roads and railway throughout the entire Nacala Corridor Region
- Small villages are distributed along the Lúrio River basin in both Nampula and Cabo Delgado Provinces, even though the roads are not well developed
- Settlements have not developed along the Lugenda River basin in Niassa
- Steep lands prevent the establishment of villages
- Villages with remarkably high density are found in stretches near the border of Malawi in Tete, Zambézia and Niassa Provinces

3.4.3 Transport Network

Figure 3.4.4 presents the transportation network in the Nacala Corridor Region, comprising roads of primary, secondary and tertiary status, railways, ports and airports.

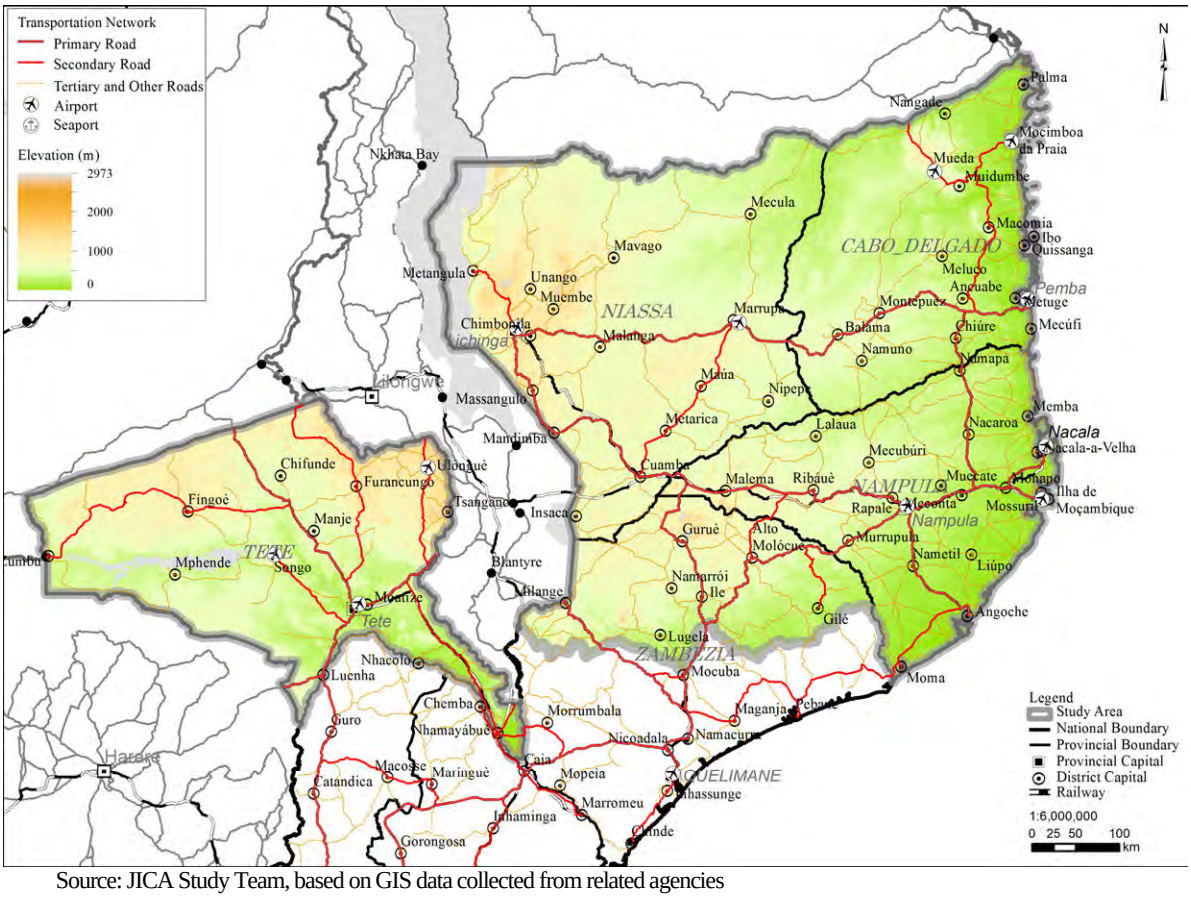
The provincial capitals are connected to each other by primary roads, except Tete Province and others. District centres in each province are connected by at least tertiary roads from its provincial capital, however some of them are not connected directly with each other and have difficulty with cross-provincial connections. Road conditions are still insufficient because some roads have only limited possibility throughout a year. The main primary road in Nacala Corridor and the Lichinga - Montepuéz Road are expected to be rehabilitated as all-weather roads in the near future.

Regarding the railway network, currently, Nacala Railway (North Railway Line) runs from Nacala Port, through Nampula and Niassa Provinces via Cuamba and connects with Malawian Railways at the border of Entre Lagos. Another railway line between Cuamba and Lichinga is expected to be revived. There are large amounts of investment that will be implemented to develop the new railway line connected from Tete Province to Nacala Port through Malawi for the coal transportation.



Source: JICA Study Team based on local village point data with population by ANE, 2007

Figure 3.4.3 Distribution of Settlements in the Nacala Corridor Region



Source: JICA Study Team, based on GIS data collected from related agencies

Figure 3.4.4 Transportation Network in the Nacala Corridor Region

3.4.4 Accessibility

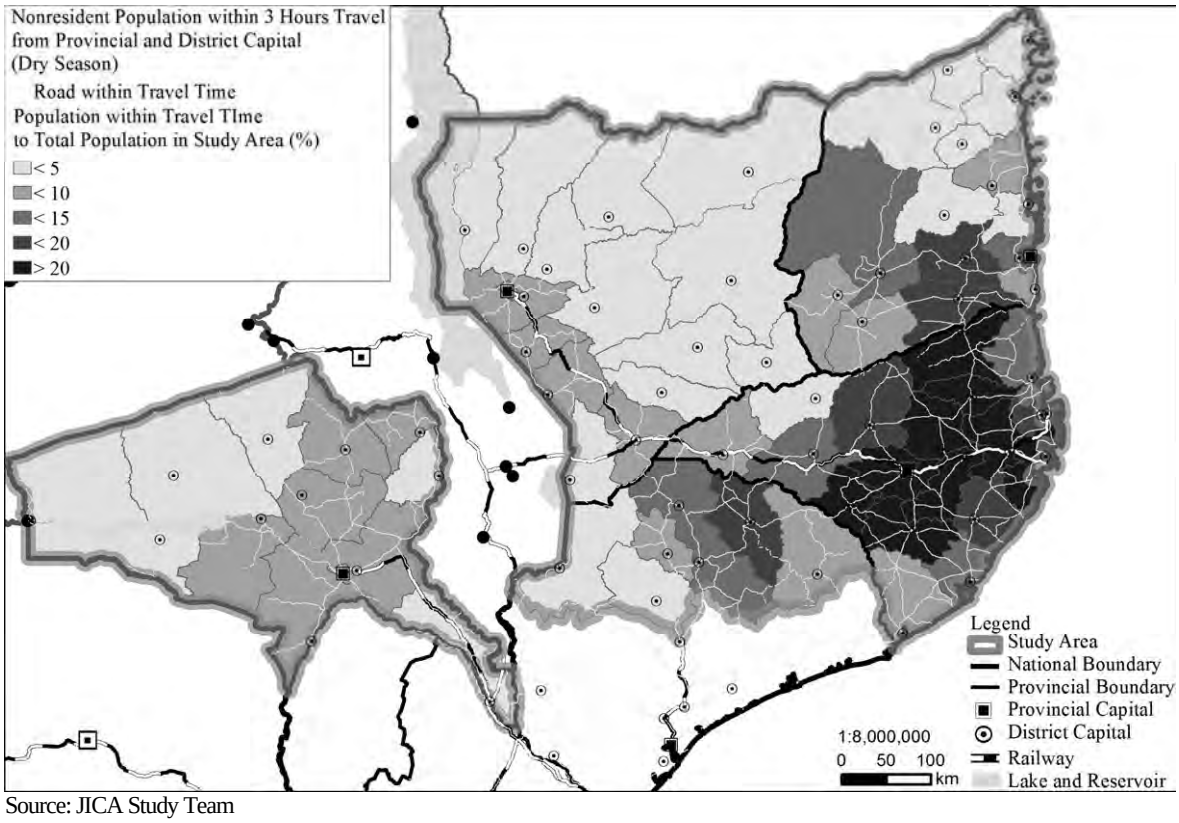
Figure 3.4.5 and Figure 3.4.6 illustrate the accessibility in the Nacala Corridor Region in the dry season and rainy season. The accessibility here is defined as the proportion of the population who are able to reach a district capital or provincial capital within three hours to the total population of the Nacala Corridor Region.

Accessibility reflects the condition of the roads. There is a big difference in the level of accessibility between the rainy season and the dry season, indicating the fact that many roads become impassable or difficult to pass through during the rainy season. Accessibility is better in Nampula Province and the south of Cabo Delgado Province, especially in the areas along national road No.1 in the north-south direction. Districts closer to provincial capitals tend to have better accessibility in Niassa Province and Tete Province.

The average accessibility rates in the Nacala Corridor Region are 7.8 % in the rainy season and 17.5 % in the dry season. These rates in the Nacala Corridor Region are expected to rise as a result of the on-going major road rehabilitation projects.

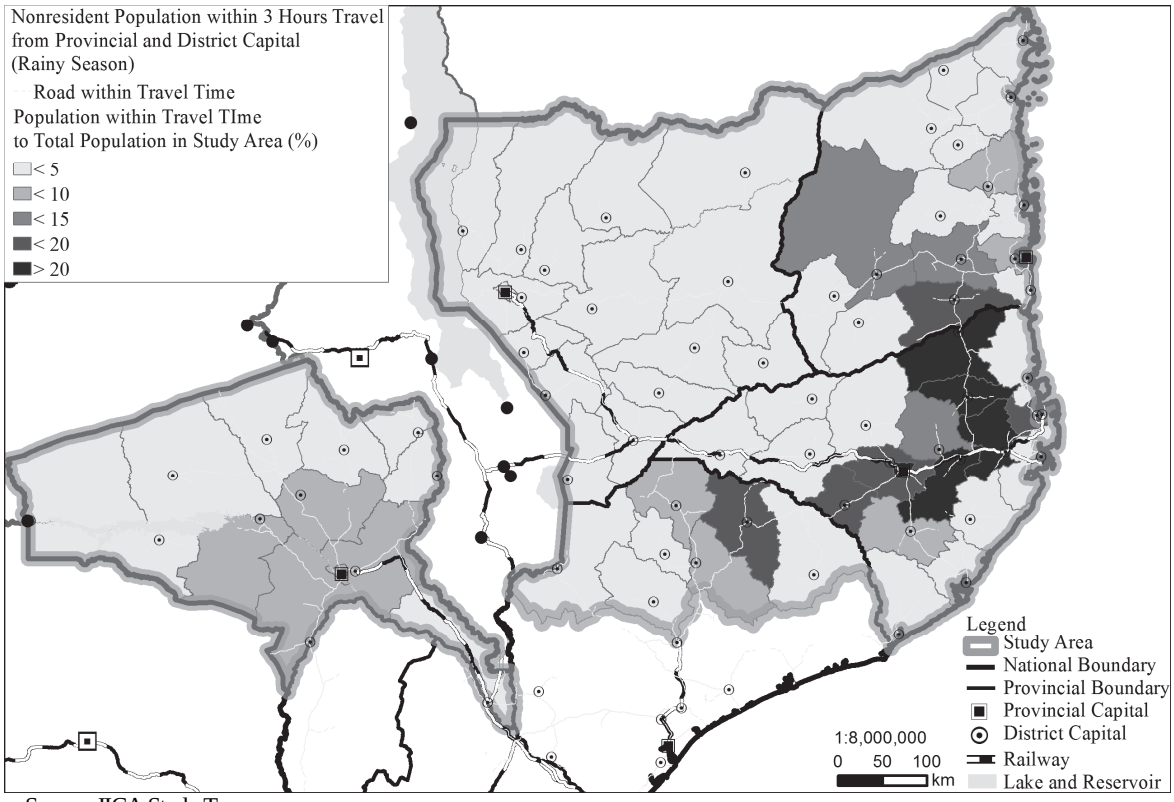
3.4.5 Mineral and Forest Concession Areas

Figure 3.4.7 presents a geographical distribution of mineral and forestry concessions in the Nacala Corridor. Mineral concessions are concentrated in Tete Province, north eastern part of Nampula Province, western part of Cabo Delgado Province and the areas long the Niassa Lake in Niassa Province. Forest concessions and other concessions are found in the eastern half of the Nacala Corridor Region.



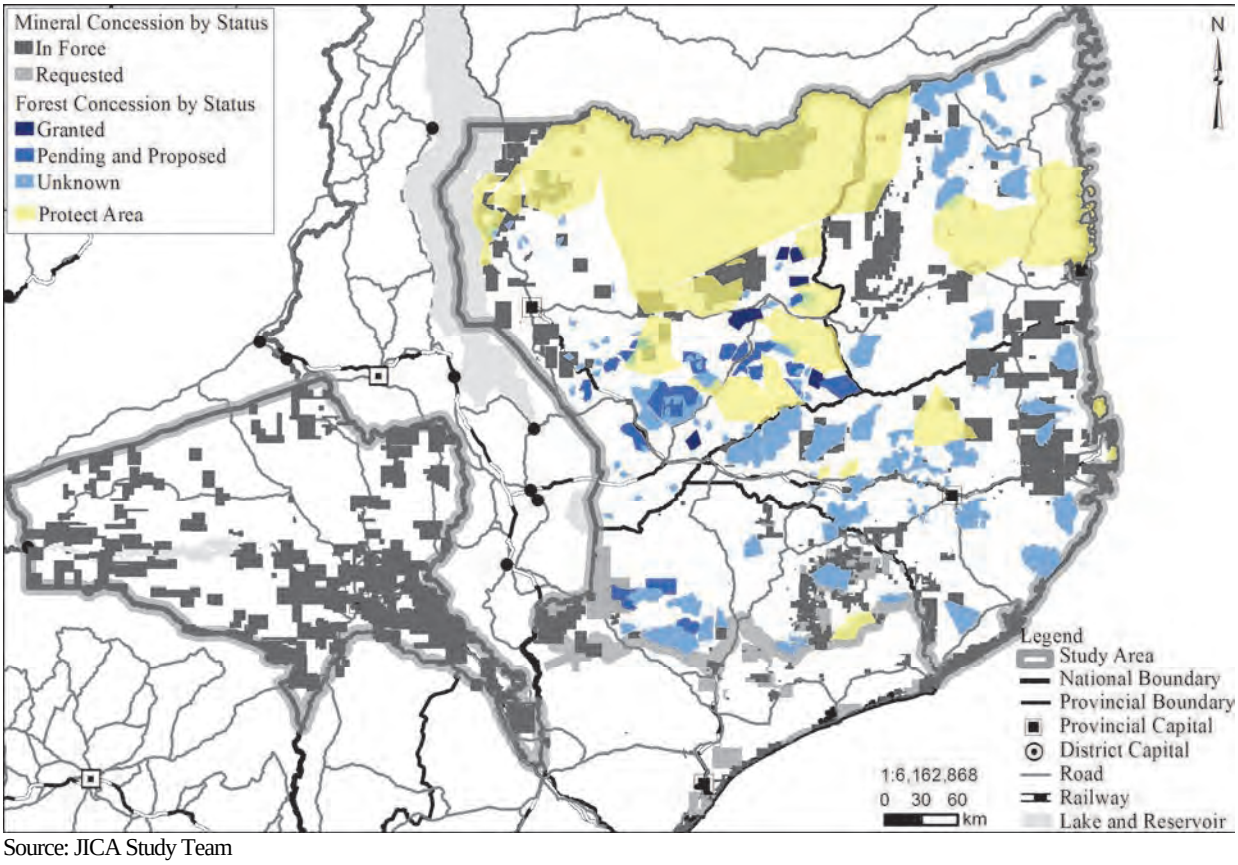
Source: JICA Study Team

Figure 3.4.5 Accessibility in Dry Season



Source: JICA Study Team

Figure 3.4.6 Accessibility in Rainy Season



Source: JICA Study Team

Figure 3.4.7 Mineral and Forest Concessions

3.5 Characteristics of Five Provinces

3.5.1 Overview of Major Indicators

To understand the characteristics of the five provinces, major indicators are summarised in Table 3.5.1, and an outline of the Provincial Strategic Development Plans is also shown in Table 3.5.2.

Table 3.5.1 Overview of Major Indicators for the Five Provinces related to the Nacala Corridor Region

	Niassa	Cabo Delgado	Nampula	Zambézia (7 districts)	Tete	Total (Nacala Corridor Region)
Population						
Population (2007)*[1]	*1,213,398*	1,634,162	**4,084,656**	3,890,453 (1,808,220)	1,807,485	12,630,154 (10,547,921)
Population Density (people/km^2, 2007)*[1]	*9.91*	21.0	**52.3**	37.6 (39.3)	17.8	25.7 (24.4)
Annual Growth Rate (1997-2007, %)*[1]	**4.14**	*1.70*	2.92	2.31 (2.88)	3.96	2.81 (2.01)
Urban Population (2007)*[1]	277,838	340,707	**1,167,813**	679,073 (220,108)	*247,178*	2,712,609 (2,253,644)
Ratio of Urban Population (%, 2007)*[1]	22.9	20.8	**28.6**	17.5 (12.2)	*13.7*	21.5 (21.4)
Land Cover (AIFM, 2007*[2])						
Dense and Open Forest (km^2)	**98,160**	50,798	23,846	(21,253)	57,588	(251,645)
Prairies (km^2)	9,343	7,536	2,345	(6,165)	**18,521**	(43,911)
Aquatic or Regularly Flooded Woodlands & Bushes (incl. Mangrove) (km^2)	180	386	**784**	(37)	258	(1,645)
Forest with Shifting Cultivation (km^2)	2,256	10,892	**28,019**	(2,814)	8,667	(52,648)
Agriculture (km^2)	11,104	6,964	**19,622**	(14,781)	12,954	(65,425)
Built-up Area & Bare Area (km^2)	915	616	**2,839**	(757)	387	(11,903)
Water (km^2)	**7,647**	553	462	(231)	3,392	(5,514)
Total (km^2)	**129,605**	*77,744*	77,917	103,544 (46,039)	101,767	490,577 (433,072)
Sociorconomy						
Literacy Rate (%, 2008)*[3]	35.6	29.0	**40.0**	26.8	*25.5*	31.4
Poverty Ratio (%, 2009)*[4]	*31.9*	37.4	54.7	**70.5**	42.0	53.3
Unemployment Ratio (%, 2004/5)*[5]	**31.7**	*10.9*	15.7	11.2	16.5	17.2
Infant Mortality Rate (per 1,000 live birth)*[3]	*97.4*	131.7	104.9	**147.1**	107.5	117.7
GRDP Constant Price: Base year 2003 (MT Million, 2011)*[6]	*5,930.7*	9,198.6	**29,321.3**	18,505.8	11,291.3	74,247.6
Share of Economic Sector (2011, INE)*[6]						
Agriculture, Fishery, & Forestry (%)	49.5	**51.2**	39.9	50.8	*20.0*	40.3
Manufacturing (%)	*4.1*	5.0	10.2	4.9	4.2	6.8
Others (%)	46.4	*43.8*	49.9	44.3	**75.8**	52.9
Annual Growth of GRDP (%, 2005-2011)	8.6	**9.3**	9.2	8.9	*5.9*	8.5
Total Investment (USD Million)	50.3	10.3	19.3	128.9	**424.4**	633.2
Natural Condition*[7]						
Temperature (Capital City)	*15-23*	22-26	22-28	22-28	**23-28**	18-27
Maximum Altitude	1,848	*1,219*	1,801	**2,419**	2,095	-
Infrastructure						
Primary Road (km, 2011)*[9]	743	*417*	**987**	1,031	540	3,718

	Niassa	Cabo Delgado	Nampula	Zambézia (7 districts)	Tete	Total (Nacala Corridor Region)
Primary Road per Land Area (km/1,000 km^2, 2011)*[8]	6.07	*5.35*	**12.63**	9.82	5.37	8.75
Classroom Student Ratio (%, 2010)*[9]	51.0	*50.4*	**56.7**	51.4	51.3	52.2
Total Number of Health Facilities (2012)*[10]	151	114	209	**224**	*107*	805
Agriculture						
Major crops (✔✔✔: >1 million ton,✔✔:> 100 thousand ton ,✔: > 10 thousand ton: 2007, MINAG)*[11]						
Maize	✔✔	✔	✔	✔✔	✔✔	-
Cassava	✔	✔	✔✔✔	✔✔✔	-	-
Rice	-	✔	-	✔	-	-
Haricot Beans	✔	-	-	✔	-	-
Cowpea	-	✔	✔	-	-	-
Sweet Potato	✔	-	-	✔✔	✔✔	-
Cashew Nuts	-	-	✔	✔	-	-
Tobacco	✔	-	-	-	✔	-
Tourism						
International Guest Arrivals (2012)*[12]	*2,992*	**16,708**	4,259	2,986	5,944	32,889
Domestic Guest Arrivals (2012)*[12]	*11,060*	12,815	10,604	**17,630**	14,999	67,108
Major Tourism Resources (✔: Numbers of Potential Area, JICA Study Team)						
Beach*[13]	✔	✔✔✔	✔✔✔	-	-	-
Safari*[13]	✔	✔	-	✔	-	-
Others*[13]	✔	✔	✔	✔	✔✔	-
Urban Development						
Population of Major Cities (2007*[1])	Lichinga: 147,475 Cuamba: 81,982	Pemba: 141,082	Nampula: 483,572 Nacala: 211,915 Nacala-a-Velha: 90,991	Quelimane: 195,758	Tete: 155,870 Moatize: 39,468	

Note: The figures in block are the highest and those in italics are the lowest.
Source:
*1: JICA Study Team based on INE, General Census of Population and Housing 2007
*2: JICA Study Team calculation based on AIFM land cover GIS data in 2007
*3: Final Report of the Multiple Indicator Cluster Survey 2008, 2009, INE
*4: Poverty and Wellbeing in Mozambique: Third National Poverty Assessment, 2010, DNEAP, MPD
*5: Integrated Survey on the Labour Force (IFTRAB), 2005-2006, INE
*6: INE's Statistics, 2011
*7: National Meteorology Institute of Mozambique (INAM), http://www.inam.gov.mz/, 2010 for Tete, 2011 for the other provincial capital cities
*8: JICA Study Team based on Road Sector Strategy (RSS) Final Report, 2007-2011, ANE
*9: JICA Study Team based on MINED's (Ministry of Education)Statistics, http://www.mec.gov.mz/STATS/Pages/default.aspx
*10: MISAU (Ministry of Health), 2012, National Plan for Health Human Resource Development
*11: National Agriculture Survey (TIA), 2007, MINAG
*12: Statistical Yearbook 2012, 2013, INE
*13: JICA Study Team

Table 3.5.2 Outline of Provincial Strategic Development Plans for the Five Provinces related to the Nacala Corridor Region

Province	Target Years	Vision, Mission and Objectives
Niassa	2008-2017	**Vision**: Niassa will have consolidated bases for fighting poverty and promoting accelerated and sustainable development. **Mission**: Accelerate social and economic development on a sustainable basis, integrating the province competitively within the national and regional economy **General Objective**: Accelerate and consolidate the economic, social and cultural development of the province and reduce poverty by 15% by 2017 **Development Pillars**: Social Development, Economic Development, Institutional Development
Cabo Delgado	2010-2014	**Global Objectives**: • The consolidation of national unity, peace and democracy; • The fight against poverty and the promotion of workplace culture; • Good governance, combating corruption and culture of accountability; • The strengthening of the sovereignty and • The strengthening of international cooperation **Development Pillars**: Development of Administration and Justice, Social and Human Development, Development of infrastructures
Nampula	2010-2020	**Vision**: Nampla Province as a national example in the production and distribution of wealth and job creation **Mission**: Place the Province of Nampula in the higher standards of wealth creation, with its epicentre in the district by maximizing public-private-community partnership **Development Pillars**: Economic Growth, Participatory Governance, Infrastructure and Promotion of the Environment, Social and Human Capital Development
Zambézia	2011-2020	**Vision**: Lay the foundations for sustainable increase in production and productivity, in particular the agrarian, for job creation and equitable distribution of wealth, and for poverty reduction. **Mission**: Zambézia as an example in the production and productivity, in particular the agrarian, job creation, equitable distribution of wealth, and fighting poverty **Development Pillars**: Develop Human and Social Capital, Economic Growth and Development, Good Governance/Decentralization/ Fighting Corruption and Promoting a Culture of Accountability, Cross-cutting issues.
Tete (Draft)	2012-2021	**Vision**: The potential wealth of the Province turned into socioeconomic development in an integrated, sustainable and equitable manner. **Mission**: Promote the development of the Province through sustainable exploitation of resources, diversification of investment, public-private partnerships in support of the creation and redistribution of wealth, generation of employment for the improvement of living conditions of the population. **Development Pillars**: Promoting economic growth, Infrastructure to support economic and social development, Access to high quality basic social services, Good governance/ public administration and public finance management, Cross-cutting issues.

Source: Provincial Strategic Development Plan for each Province

3.5.2 Outlines of the Five Provinces

(1) Niassa Province

Niassa Province is located next to Tanzania (Niassa Lake is located at its border) and Malawi (there are three border posts). It currently has the smallest population (1.2 million) and the smallest economic activities (MT 5,930.7 million in GRDP) among the five provinces. On the other hand, it has the largest land area (129,600km^2), which is mainly covered by forest accounting for 76% of the total land area in Niassa. This is 39% of the forest area in the Nacala Corridor Region. Niassa Province is situated at a comparatively high altitude and has the lowest temperature. Its urban

population is relatively low. Furthermore, it has a relatively low poverty ratio (31.9%) despite the highest unemployment rate (31.7%). Lichinga and Cuamba are major cities in Niassa Province with populations of 147,475 and 81,982 respectively. The length of primary roads per land area is relatively low at 6.07 km per 1,000 km^2. As its unemployment rate was the highest (31.7 %) in the five provinces, it is necessary to develop work places for the people. As development potentials, Niassa Province has coal resources in the northern area, tourism around Niassa Lake and Niassa Reserve, tree plantation around Lichinga City etc.

(2) Cabo Delgado Province

Cabo Delgado Province is located along the Indian Ocean with a population of 1.6 million. It had the highest pace of annual GDP growth (9.3%, 2005-2011). It borders Tanzania, but there is only one border post. The major economic sectors are agriculture, fishery and forestry industries (51.1%). Furthermore, it has a beautiful coast line and islands which are attracting many tourism investments. Actually, it has the largest number of international guest arrivals (10,192) of the five provinces. In addition, the poverty ratio and the unemployment rate are low (37.4% and 10.9% respectively). The capital city of Cabo Delgado is Pemba City with a population of 141,082. Pemba has a small natural deep-sea port, from which, mainly timber is shipped to China. As the flat land area is rather small around its bay, it is not suitable for large scale manufacturing. In addition to agro-forestry industry, Cabo Delgado has a good fishery sea field near by Mocimboa da Praia. Huge hydrocarbon resources are currently found along the coastal area from Palma to Pemba.

(3) Nampula Province

Nampula Province with cities such as Nampula City and Nacala City (also known as Nacala Porto) is the most populated (4.1 million) and urbanized province of the five provinces (28.6% of population live in an urban area). Nacala City has a natural deep-sea port, Nacala Port, which acts as the gate to Nacala Corridor. Nacala City and Nacala-a-Velha District have been designated as a special economic zone (SEZ), which has attracted direct investment in manufacturing and other industries. Thus, Nampula Province has the largest GRDP (MT 29,321 million) of the five provinces and high annual growth of GRDP (9.2%). The length of primary roads per land area is the highest (12.63 km per 1,000 km^2). The airport in Nampula plays the role of a hub in the Northern Region of Mozambique. The coal of Tete Province is planned to be transported by the railway passing through Nampula to Nacala. A new airport has been constructed in Nacala and it started operation in December 2014. The urban structures of these cities would be changed and clear urban plans are yet to be developed for them. In addition, the literacy rate of Nampula is the highest (40.0%), thus people in Nampula Province are comparatively more educated. It has tourism development potential in beach tourism (Nacala, and Angoche) and history and culture tourism (Mozambique Island).

(4) Zambézia Province

Zambézia Province had a population of 3.9 million as of 2007 and has a high rate of annual growth of GRDP (8.9%). Zambézia Province was the largest agricultural production area in Mozambique about 20 years ago. However, it was damaged by and is still influenced by the civil war. Currently, Zambézia has 868 processing businesses, and most of them are micro-size. The poverty ratio is the highest (70.5%) of the five provinces. Zambeze River, which is the fourth longest river in Africa (which is also the longest river in Mozambique) and the longest flowing into the Indian Ocean from

Africa, flows through this province. In the area of the northern 7 districts, which is part of the Nacala Corridor Region, there is a huge development potential for agro-forestry, such as tea plantation around Gurué, cotton around Milange, and paddy rice around Insaca, etc.

(5) Tete Province

Tete Province has long been a well-known area where the power plant of Cahora Bassa Dam is located, and currently coal production has been initiated by foreign investors. Other mineral resource developments have also been planned in Tete, such as iron, fluolite, phosphate, base metal, and gold. Although its annual GRDP growth rate was the lowest (5.9%, 2005-2011) of the five provinces, it is expected to have rapid economic growth in the near future because of the mineral resources development. Currently, the share of the industry sector in Tete Province is the highest (36.7%) among the five provinces. This is due to the electricity and water sector in Tete supplying power to the whole country and the share of the manufacturing sector is one of the smallest which accounts for only 4.2% of the GRDP. The population of Tete Province is 1.8 million and it has a high poverty ratio (42.0%). However, it also has the highest total investment (US$ 424.4 million), which is 67% of the total for the five provinces. The huge capital investment has not provided employment for the local people yet. In addition, its literacy rate was the lowest (25.5%). Tete has the highest temperature of the five provinces, and has suitable land for the production of tobacco.

3.6 Emerging Development Opportunity for the Nacala Corridor Region

There are four strong driving forces for development for the Nacala Corridor Region. They have a large transformative power to the economy and spatial structure of the Nacala Corridor Region.

- Coal mining and coal transport for export
- Natural gas exploitation and LNG production for export
- Increasing investments and development in Nacala Special Economic Zone (SEZ) near the Nacala Port to be rehabilitated and upgraded
- Key transportation projects as driving forces to regional development

3.6.1 Coal Mining and Coal Transport for Export

A huge coal reserve of over 23 billion tons has been found in Tete Province. The developable coal found in Tete contains around 50% high quality coal (coking coal), which is one of the raw materials for iron making. At present, three coal mines are operational and the development of five more coal mines is planned. Coal production is expected to reach 53.4 million ton per year by 2017 and 60 million tons per year by 2020, and 100 million tons per year in the future.

For exporting the increasing amount of coal production in Tete Province, 3-4 railway lines from Tete Province connecting to seaports are required. Coal export was started in 2012 and is currently using Sena Line and Beira Port. However, the Sena Corridor does not have enough transport capacity for the amount of coal to be produced by 2017.

One of the promising export routes is the Nacala Line which connects Moatize of Tete Province through Malawi with Nacala Port. The Nacala Line is composed of existing lines and new lines.

3.6.2 Natural Gas Exploitation and LNG Production for Export

Natural gas reserves in Mozambique were drastically increased by the discovery of huge gas fields at the concession areas in the offshore Rovuma Basin, in northern Mozambique. Recoverable reserves in Areas 1 and 4 are estimated as 75 trillion cubic feet (Tcf).[2]

Natural gas exploitation and LNG production are planned to start in 2018 at 10 million tons per year. This world-class natural gas production could create 70,000 job opportunities at most (including direct and indirect employment and construction jobs).

It could offer an opportunity for the Nacala Corridor Region to acquire a new energy source other than the electricity transmitted long distance from Cahora Bassa and to generate new chemical industries, such as those for ammonia and methanol, resulting in widening the industrial base of the Nacala Corridor Region.

3.6.3 Increasing Investments and Development in Nacala Special Economic Zone (SEZ)

Mozambique enacted the law on Special Economic Zone (SEZ) in 2009. In 2009, the first SEZ in Mozambique was established in Nacala Municipality and Nacala-a-Velha District. Since then the

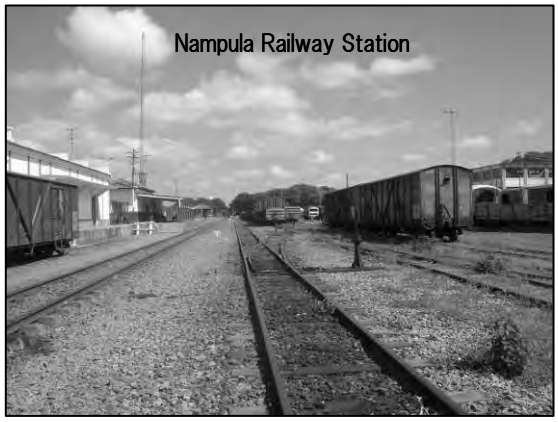
[2] ICF International's estimation shown in "The Future of Natural Gas in Mozambique: Towards a Gas Master Plan (20 December 2012)" prepared by ICF International.

number of approved investment projects and the amount of registered investment values has increased in the Nacala SEZ. From 2009 to 2012, there were 68 investment projects approved by GAZEDA. The total amount of investment value registered with GAZEDA was US$ 3,300 million (in years 2009-2012).

The increase in investments and development in the Nacala Area have been driven by the Nacala Port and SEZ. With the rehabilitation and upgrade projectss for Nacala Port and the upgraded railway from Tete, the Nacala Area will attract more investments and developments as the international gateway for the Nacala Corridor Region.

3.6.4 Key Transportation Projects as Driving Forces to Regional Development

Opportunities are emerging in the Nacala Corridor Region for economic growth. There are a number of ongoing and planned initiatives that could fundamentally enhance the development potential of the Region. They include 1) the railway upgrade projects to be undertaken by a private concessionaire for operating trains for transporting not only coal but also other cargoes from Moatize in Tete Province and Nacala Port in Nampula Province through Malawi, 2) rehabilitation and upgrading of Nacala Port, 3) upgrading of trunk roads in the provinces of Niassa, Cabo Delgado and Nampula.

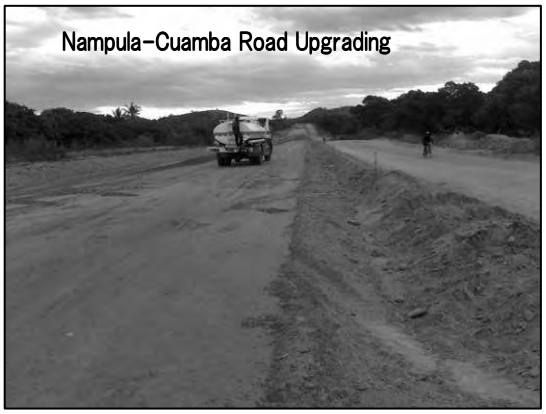

Nampula Railway Station

A private consortium headed by Vale Mozambique S.A, a subsidiary of Vale, a Brazilian mining company, started railway upgrading works in 2012 for a total length of 919 km comprising 237 km for installation of a new line and the remaining 682 km for upgrading of the existing line. The primary purpose of this railway line is to transport the coal produced in Moatize in Tete Province to Nacala Port for export. The consortium started rehabilitation work of the Cuamba-Lichinga line as well as part of its CSR. One of the concessionaire conditions is to ensure transportation of other companies' coal, general cargoes and passengers capitalising on the upgraded railway line. This condition could create a significant impact on the economy of the Nacala Corridor Region, as well as on land locked Malawi and Zambia. Access to and from international markets would be greatly improved, contributing to an increase in export of agro-products from the Region and inland neighbouring countries, as well as to lower prices and wider availability of daily goods, fuels, construction material and chemical inputs to agriculture. Intra-regional commerce will also be activated, thus stimulating production. Coupled with appropriate measures to support small-scale farmers, this railway upgrading could contribute to the improvement of income and living standards of people, reduction of poverty and reduction of income disparity.


Nacala Port

Nacala Port, situated at the eastern end of the

Nacala Corridor, is currently under rehabilitation and will be upgraded with the assistance of the government of Japan. The cargo-handling capacity, which declined significantly due to the damages caused during the civil war, poor maintenance and lack of fund for rehabilitation, will be significantly enhanced by the two current projects. Urgent rehabilitation work and the upgrading of the facilities would increase its cargo-handling capacity from the present 1.3 million tons per year for general cargoes and 53 thousand TEU per year for containers to 49 million tons and 491 thousand TEUs respectively. Nacala Port could ensure efficient export and import of goods in large amounts as a new international gateway.


Nampula-Cuamba Road Upgrading

There are three major initiatives in upgrading the conditions of trunk roads in the Nacala Corridor Region. They are the road upgrade projects for Nampula-Cuamba, part of National Road No.13 (N-13), the project for two sections of National road No.14 (N-14) running eastward from Lichinga of Niassa Province toward Montepuez of Cabo Delgado Province and the project for National Road No.13 (N-13) connecting Cuamba and Lichinga in Niassa Province. Upgrading works are ongoing for Nampula-Cuamba and N-14 from Lichinga, while the upgrading of the Cuamba-Lichinga section has been committed for implementation. The government of Japan, the African Development Bank and other banks are supporting these three projects. The areas inland from Nampula westward have been largely isolated by poor roads, many of which have been impassable during the rainy season. Upgrading of these trunk roads to all-weather roads will significantly improve the mobility of the population in the surrounding areas, ensuring better access to market for agro-products and easier procurement of inputs and consumer goods. Activation of the regional and local economies could, thus, be accelerated.

Chapter 4 Existing Conditions of Economic Sectors

4.1 Agricultural Sector

4.1.1 Existing Conditions of Agricultural Sector

(1) Share of Agricultural Sector and Size of Farmers

In Mozambique, agriculture sector generated 29.4% of the GDP in 2009. It is estimated that the sector absorbs about 80% of the total labour force of the nation. In the Nacala Corridor Region, the proportion is even higher with almost 85%.

Table 4.1.1 Labour Force Projection by Economic Sector in the Nacala Corridor Region (2007)

Economic Sector	EAP (Thousand persons)	Share (%)
Agriculture, livestock, fishery & forestry	3,249	84.8
Mining	12	0.3
Manufacturing	90	2.3
Energy	4	0.1
Construction	49	1.3
Commerce & finance	259	6.7
Transport & communication	19	0.5
Other services	151	3.9
Total	3,833	100.0

Source: INE, General Census of Population and Housing 2007

The number of total farm-households (agriculture & livestock) in Mozambique is 3,827,797, while their total cultivated area is only 5,633,850 ha. The farm-households are predominately small-scale farmers, and their average cultivated area is only 1.47 ha.

Table 4.1.2 Number of Farm-Households and their Cultivated Areas in Mozambique

	Small	Medium	Large	Total
Farm-Households (HH)	3,801,259	25,654	884	3,827,797
(%)	(99.3)	(0.7)	(0.0)	(100.0)
Cultivated Areas (ha)	5,428,571	130,651	74,628	5,633,850
(%)	(96.4)	(2.3)	(1.3)	(100.0)
Average Cultivated Area (ha/household)	1.43	5.09	84.4	1.47

Source: Agriculture Census in 2009-2010, INE

Note: Farm scale is defined as follows:

- Small-scale farmer: all factors are under "Limit 1"
- Medium: if one factor is greater than or equal to "Limit 1"
- Large: if one factor is greater than or equal to "Limit 2"

Factors	Limit 1	Limit 2
Non irrigated cultivation area (ha)	10	50
Irrigated cultivation, crops, horticulture, floriculture	5	10
Number of head of cattle	10	100
Number of head of goats / sheep / swine	50	500
Number of poultry	2,000	10,000

The table below shows cultivated areas by size of farm and province. The total cultivated area in the five provinces related to the Nacala Corridor Region is 3.63 million hectares, of which 3.55 million ha or 97.6% is cultivated by small-scale farmers, whereas 1.5% and 0.8% are cultivated by medium and large-scale farmers respectively. The percentages of medium-scale and large-scale farmers are relatively high in Tete, Gaza and Maputo Provinces, while the percentage is very limited in the northern provinces, which are the agricultural production centres in the country.

Table 4.1.3 Cultivated Areas by Size of Farm and Province

Province	Small	Medium	Large	Total
Niassa	402,633 (98.3)	6,114 (1.5)	726 (0.2)	409,473 (100.0)
Cabo Delgado	487,273 (99.2)	3,194 (0.7)	684 (0.1)	491,151 (100.0)
Nampula	1,010,769 (97.4)	7,771 (0.7)	19,208 (1.9)	1,037,748 (100.0)
Zambézia	1,056,050 (98.6)	6,968 (0.7)	8,152 (0.8)	1,071,170 (100.0)
Tete	590,040 (94.7)	31,727 (5.1)	1,247 (0.2)	623,014 (100.0)
Manica	534,900 (96.2)	18,212 (3.3)	2,788 (0.5)	555,900 (100.0)
Sofala	458,150 (96.7)	10,696 (2.3)	4,702 (1.0)	473,548 (100.0)
Inhambane	403,284 (97.2)	10,553 (2.5)	1,004 (0.2)	414,841 (100.0)
Gaza	337,233 (92.6)	20,131 (5.5)	7,003 (1.9)	364,367 (100.0)
Maputo	119,572 (74.1)	12,714 (7.9)	29,066 (18.0)	161,352 (100.0)
Cidade de Maputo	28,667 (91.6)	2,571 (8.2)	48 (0.2)	31,286 (100.0)
Total (ha)	5,428,571 (96.4)	130,651 (2.3)	74,628 (1.3)	5,633,850 (100.0)

Source: Agriculture Census in 2009-2010, INE
Note1: Figures in parentheses show the percentages of cultivated areas in each province.
Note2: Farm scale is defined the same as in the Note of Table 4.1.1.

(2) Major Crop Production

Maize, cassava, sorghum and millet are major traditional food crops cultivated by small-scale farmers, while paddy is grown by large-scale farmers, as well as individual farmers. Wheat production is negligible although it is a major food that is consumed by the locals. Production in 2010 of pulses/beans ranked 3rd in the world, while cassava ranked 10th and sweet potatoes ranked 11th. The following table shows the area harvested, production and yield by each of food crop in Mozambique in 2010.

Most cash crops were developed during the colonial period, and cotton, tobacco, cashew nuts and sugar are still important export commodities of Mozambique. Many individual farmers also have started the production of cash crops. Cotton and tobacco are grown by outgrowers of private companies that have monopoly rights from the government to contract out to farmers and buy their harvested crop within their concession areas. Production in 2010 of castor oil seed ranked 4th in the world, while cashew nuts with shells ranked 11th, unmanufactured tobacco was 12th, sesame seed was 15th, and coconuts was 17th in the world.

Nampula, Zambézia and Tete are leading provinces in terms of crop production in the country as shown in Table 4.1.4. They are also relatively densely populated provinces, and more than half of the total farm-households are concentrated these provinces.

Table 4.1.4 Crop Production in Mozambique

	Production in the Nacala Corridor Region* (2007)		Rank in Mozambique		
	(1,000 ton)	% to National Production	1	2	3
Maize	725	64.0	Zambézia	Tete	-
Cassava	3,623	79.5	Zambézia	Nampula	-
Rice (milled)	90	87.4	Zambézia	Cabo Delgado	-
Sorghum	83	49.1	-	-	Tete
Millet	16.6	66.4	Tete	0	Zambézia
Haricot Beans	47.1	85.6	Niassa	Zambézia	Tete
Cowpea	44	71.0	Nampula	Cabo Delgado	-
Groundnut	86	85.1	Nampula	Zambézia	Cabo Delgado
Sweet Potato	530	61.6	Tete	Zambézia	-
Cotton	61	65.6	Cabo Delgado	-	Tete
Cashew Nuts	32.1	56.3	Nampula	Zambézia	-
Sesame seed	13.3	70.0	Tete	Niassa	Zambézia
Tobacco	33.3	92.5	Tete	Niassa	Zambézia
Sunflower	2.33	38.8	-	Zambézia	Tete

Note: * Total production of Cabo Delgado, Nampula, Niassa, Tete and the whole of Zambézia Province.
Source: TIA 2007, MINAG

The table below shows the major crop production by province, including the five provinces related to the Nacala Corridor Region.

Table 4.1.5 Major Crop Production by Provinces

unit: 1,000 tons

Crop	Northern Region			Central Region				Southern Region			Total
	Niassa	Cabo Delgado	Nam-pula	Zam-bézia	Tete	Manica	Sofala	Inham-bane	Gaza	Mapu-to	
Maize	104	86	94	**229**	**212**	**212**	97	29	61	11	1,133
Cassava	88	45	**1,144**	**2,322**	24	171	123	442	156	42	4,557
Rice (milled)	3	12	10	**62**	3	2	11	2	2	0.1	103
Sorghum	8	18	21	14	22	**44**	**36**	3	1	-	169
Millet	0.9	0.2	1.5	3.4	**10.6**	2.4	**3.6**	0.5	1.8	-	25
Haricot Beans	**16**	0.1	4	**15**	12	3	1	0.2	3	0.1	55
Cowpea	1	**12**	**20**	6	5	3	2	9	3	1	62
Ground Nut	3	11	**50**	12	10	3.3	3	8.3	2	1	101
Sweet Potato	20	8	9	**205**	**288**	**178**	74	7	56	15	861
Cotton	1	**24**	11	9	**16**	**17**	**15**	0.02	0.02	0	93
Cashew Nuts	-	3.9	**14.8**	**13.4**	-	3.2	4.7	**9.8**	7.2	0.5	57
Sesame Seed	0.3	**4**	**6**	1	2	2	**4**	-	0	-	19
Tobacco	**11**	0.3	1	5	**16**	1	0.1	0.1	-	0	36
Sunflower	0.1	0.02	0.01	**2**	0.2	**3**	0.04	0	0	-	6

Source: TIA 2007, MINAG
Note: The total (national) calculation is not correct for some crops.

(3) Price of Crops and Cash Income

According to Strategic Plan for Development of the Agriculture Sector (PEDSA, 2011-20), less than 10% of all farming households have surplus products and earn cash incomes. It can be estimated that the percentage is lower in less accessible rural areas. Most of the surplus is staple food, and the average prices of crop food and cash crop are generally low. These crops are purchased by middlemen at each farmer's house or at a nearby market, and limited availability of markets for the farmers can be some of the causes of the low price.

(4) Land Use

The Land Law of Mozambique (Law No. 19/97) regulates that land use rights (DUAT: "Right of land use and benefit") can be declared if the local resident occupied the land in accordance with customary norms or he has used the land for at least 10 years. However, most farmers practice agriculture without having registered DUAT, since it is not compulsory to register DUATs acquired through good faith occupation by national individuals. Farmers also do not recognize necessity and benefit of DUATs and the land law itself. In addition, the application fee for DUAT is too expensive for small-scale farmers to register lands. As a result, few small-scale farmers apply for DUAT registration. Therefore, investors could come in and think that these occupied but un-registered lands are available, and this has caused conflicts between local farmers and outside investors.

Further, in some areas of the Nacala Corridor Region where population density is relatively high and is expected to be higher in the future as well, land will be insufficient for all the farmers' cultivation. In reality, land disputes between community members have actually happened in some densely populated areas, when for example a new comer tries to expand his land and cultivate someone's fallow land.

4.1.2 Policies and Programmes for Agriculture Sector

(1) Strategic Plan for Development of the Agriculture Sector (PEDSA)

The government approved the Strategic Plan for Development of the Agriculture Sector (PEDSA, 2011 - 2020) on 3 May 2011. PEDSA emerges as a guiding framework, synergies driver and harmonising tool to promote agriculture development with a target of achieving an average annual agriculture growth of 7%.

In PEDSA, the agricultural development vision is set as "an integrated, prosperous, and sustainable agriculture sector" and the mission is to "contribute towards the food security and income of agricultural producers in a competitive and sustainable way, guaranteeing social and gender equity." The strategic objectives (pillars) are as follows:

- Increase productivity and production, competitiveness and its contribution to food security and nutrition
- Improve services/infrastructure for better market access and the guiding framework for agricultural investment
- Sustainable use of resources, land, water, forests, and fauna
- Strengthen institutions and organisations for agriculture development

PEDSA will be operated in five-year and annual plans:

- The Five-Year Programme 2010 to 2014 harmonises sectoral activities to introduce significant improvements in land, water and forest use, with the objective of achieving the Millennium Development Goals. The Food Production Action Plan (PAPA) for 2008 to 2011 forms part of PEDSA during the first five years.
- The Five-Year Programme 2015 to 2019 consolidates food security and widens access to domestic, regional and global markets. The operational basis for this period will be established in light of lessons learned during implementation in the first five years.

(2) ProSAVANA

A trilateral cooperation programme called "ProSAVANA" was started after the signing of an agreement

in September 2009 between the governments of Mozambique, Brazil and Japan. The programme is consistent with its upper level plan PEDSA and aims to create new models of sustainable agricultural development along the Nacala Corridor with due considerations for human security, food security, and poverty reduction for the local population, as well as protection of wildlife and preservation of the environment. ProSAVANA has three components under the framework: 1) Improvement of Research and Technology Transfer Capacity (ProSAVANA-PI); 2) Support for Agriculture Development Master Plan in the Nacala Corridor (ProSAVANA-PD); and 3) Improvement of Agricultural Extension Services Capacity (ProSAVANA-PEM).

(3) Other International Cooperation Projects

There are a number of on-going projects to support agriculture development in Mozambique assisted by countries and organisations such as Canada, Switzerland, Finland, EC, Italy, UK, Sweden, IFAD (International Fund for Agriculture Development), World Bank, UNDP, FAO, USA and MCC (Millennium Challenge Corporation), Japan and Norway. An increasing number of investments in the agriculture sector is observed. Information obtained regarding CEPAGRI (*Centro de Promoção de Agricultura*, Agriculture Promotion Centre) shows that a total investment amount of US$ 386 million and employment of 13,800 workers is planned.

4.2 Forestry Sector

4.2.1 Existing Conditions of Forestry Sector

(1) Forest Area

Mozambique has excellent agro-climatic conditions for tree growth and faces the Indian Ocean, which gives it proximity to huge emerging markets such as India and China. According to the "Strategies for Reforestation," Mozambique has 36 million ha of arable land and presently only 14 million of them are used for agricultural production including industrial tree planting. Moreover, the strategies state that about 15 million ha of land is required to attain 100% national food self-sufficiency. Therefore, about 21 million ha of the land would be available for purposes besides domestic food production including industry tree planting.

The forest cover rates of the five provinces related to the Nacala Corridor Region are high so the potential for forestry is relatively high compared with other provinces. Hence, Nacala Corridor Region is characterised as an important area for forestry.

Table 4.2.1 Forest Cover of the Nacala Corridor Region and Mozambique

Province	Total Area (km^2)	Forest Area (km^2)	Forest Cover Rate (%)
Nacala Corridor Region	433,072	26,289	58.1
Cabo Delgado	*77,744*	*50,798*	*65.3*
Nampula	*77,917*	*23,846*	*30.6*
Niassa	*129,605*	*98,160*	*75.7*
Tete	*101,767*	*57,588*	*56.6*
*Zambézia**	*46,039*	*21,253*	*46.2*
Other Area	346,838	149,035	43.0
Mozambique	779,910	400,680	51.4

Note: * The area and rate shows the data of seven districts of Zambézia Province part of Nacala Corridor Region
Source : AIFM 2008, MINAG

(2) Production and Export

Timber produced in the Nacala Corridor Region is exported to international markets from Nacala Port or Pemba Port. Actually, there is no production from any planted forests, therefore, those forest products were made from natural forest stands through the issuance of forest concessions controlled by Provincial Services of Forest and Wildlife (SPFFB/DPA). The average annual timber exportation volume is 20,000 m^3 from Nacala Port and 30,000 m^3 from Pemba Port. Exportation volume from Pemba is growing in the context of the relatively abundant natural tropical forest resources in Cabo Delgado Province. Main market of the timber is China. Total volume of forest concessions is controlled and this volume will not expand much.

4.2.2 Policies and Programmes for Forestry Sector

(1) National Strategy for Reforestation

In order to promote economic development in the forestry sector of the country, the National Strategies for Reforestation was established in 2009. The overall objective of the strategies are to increase the contribution of the forestry sector in poverty reduction, and economic, social and environmental

development through the establishment of a modern, dynamic and competitive forest industry, and forestry based value chains. Some of the targets set forth in the strategies include establishment of at least one million ha of forest plantation by 2030, creation of at least 350,000 permanent jobs over the next 20 years, attraction of private investment for reforestation at one billion US$ and generation of an annual revenue at US$ 1,500 million per year through the export of manufactured forest products.

(2) International Cooperation Projects

Japan and Finland are supporting the forestry sector by technical assistance for capacity development, grant aid for forest preservation and a REDD+[1] related project (See Table 4.2.2).

Table 4.2.2 International Cooperation Projects on Forestry Sector

Type/Name of Project	Outlines
JAPAN	
Technical Assistance[1)]	✓ Dispatching one JICA expert as an advisor for strengthening forest management to DNTF (Directorate of Land and Forestry). ✓ Provision of a certain technology concerning the REDD+ system ✓ To strengthen forest management capacity, forest management in the community, and forest monitoring and evaluation.
Japanese Grant Aid: Forest Preservation Programme[2)]	✓ Grant Amount: JPY 700 million (approximately US$8.75 million) ✓ Provision of goods and services to strengthen Mozambique's forest management capacity (satellite image, PCs, sampling devices, severs, vehicles for surveys and management) ✓ Establishment of a sustainable forest resource information platform to monitor REED+
Project for Establishment of Sustainable Forest Resource Information Platform for Monitoring REDD+[3)]	✓ Project Period: 5 years programme from 2012 ✓ Pilot Provinces; Gaza Province and Cabo Delgado Province ✓ To develop a database system to serve as a forest resource information platform ✓ To develop a Monitoring, Reporting and Verification ✓ To estimate the Reference Emission Level or/ and Reference Level ✓ To Develop the necessary data-set for estimation of biomass and amount of carbon
FINLAND	
Forest Sector Support Programme in Mozambique[4)]	✓ Programme Area; Cabo Delgado, Nampula, Zambézia, Niassa ✓ Time Frame: August 2009-July 2014 ✓ Overall Objective: ➢ Forest management more sustainable ➢ DNTF, SPFFB with better capacity to manage the forestry and wildlife resources ➢ Wood industries producing quality products and managing their concessions well ➢ Forest research and training institutes with better capacity to implement studies on forestry and climate change related issues ➢ Communities and small-scale farmers benefitting from forest and wildlife related business opportunities
Source : 1)JICA website;http://gwweb.jica.go.jp/km/ProjectView.nsf/0/1624082515fa34ce492577ea007a02a3?OpenDocument 2) MoFA website; http://www.mofa.go.jp/mofaj/press/release/22/4/0428_09.html 3) JICA website; http://www.jica.go.jp/oda/project/1100607/index.html 4) Forest Sector Support Programme in Mozambique, Programme Document,Ministry for Foreign Affairs of Finland, March 2009, Unit for Southern Africa	

(3) Industrial Tree Planting (On-going and Planning Stage)

Industrial tree plantations in the Central and Northern Regions of Mozambique have been developed mostly since 2005 and tree plantation areas in Niassa Province are expanding every year. Other companies are already investing in the forestry sector in Niassa, and the majority of these companies are owned by Swedish shareholders (Global Solidarity Forest Fund). Furthermore, it is expected that one another centre of the industrial tree plantation will be foreseen in the central of Nampula, namely, district

[1] REDD+: (Reducing Emissions from Deforestation and Forest Degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries)

of Mecuburi, Ribaué, Nampula and Murrupula. Expected rapid growth of this sector is also to be seen in the north of Zambézia Province.

The on-going and planned tree planting projects in the Nacala Corridor Region cover areas of 10 thousand ha in Cabo Delgado Province, 126 thousand ha in Nampula Province, 825 thousand ha in Niassa Province and 466 thousand ha in Zambézia Province (See in the table below).

Table 4.2.3 Industrial Tree Planting Companies and Operations in the Nacala Corridor Region

Province	District	Company	Area (ha)		Tree Species	Investors
Cabo Delgado	n.a.	MedEnery	10,000	*1	Palm	MedEnergy of Italy
Cabo Delgado Sub-Total			10,000			
Nampula	Mecuburi, Ribaue, Nampla, Murrupula	Lurio Green Resource	126,000	*1	Eucalyptus, pine and acacia	Green Resources (Norway) and Norwegian Fund
Nampula Sub-Total			126,000			
Niassa	Lago, Sanga, Lichinga	Chikweti	140,000	*2	Eucalyptus and indigenous sp.	Global Solidary DITH(USA), GSFF(Sweden), Fundação Universitária, Sociedade de Móveis de Licungo, Diocese de Niassa, etc.
Niassa	Lichinga, Sanga, Lago, Ngauma, Muembe, Majune	Florestas de Niassa	210,000	*2	Eucalyptus and pine	Rift Valley Forestry, Malonda Fundation
Niassa	Ngauma, Mandimba	Florestal de Messangulo	100,000	*2	Eucalyptus and pine	GSFF
Niassa	Muembe	New Forests	87,000	*2	Eucalyptus and pine	New Forests Company (UK)
Niassa	Sanga	Green Resources Niassa	42,330	*2	Eucalyptus and pine	Green Resources (Norway)
Niassa	Lichinga	Florestas do Planalto	165,700	*2	Eucalyptus and pine	UPM (Finland)
Niassa		Malonda Fundation	80,000	*2	Eucalyptus and pine	Sweden & Mozambique
Niassa Sub-Total			825,030			
Zambézia	Ile, Namarroi	Portucel	173,327	*3	Eucalyptus	Grupo Portucel/Soporcel (Portugal)
Zambézia	Alto Molocue, Ile, Lugela	Ntacua Florestas	57,485	*4	Eucalyptus and pine	GSFF 53%, DITH 35%, Diocese de Niassa 10%, other diversified small-scale investors 2%
Zambézia	Gurue, Milange, Namarroi	Tectona Forests	117,874	*4	Teak	GSFF 53%, DITH 35%, Diocese de Niassa 10%, other diversified small-scale investors 2%
Zambézia	Lugela, Milange	Winnua, Lda	1,000	*3	n.a.	n.a.
Zambézia	Gurué, Milange, Namarroi	A.T.F.C. Madeiras e Agricultrura	116,074	*4	n.a.	n.a.
Zambézia Sub-Total			465,760			
Total			1,426,790			

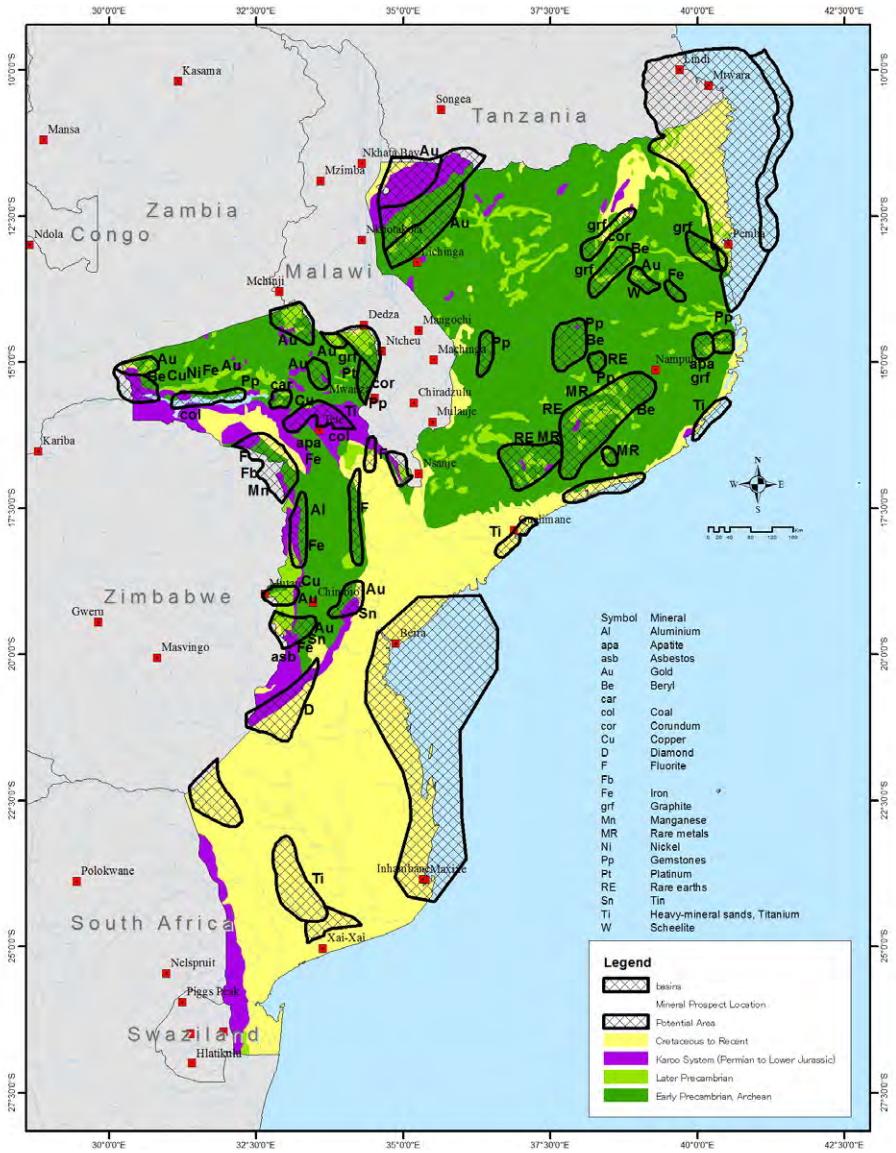
Source:
*1 : JICSA Study Team
*2 : Seminar on Forestry Plantation and Industry of Niassa, 6th August 2012, Forestry Association of Niassa
*3 : SPGC/Zambézia.
*4 : SPGC/Zambézia, included under process-proposal,

Note:
*GSFF : Global Solidarity Forest Fund is a Sweden-based, investment fund focused on the forestry sector in Mozambique. GSFF develops projects that provide returns to its investors and at the same time promotes community development and environmental integrity.
*DITH : Diversified International Timber Holdings (USA)

4.3 Mining Sector

4.3.1 Existing Conditions of Mineral Resources in Mozambique

Various kinds of mineral resources have been found in Mozambique, and the country is now an important producer of metal, accounting for a world share (2011) of 7% for titanium, 3% for zirconium, and 1% for aluminium. The export income share of Mozambique in 2011 consisted of aluminium (50%), natural gas (6%) and ilmenite (4%). The geology of Mozambique can be broadly classified into four categories as shown in the Figure 4.3.1, and each possesses different kinds of mineral deposits according to the geological features.



Source: JICA Study Team based on the Geological Map of Mozambique

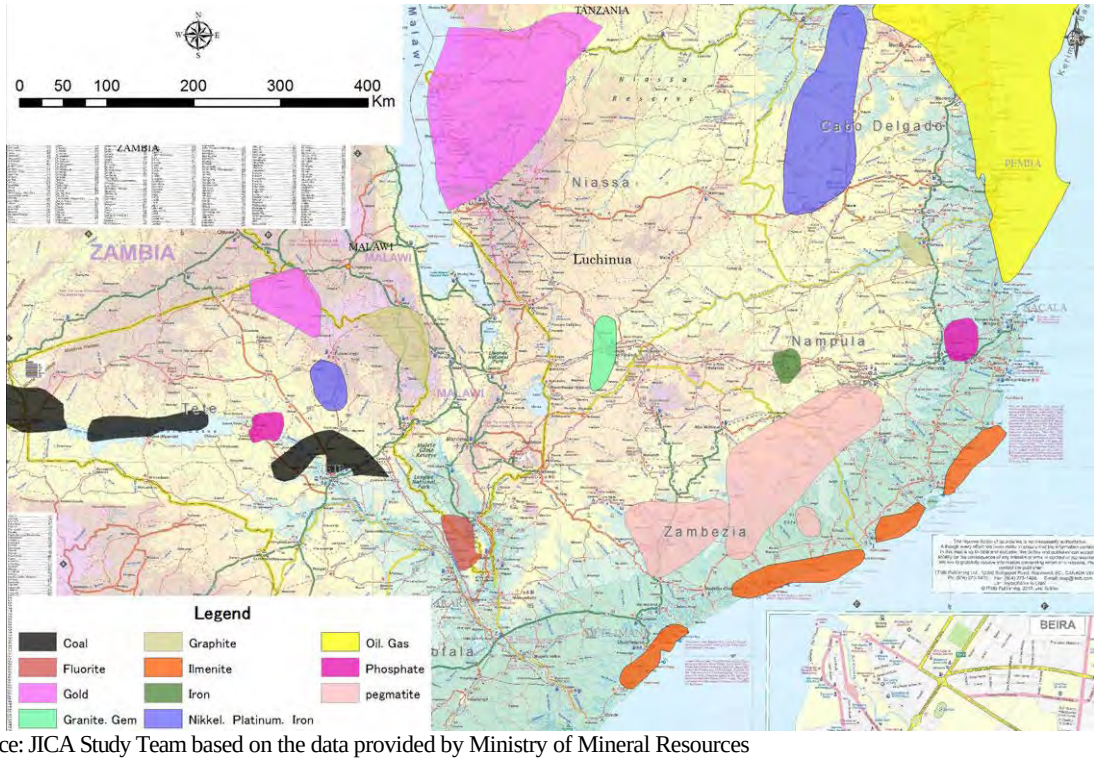
Figure 4.3.1 Mineral Resource Map of Mozambique

Mineral resources that are distributed in the Nacala Corridor Region, and financially feasible resources are, as energy resources, coal and natural gas; and as metallic minerals, mineral sand and pegmatite. Furthermore, phosphate, fluorite, and graphite are regarded as industrial mineral resources (industrial material) whose production will be developed in a short period. As for other resources, small-scale

mining and exploration in a few locations are currently being conducted for a kind of iron ore (magnetite) that has the potential for development. Also, gravel, granite, marble, and limestone similarly have potential for their development as mineral resources for construction, although only on a small scale. Precious stones such as beryl and corundum are also mined locally. Despite the fact that gold and diamonds are present, so far, none of the deposits have been found to be adequate for large-scale development. Newspapers reported that foreign investors sometimes implement the exploration works for metal resources. However the results were rarely reported. That means it is very difficult to find a large mineral deposit.

4.3.2 Existing Conditions of Mineral Resources in the Nacala Corridor Region

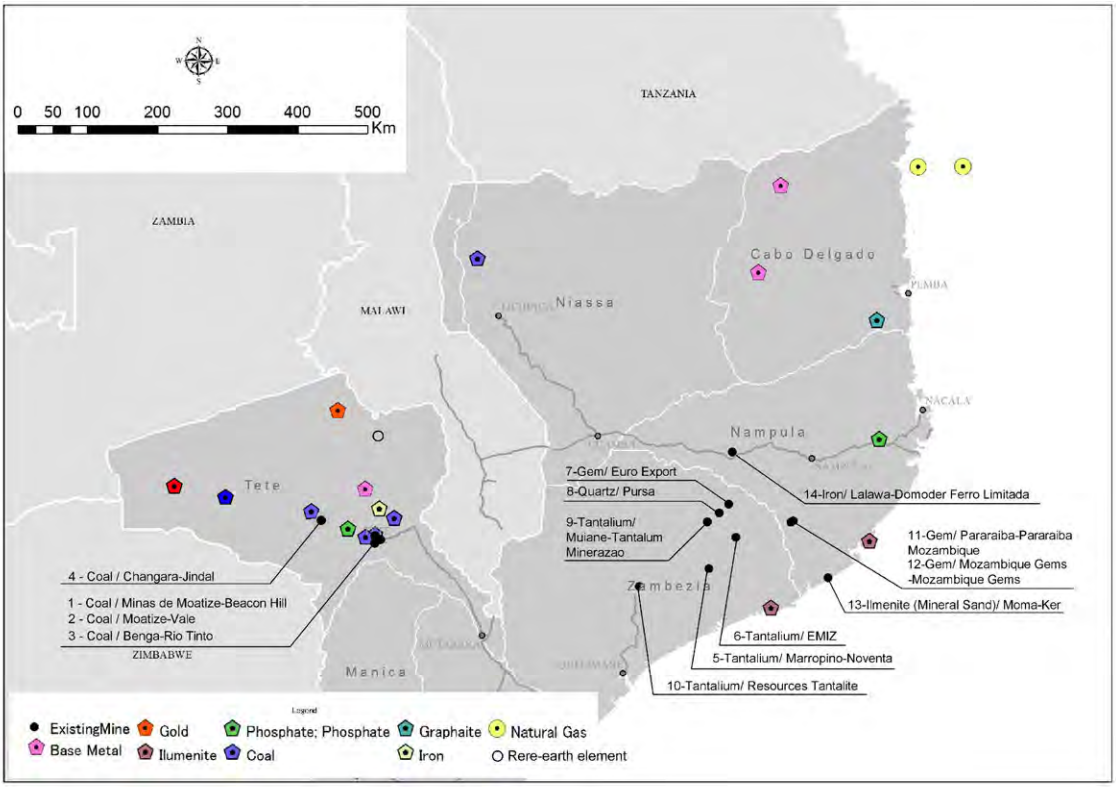
Figure 4.3.2 shows the distribution of mineral resources in the Nacala Corridor Region. Coal in Tete Province and natural gas in Cabo Delgado Province are those with high potential to meet the increasing global demand. Additionally, mineral sand, which exists along the coastal area from Cabo Delgado to Zambézia Province, contains ilmenite, rutile and zircon. In pegmatite, which is spread throughout Nampula Province and Zambézia Province, mineral resources such as tantalum, rare earth elements, and precious stone are produced. Other resources have been found as follows: phosphate in the Monapo area, which is located 100 km east of Nampula City; graphite in the Ancuabe area, 100 km south of Pemba City in Cabo Delgado Province; phosphate in areas 30 km northwest of Tete City in Tete Province; iron ore 30 km northeast of Tete City; and fluorite in southern Tete Province. Though distribution of gold has been found in an area called the "Niassa Gold Belt" in the northwest of Niassa Province, large-scale development is not feasible. A newspaper reported a company started the exploration works for gold at the north part of Cahorra Bassa Lake in western Tete Province. There is a possibility of the existence of nickel and copper in the broad areas in western Cabo Delgado Province. Similarly, distribution of metallic minerals such as nickel is expected in the areas 150 km north of Tete City.



Source: JICA Study Team based on the data provided by Ministry of Mineral Resources

Figure 4.3.2 Distribution of Mineral Resources in the Nacala Corridor Region

There are 14 mines in the Nacala Corridor Region that are currently operated on a commercial basis. Figure 4.3.3 and Table 4.3.1 show their locations and outlines of the projects. There are four coal mines, one mineral sand mine, four small tatalum mines, four small mines producing aquamarine and emeralds and one small iron-producing mine.



Source: JICA Study Team based on National Directorate of Mine and National Directorate, 2012

Figure 4.3.3 Location of Operating Mines in the Nacala Corridor Region

Table 4.3.1 Operating Mines in the Nacala Corridor Region

No.	Province	Commodity	Project Name	Owner of Project	Type	Production Capacity
1	Tete	Coal	Minas de Moatize	Beacon Hill (South Africa)	Sedimentary	2 million ton/year
2		Coal	Vale Moatize	Vale (Brazil)	Sedimentary	22 million ton/year
3		Coal	Benga	Rio Tinto (UK), Tata (India)	Sedimentary	10 million ton/year
4		Coal	Changara	Jindal (India)	Sedimentary	10 million ton/year
5	Zambezia	Tantalium	Marropino(closed as of 2013)	Noventa (Bailiwick of Jersey)	Pegmatite	*n.a.*
6		Tantalium	EMIZ	*n.a.*	Pegmatite	*n.a.*
7		Gem (tourmarine)	Euro Export	*n.a.*	Pegmatite	*n.a.*
8		Quarts	Purusa	*n.a.*	Pegmatite	*n.a.*
9		Tantalium	Muiane	Tantalum Mineracao e Prospeccao Limitada (Bailiwick of Jersey)	Pegmatite	25 ton/year (2010)
10		Tantalium	Resources Tantalite	*n.a.*	*n.a.*	*n.a.*
11	Nampula	Gem	Pararaiba	Pararaiba Mozambique (Mozambique)	Pegmatite	*n.a.*
12		Gem	Mozambique Gems	Mozambique Gems (Mozambique)	Pegmatite	*n.a.*
13		Ilmenite (titanim ore)	Moma	Kermare (Ireland)	Mineral Sand	800,000 ton (ilumenite), 50,000 ton (zircon), 14,000 ton (rutile) (2010)
14		Iron	Lalawa	Domodor Ferro Limitada (Mozambique)	Volcanics	*n.a.*

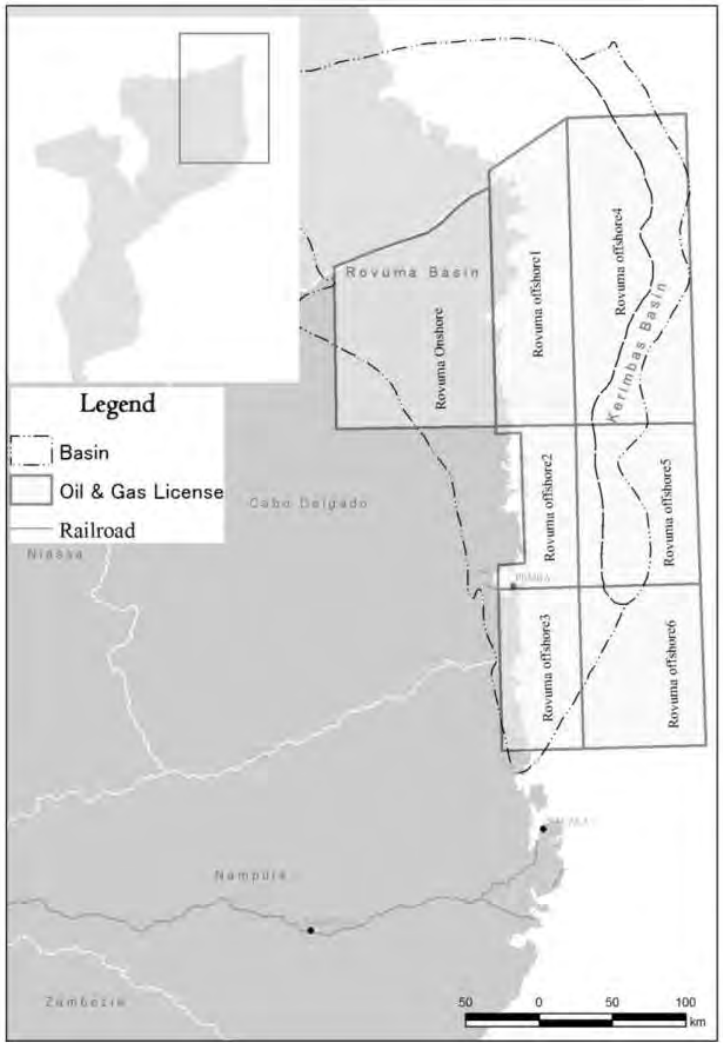
Source: JICA Study Team based on National Directorate of Mine, 2012

4.4 Natural Gas

4.4.1 Current Situation of Natural Gas Reserves in Mozambique

Mozambique natural gas production started in 2004 at Temane gas field by Sasol (South Africa). It was followed by Pande gas field in 2009. The remaining recoverable reserve of Pande-Temane gas fields is 2.7 Tcf, which is the balance of reserve after deduction of gas already extracted.

The recoverable reserve in Mozambique expanded greatly when huge natural gas fields were discovered in the offshore Rovuma Basin. For the Rovuma Basin, six offshore licences have been issued and one onshore licence has been issued as shown in Figure 4.4.1.



Source: JICA Study Team based on JOGMEC, etc.

Figure 4.4.1 Location of Oil and Gas Licences in Rovuma Basin

Anadarko Petroleum (US) and ENH have a concession for Area 1. ENI (Italy) and ENH has a concession for Area 4. To the south, Statoil (Norway) has concessions for Area 2 and 5, and Petronas (Malaysia) and ENH have concessions for Areas 3 and 6. In addition to the offshore areas, Anadarko Petroleum has a concession for an onshore area on the west side of Area 1, but the exploration result has not yet been revealed.

The current status of natural gas concessions is as shown in Table 4.4.1. Anadarko Petroleum, ENI,

Statoil and Petronas, which are the original concessionaires, still have the largest interest and responsibility for operation of their concession areas.

Table 4.4.1 Operators and Partners of Rovuma Offshore Concession Areas

Area (Year of Contract)	Operator	Partner	Status
Area 1 (2006)	Anadarko (USA) 36.5%	Mitsui (Japan) 20%; Videocon (India) 10%; Bharat Petroleum (India) 10%; PTT (Thailand) 8.5%; ENH (Mozambique) 15%	Discovered, under appraisal
Area 2 (2006)	Statoil (Norway) 40%	Tullow Oil (UK) 25%; INPEX (Japan) 25%; ENH (Mozambique) 10%	Under exploration
Area 3 (2009)	Petronas (Malaysia) 50%	Total (France) 40%; ENH (Mozambique) 10%	Under exploration
Area 4 (2006)	Eni (Italia) 50%	CNPC (China) 20%; Galp (Portugal) 10%; Kogas (South Korea) 10%; ENH (Mozambique) 10%	Discovered, under appraisal
Area 5 (2006)	Statoil (Norway) 40%	Tullow Oil (UK) 25%; INPEX (Japan) 25%; ENH (Mozambique) 10%	Under exploration
Area 6 (2009)	Petronas (Malaysia) 50%	Total (France) 40%; ENH (Mozambique) 10%	Under exploration

Source: JOGMEC, 21 May 2013, "Current Status of Exploration and Development in the East African Deep Sea Area", page 3

ICF International[2] analysed the discovered gas fields in Areas 1 and 4 in accordance with the information disclosed by the operators. Based on this analysis, ICF estimated initially-in-place[3] and technically and economically recoverable reserves of non-associated gas and natural gas liquid (NGL) as shown in Table 4.4.2. Recoverable reserves in Areas 1 and 4 are estimated as 75 trillion cubic feet (Tcf).

Ethane, propane, and butane are present; therefore, NGLs will be produced from the gases in Areas 1 and 4, according to ICF. The percentage of impurities, such as carbon dioxide (CO_2) and nitrogen (N_2) is very low. There is apparently no hydrogen sulphide (H_2S).

Table 4.4.2 Natural Gas Reserves in Areas 1 and 4 estimated by ICF

, Unit: Tcf

	Non-associated gas Initially-in-place	Non-associated gas recoverable reserve
Area 1	76.5	45.5
Area 4	48.5	29.1
Total	125.0	74.6

Source: The Future of Natural Gas in Mozambique: Towards a Gas Master Plan, 20 December 2012 (ICF International), Exhibit 4-18 on page 4-22

4.4.2 Natural Gas for Power Generation and Chemical Industries

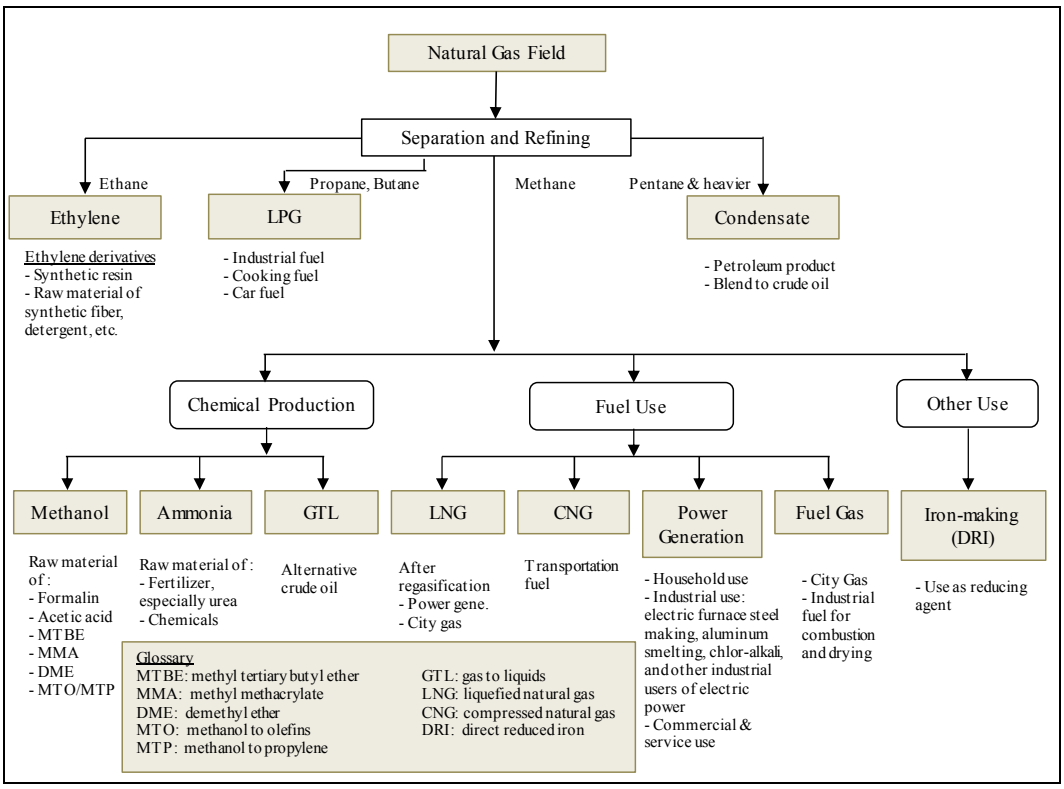
(1) Natural Gas Utilization

Figure 4.4.2 shows a systematic diagram of chemical products produced utilizing natural gas. They are natural gas related industries. Natural gas extracted from gas fields is separated and refined into methane, ethane, propane, butane, pentane and heavier components. Methane is the main component of natural gas, being used for raw materials including methanol, ammonia (mostly used for urea and other fertilizers) and gas to liquids (GTL); and for fuel, such as liquefied natural gas (LNG), compressed natural gas (CNG), thermal power plants, city gas and industrial gas. Direct reduction iron (DRI) plants reduce

[2] Based on "The Future of Natural Gas in Mozambique: Towards a Gas Master Plan(20 December 2012)" prepared by ICF International, section 4.2.2 Rovuma Basin Discoveries

[3] Amount of oil and gas geologically estimated in a specific oil and gas field

iron ore using natural gas.



Source: JICA Study Team

Figure 4.4.2 Systematic Diagram of Natural Gas Utilization

(2) Liquefied Natural Gas

Natural gas is transformed into liquefied natural gas (LNG) by liquefaction at an ultralow temperature of minus 162 degrees centigrade. The volume of natural gas is compressed to 1/600 by liquefaction so as to be suitable for long distance transport by tanker. According to ICF[4], if a transport distance is shorter than 3,000 km, the transport cost of natural gas by pipeline is lower than that of LNG. While, if it is longer than 3,000 km, the surface transport cost of LNG is lower than that by pipeline.

1) International Trade in LNG

Most LNG is traded globally, since it is a form of natural gas suitable for long distance mass transportation. Exports by the Middle East account for more than 40% of the world exports, and those particularly by Qatar are the largest in the world accounting for 32%. The second largest LNG exporting region is the Asia Pacific Region, accounting for 29% of the world exports. The third one is the Africa Region that includes Nigeria and Algeria, accounting for 17% of the world exports.

On the other hand, nearly 70% of LNG imports are concentrated in the Asia Pacific Region. In particular, Japan is the largest LNG importing country in the world, accounting for 36% of world LNG imports. In addition to Japan, there are other LNG importing countries in Asia Pacific Region, including South Korea, India, China, Taiwan and Thailand. As stated earlier, companies from those LNG importing countries participate in development of Rovuma offshore concession areas.

[4] Based on "The Future of Natural Gas in Mozambique: Towards a Gas Master Plan (20th December 2012), Executive Summary Exhibit" prepared by ICF International, page ES-20 (page ES-41)

2) Emergence of LNG from Nonconventional Natural Gas

LNG is a clean fuel with relatively small CO_2 emission. The role of LNG is quite likely to further expand to meet growing demand in the world. Under such circumstances, developments of nonconventional natural gas, such as shale gas, will be stimulated in addition to conventional natural gas.

3) LNG Projects in Mozambique

In Mozambique, LNG projects are scheduled to liquefy natural gas from Areas 1 and 4 in Rovuma Basin for exporting to LNG consuming countries. LNG plants with a total production capacity of 20 million tons per year will be constructed in Palma in Cabo Delgado Province. Construction of the plants will be divided into the first and second phases. Each phase will have two of five million tons per year trains.

Front end engineering and design (FEED) for LNG plants and offshore gas production facilities, were ordered in December 2012. It was said that the estimation for construction cost will be completed based on FEED by the beginning of the second quarter in 2014. Taking all the considerations including cost and LNG market into account, the final investment decision of the first phase LNG project will be made. However, as of 22nd of March 2015, it seems that such investment decision was not made.

4.4.3 Mozambique Natural Gas Master Plan

The Government of Mozambique submitted the Natural Gas Master Plan to the Council of Ministers in November 2013 and it was approved in June 2014. One of the basic principles of this master plan is that natural gas of the country should be utilized in a sustainable manner to satisfy development needs of Mozambique. LNG production is the most important objective of production of natural gas from the offshore Rovuma Basin because the production of LNG has the highest netback value to natural gas. When more LNG is produced using the natural gas from Rovuma Basin, a less volume of natural gas would be available to the domestic use of natural gas in Mozambique.

Under the Concession Contracts, the Government of Mozambique has the right to take both royalty gas and profit gas in kind and/or in cash. However, the volume of royalty gas that the government is supposed to obtain is very limited and the volume of profit gas for Mozambique has not yet been well known. As a result, the volume of natural gas that Mozambican Government is to own is not enough to promote development of chemical industries utilizing natural gas. Therefore, it is necessary for Mozambique to rely on the natural gas to be provided by private natural gas holders, such as Anadarko, Mitsui and ENI.

4.5 Processing Industry Sector

4.5.1 Existing Conditions of Processing Industry Sector

There are 3,850 processing industries in the Nacala Corridor Region, accounting for 44% of those in Mozambique as shown below. Most of them (95%) are micro industries with fewer than 25 employees and capital of less than US$ 25,000. Province-wise, Nampula is the largest with 1,224, followed by Zambézia (868), Tete (778), Niassa (540) and Cabo Delgado (440).

Table 4.5.1 Number of Existing Processing Industries by Size in 2007

Area	Micro	Small	Medum	Large	Others*	Total
(In number)						
Mozambique	*7,851*	*579*	*58*	*9*	*223*	*8,720*
Study Area	3,645	170	28	1	6	3,850
Other Provinces	4,206	409	30	8	217	4,870
(In %)						
Mozambique	*90.0%*	*6.6%*	*0.7%*	*0.1%*	*2.6%*	*100.0%*
Study Area	94.7%	4.4%	0.7%	0.0%	0.2%	100.0%
Other Provinces	86.4%	8.4%	0.6%	0.2%	4.5%	100.0%
Mozambique	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Study Area	46.4%	29.4%	48.3%	11.1%	2.7%	44.2%
Other Provinces	53.6%	70.6%	51.7%	88.9%	97.3%	55.8%

Source: MIC, 2007, Industrial Policy & Strategy of Ministry of Industry & Trade
* Enterprises not classified

The value-added generation in the processing industry sector in the Nacala Corridor Region in 2011 was MT 4,545 million in 2003 constant prices, which was 19.3% of that in all of Mozambique. Value added produced by one industry is MT 1.1 million per year in Nampula, which is about 28% of that in the other provinces at MT 3.9 million per year. Province-wise, Nampula produced the largest amount of value-added at 2,686 million (59.1% of the Nacala Corridor Region), followed by Zambézia (MT 814 million, 17.9%), Tete (MT 420 million, 9.2%), Cabo Delgado (MT 408 million, 9.0%) and Niassa (MT 218 million, 4.8%). The processing industry in the Nacala Corridor Region has been constantly growing at an annual average rate of 9.8% per year since 1997.

Table 4.5.2 Value Added of Processing Industry by Province in 2011

Province	Value Added (million meticais in 2003 price)	Share (%)	
		In the Nacala Corridor Region	In Mozambique
Nacala Corridor Region	4,545	100.0	19.3
Niassa	218	*4.8*	*0.9*
Cabo Delgado	408	*9.0*	*1.7*
Nampula	2,686	*59.1*	*11.4*
Zambezia	814	*17.9*	*3.5*
Tete	420	*9.2*	*1.8*
Other Provinces	19,028	-	80.7
Mozambique	23,573	-	100.0

Source: INE

4.5.2 Characteristics by Province[5]

(1) Nampula Province

The processing industry in Nampula Province is characterized by the existence of some large scale industries such as cement factories, agro-industry including a wheat milling factory and cashew nut factories, and a plastic factory, many of which are concentrated along the national road No.1, near Nacala City and near Nacala Port. Nampula Province is the biggest agro-processing production province in the country. The main production areas are Mogovolas, Angoche and Moma. The destinations of cashew nut exports are India, Malawi and Singapore, mostly in the form of raw cashew nuts and EU, USA and India in the form of shell-removed or packed cashew nuts.

In Nacala Special Economic Zone (SEZ), the following industries have been investing from 2009 to 2012.

Table 4.5.3 Investments in Nacala SEZ

Year	Number of Projects	Total Inestment Value (US$ million)	Number of Local workers
2009	11	151	4,679
2010	22	218	2,944
2011	8	132	445
2012	27	1,077	6,260
Total	68	1,578	14,328

Source: GAZEDA, 2012

There is a big foreign investment project under negotiation. A Brazilian company is planning a paper and pulp factory in Nampula Province with an investment amount of US$ 1,200 million, employing 1,300 workers.

(2) Cabo Delgado Province

In Cabo Delgado Province, there are many factories of various sizes located along the national road No.1 from Pemba City. Several large factories such as a seafood processing factory, marble factory and furniture factory have stopped operation due to the past war, shortage of funds, trouble in management and technical problems.

There are the wood processing industry, agro-industry and stone processing industry in Cabo Delgado Province. Chinese and Hong Kong's two companies concluded concession contracts with the government and recently started to export sawn logs, semi-processed logs, and chips to China and Hong Kong with a volume of 50 to 70 containers per year from Pemba Port for export. While there are furniture manufacturing enterprises, most of them are very small minor-scale family operated firms. Marble is produced near Pemba and the local company constructed a marble processing factory for manufacturing wall and floor tiles in the suburbs of Pemba City. This factory, however, has put off starting operation due to lack of technical experience and the shortage of capital. This province has cotton fields in Montepuéz where one company named Plexus from South Africa is producing cotton, extracting seed and exporting abroad. There is no factory to produce further high-valued processed cotton products. Cabo Delgado Province has no seafood processing factory at present, although it has a good fishery sea-field for shrimp,

[5] Information from Study Team member's hearings and site visits in 2012.

cuttlefish, oyster, tuna etc., near Mocimboa da Praia. In the past there was one big shrimp processing factory located along the sea coast near Pemba. It is closed due to conflict among the joint venture partners, lack of management and frequent black-out of electricity.

The government has a conceptual plan to establish an industrial park with an area of 18,000 ha in Palma capitalizing on the planned off-shore natural gas. Down-stream industries such as methanol, ethylene, HDPE, LDPE, ammonia, and urea are planned.

(3) Niassa Province

In Niassa Province, most of the agro-products such as maize and flour milling, juice, sunflower-seed oil and jam are being produced as family-units by a few persons and sold in 20 littre cans at small local markets. Six companies have obtained permission for forestry plantation with a total area of 500,000 hectares, while total developed forestry plantation area was about 30,000 hectares as of the end of 2011. No actual commercial wood processing industry exists at present. There are plans to start wood processing in the future such as furniture or building materials. A Finnish company is said to be negotiating a paper and pulp factory project with the Mozambican government, with an investment amount of US$ 1,700 million and employing 6,000 workers.

(4) Zambézia Province

There are a number of industries in Zambézia Province whose products are exported such as tea for the USA, Kenyan and South African markets, bean products for India, cotton products for the EU, and cashew nuts for India and UK. Other factories for the domestic market include rice mills, a confectionary factory, coconut processing factory, maize mills, a bean oil factory, a plastic factory and a wood furniture manufacturing enterprise. The projects on-going and planned include factories for sugar, fruit juice, bean oil, rice processing and cement.

(5) Tete Province

In Tete Province, some agro-processing industries exist in such areas as processing of cereals in Angónia, tobacco processing and cotton processing in Tete. Tobacco and cotton are produced for export. Tobacco is produced by Mozambique Leaf Tobacco employing 1,720 workers. The tobacco produced is exported to South Africa, Vietnam, USA, Canada, China and the EU. Some industries related with coal production are emerging producing such products as coated steel pipes for mining purposes, plastic tube for drainage and auto repairing.

4.6 Logistics Sector

4.6.1 Existing Conditions of Logistics Sector

(1) Logistics Performance Index of Mozambique

Mozambique ranked 136th in the Logistics Performance Index 2010[6] among 155 countries (Table 4.6.1). This is slightly better than Zambia but worse than all other adjacent countries.

Table 4.6.1 Logistics Performance Index of Mozambique (2010)

	Mozambique	
Overall LPI	score	2.29
	rank	136
Customs	score	1.95
	rank	145
Infrastructure	score	2.04
	rank	124
International shipments	score	2.77
	rank	87
Logistics competence	score	2.2
	rank	130
Tracking & tracing	score	2.28
	rank	135
Timeliness	score	2.4
	rank	150

Source: World Bank Web Page (http://info.worldbank.org/etools/tradesurvey/mode1b.asp)

While shipment is ranked higher than others, customs are evaluated relatively worse than other items. The index is generally bad in all items and shows there is much room for improvement.

(2) Strategic Location of Mozambican Ports on African Continent

Mozambican ports are in strategic location on the south eastern part of the African continent, located closer to Middle East and Asia than other part of Africa. Mozambican ports and transport corridors also function as the gateway for inland countries of Malawi, Zambia and Zimbabwe.

4.6.2 Institutional Framework

(1) International Agreements

1) South African Development Community (SADC)

As a regional cooperation organisation, SADC aims at lowering institutional and physical barriers within SADC countries for trade facilitation. SADC allows cargo to pass through a transit country without paying duty. SADC once prepared a "Regional Chain Custom Bond" system, which is a custom bond system commonly effective for two or more countries' customs.

2) Common Market for Eastern and Southern Africa (COMESA)

Common Market for Eastern and Southern Africa (COMESA) is a regional economic cooperation body consisting of 19 member states in eastern and southern Africa. In the sectors of trade facilitation and transport, various multilateral negotiations have taken place within the framework of COMESA rather than SADC. Later, SADC follows and harmonizes its standards and regulations to those of COMESA. Mozambique was once a member of COMESA from 1994 to 1997, however, at present it is only a

[6] Mozambique was not included in the 2012 version.

member of SADC. Therefore, there is a little disadvantage for Mozambique not being a member of COMESA.

3) Bilateral Agreement with Neighbouring Countries

Based on the SADC agreement and protocol, bilateral agreements have been prepared with adjacent countries. For example, Mozambique and Zambia agreed on the "Bilateral Agreement on the Carriage of Goods by Road Transportation." This agreement allows transportation companies of the adjacent country to conduct operations based on the issuance of a permit. Similar agreements have been made and revised as necessary with other adjacent countries, namely South Africa, Zimbabwe and Malawi.

(2) Government Sector

1) Ministry of Transport and Communication (MTC) and related Organisations

At the national level, the Ministry of Transport and Communication (MTC) and the Ministry of Public Works, Housing and Water Resources (formerly known as Ministry of Public Works and Housing, MOPH) are working for the logistics sector.

The MTC is working as a policy maker and regulatory body that prepares transportation policy and supervises agencies of each mode. Under the MTC, CFM (Mozambique Railways) deals with railways and ports, and ADM (Mozambique Airports) operates airports. Under the Ministry of Public Works, Housing and Water Resources, ANE (National Administration of Roads) handles all aspects of road matters.

Commercial transporters should be licensed according to the following categories and the respective licensing authorities are responsible for supervising them.

Table 4.6.2 Types of Transportation Business Licences

Categories	Business Areas	Organisations to which Applications are Submitted
Type A	International and inter-urban passengers and cargo Rent-a-car	MTC
Type B	Inter-district, emergency, and national cargo	Provincial department of transport and communication
Type C	Urban transportation, school bus, semi-collective and taxi	Municipality
Type D	School bus, semi-collective, taxi and mixed	Province / District

Source: MTC

2) INAV

INAV *(Instituto Nacional de Viação*, National Institute of Transport) operates under the MTC, (Decree 3/2006 of February 28 2006) and is responsible for road safety policy and its implementation, including regulating drivers and vehicles, road regulations such as speed limits, and the collection of road safety data. It also handles the following tasks:

- Transportation safety
- Vehicle registration
- Issuance of drivers' licences
- Vehicle inspection

3) INATTER

The MTC is reorganising INAV into INATTER (*Instituto Nacional dos Transportes Terrestre*, National Institute of Land Transport) under the Decree No.32/2011. As of May 2013, only the top level of executives was formally appointed and INAV is still operating. Thus, the reorganisation is still in process. In addition to INAV's function, INATTER works as a regulator of railway sector. It is to succeed the railway regulatory function of CFM. INATTER is to coordinate the international transportation rules to be adopted in the countries. The rules included the driving licences, axle weight and vehicles.

4) Customs

The Customs General Directorate belongs to the Mozambique Revenue Authority. The Northern Regional Department of Customs operates all the custom posts at the borders, ports and international airports.

The customs offices at border posts in the Nacala Corridor Region are mostly housed within one room in the immigration office. However, they perform all the functions of customs processing including payment.

Manual work of customs operations takes time and is often inefficient. Therefore, the introduction of a computerised system has been one of the necessary reforms of customs operations for a long time. Once, in the 2000s, the introduction of ASYCUDA (Automated System for Customs Data) was examined but was not realised. Currently, large customs offices use TIM. On the other hand, customs at border posts keep their logs manually and send them to the headquarters by the form of electrical data regularly.

(3) Private Sector

1) FEMATRO

As a national organisation of private transporters, the Mozambican Federation of Association of Transporters (FEMATRO) represents the interest of the logistics business community. FEMATRO was founded in 2002 and has 25 member associations. Member associations are basically regional and specialise in passenger and/or cargo transport. As members of FEMATRO, local associations in the Nacala Corridor Region have been organised as follows:

- ATPZ: Zambézia Province
- ATROTE: Tete Province
- ASTRA: Nampula Province
- Niassa Association of Transporters: Niassa Province

Among these, ASTRA (Association of Transport, *Associação de Transporte* (Nampula)) is working for 520 member transport companies in Nampula Province. Out of which 470 member companies are cargo transporters and the other 50 handle with both cargo and passengers. There are 250 transport companies based in Nampula City.

In order to be licensed, transport operators must be affiliated with an association so the organisation rate is very high. In addition, the association functions as a conduit between public and private sectors.

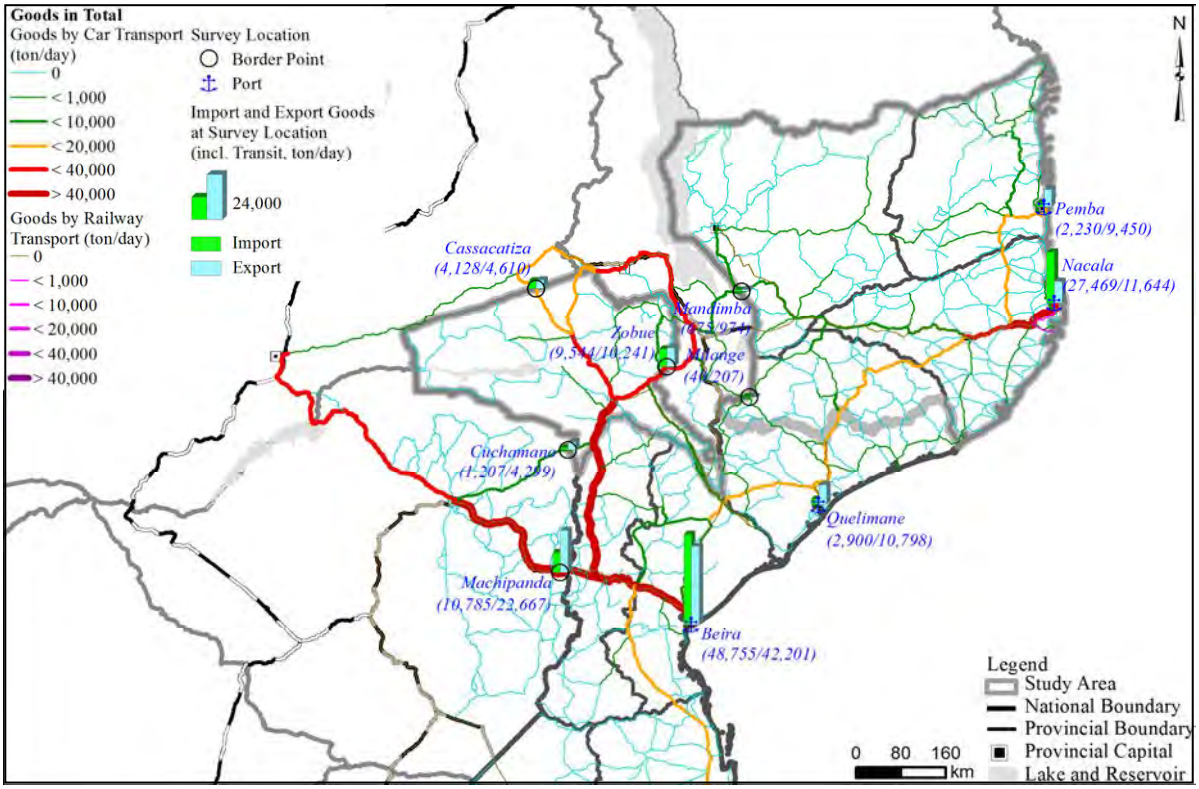
2) Private Transporters

In order to receive cargo operator licences, cargo transporters are required to have more than three trucks and to be associated with a regional transport organisation such as ASTRA. Therefore, each transporter

operates as a company, and not as an individual. Fleet sizes differ from three to in the hundreds. FEMATRO estimates 650 trucks are operating in Nampula Province for international transportation.

4.6.3 Transportation and Logistics Network

The overall transportation network and its cargo volumes transported on roads in the Nacala Corridor Region (in 2012) is shown in Figure 4.6.1. The cargo volumes were obtained by a logistics survey conducted by the JICA Study Team in 2012. It shows relatively developed roads in densely populated areas and a segmented network of roads and railways.



Source: JICA Study Team based on Logistics Survey

Figure 4.6.1 Logistics Networks and their Volumes

4.6.4 Cargo Volume

(1) Cargo Volume by Mode

Over the past eight years, logistics modes in Mozambique have experienced a drastic transition. In 2002, railways transported more than twice the cargo of roads, but this has completely turned around in recent years. Roads transported more than three times the cargo of railways in 2010. This means that the road sector is absorbing all the increasing transport demand, which is growing by an annual rate of 14%. At the same time, the importance of railways still remains.

(2) Cargo Origin-Destination by Provincial Level

Based on the result of Logistics Survey, the cargo volume of each origin-destination pair on the trucks and railways was developed using the raw data obtained from a road side OD interview and railway statistics.

Table 4.6.3 Origin and Destination of Cargo Transport (ton/day)

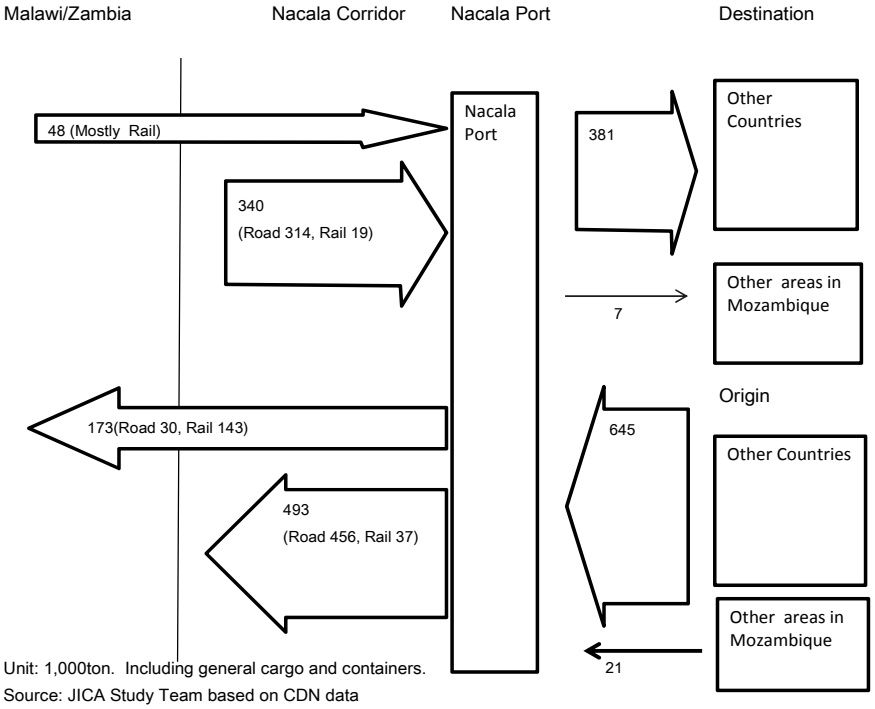
Origin \ Destination		01.Niassa			02.Cabo Delgado		03.Nampula			04.Zambezia		05.Tete	06. Manica	07.Sofala		08. Maputo	09.Other Mozam	10. Tanzania	11. Malawi	12. Zambia	13.Zimbabwe	14.South Africa	Total
		Lichinga City	Cuamba District	Other Niassa	Pemba Port	Other Cabo Delgado	Nampula City	Nacala Port	Other Nampula	Quelimane Pt. & City	Other Zambezia			Beira Pt.	Other Sofala								
01.Niassa	Lichinga City		364	146		783	66	188	65		17		24	243		300							2,195
	Cuamba District	370	211	713			112	90	90	20	81	429		20		76			59			15	2,287
	Other Niassa	273	975	117		271	187		51	1	4	304		46		100							2,330
02.Cabo Delgado	Pemba Port					104	36																141
	Other Cabo Delgado	911		60	194	8,204	179	2,058	888	18		1				223							12,736
03.Nampula	Nampula City	140	49	211		2,010	261	2,987	599	819	514	285	114	157	58	196		75	3				8,479
	Nacala Port	265	90	98		565	4,825	676	2,047	207	514	241	24	454	58	596		1	510			22	11,191
	Other Nampula	938	312	142		5,937	5,076	5,052	3,139	1,275	1,139	709	173	195	34	601			90		27	84	24,924
04.Zambezia	Quelimane Pt. & City	7		12		188	409	115			470	212	12	505	212	51			687	12		6	2,900
	Other Zambezia	37	3	47		80	345	1,234	75	6,604	233	128	249	746		54			64				9,898
05.Tete			102				69	18		41		829	677	9,357	728	983			113	46	953	861	14,776
06.Manica		160	37	183		85	99	379	12	24		581	115	2,083					33		151		3,942
07.Sofala	Beira Pt.	88	16	30		125	474	293		1,001	100	2,614	1,098	582	472	502	57		19,493	12,516	8,832		48,292
	Other Sofala						194	181		43	2	528	239	3,545	455		115		505	45			5,853
08.Maputo		444	57	13		772	918	533	146	444	112	756		281	380				14		46		4,916
09.Other Mozambique		10					18	11		24		51		1,360	69								1,544
10.Tanzania							36	3	10	9													58
11.Malawi			197			108	56	290	37	142	21			13,079	445	14	1		159		3,324	4,477	22,349
12.Zambia														4,476							491	394	5,362
13.Zimbabwe										125		236	43	5,248					972	49			6,673
14.South Africa						465	77	90	150			598		212					2,810		83		4,485
Total		3,643	2,413	1,772	194	19,697	13,435	14,198	7,308	10,799	3,208	8,502	2,768	42,592	2,912	3,695	173	76	25,513	12,667	13,907	5,860	195,332

Note: Road+Railway :Road Only
No link in the study area

Source: JICA Study Team based on Logistics Survey

(3) Cargo Flow from/ to Ports

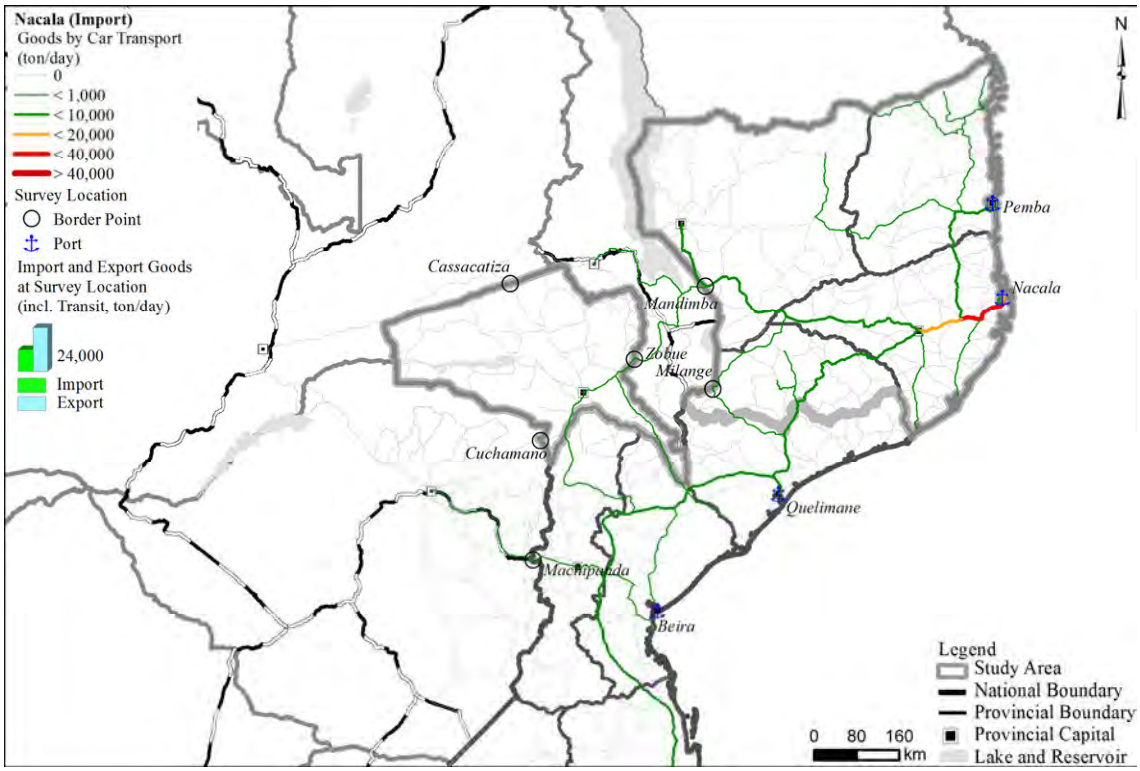
The figure below illustrates the basic cargo flow through Nacala Port.



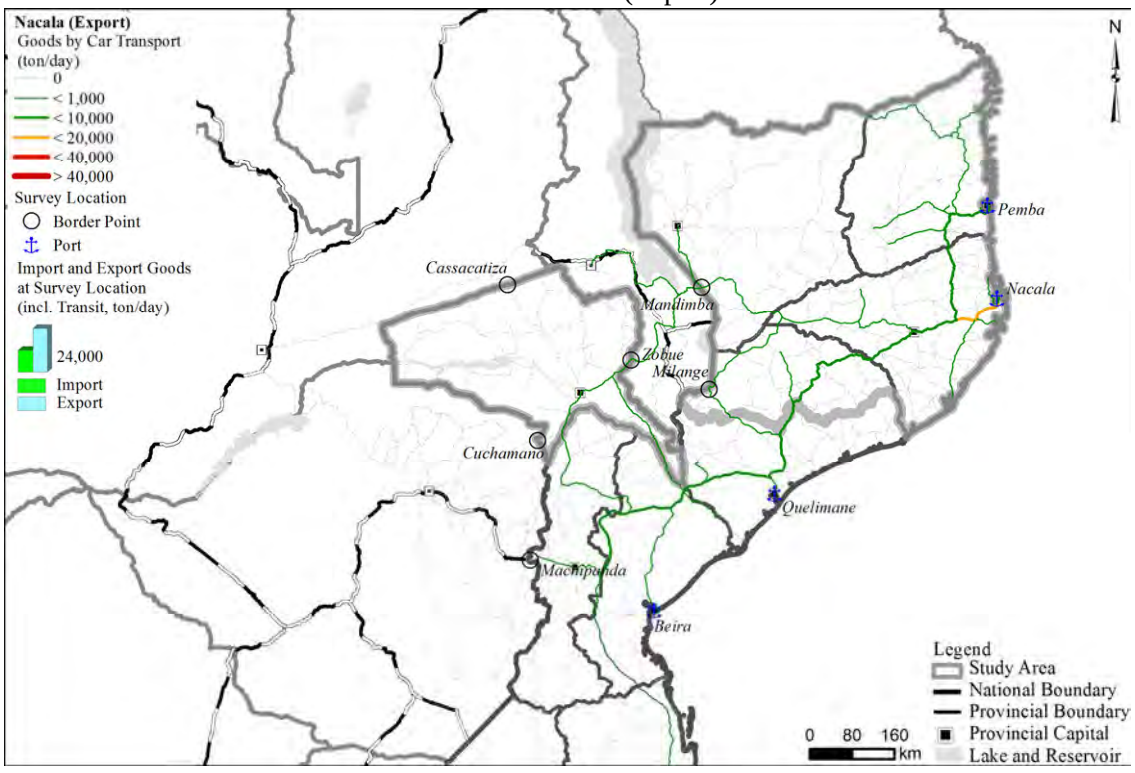
Unit: 1,000ton. Including general cargo and containers.
Source: JICA Study Team based on CDN data

Figure 4.6.2 Cargo Flow Through Nacala Port

Although the Nacala Corridor Region has both roads and railways, the shippers' mode preference is strongly prevalent. Transit cargo shippers prefer railways to roads and 86% is carried by railway. On the contrary, domestic cargo shippers prefer roads to railway and only 7% is carried by railway.



From Nacala Port (Import)



To Nacala Port (Export)

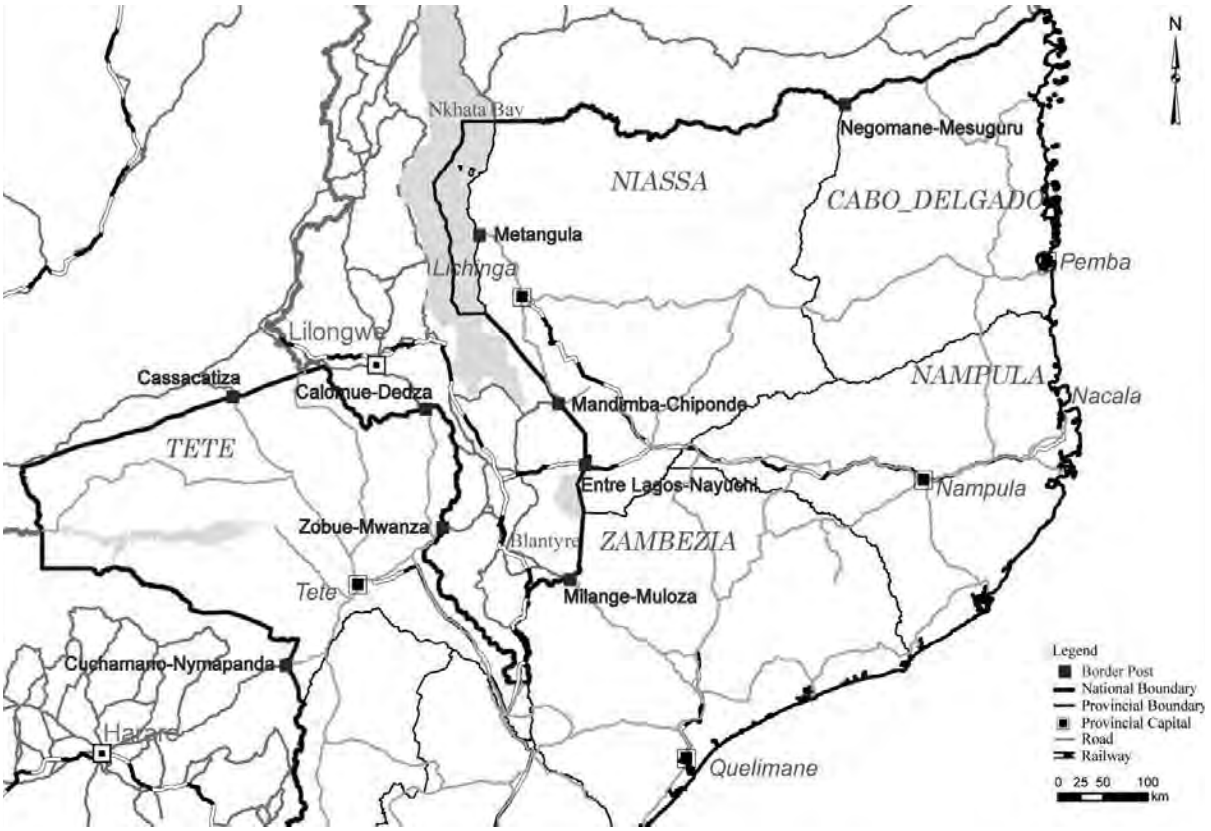
Source: JICA Study Team based on Logistics Survey

Figure 4.6.3 Cargo Flow on Roads from/to Nacala Port

The figures above show that Nacala Port is collecting and distributing goods to most parts of the Nacala Corridor Region. The farthest area of service reaches to Sofala and Manica Provinces. The volume of the cargo on the roads in general is lower than the cargo flow from and to Beira Port.

4.6.5 Customs Operations and Border Facilities

The Nacala Corridor has several border posts with adjacent countries (Figure 4.6.4). Basically, the immigration and customs divisions each have an office and the transporter is required to have their documentation processed at least twice in each country. Vehicles are required to obtain temporary export and import permission.



Source: JICA Study Team

Figure 4.6.4 Major Border Posts in the Nacala Corridor Region

The customs operations at land borders are quite different from those at ports. The customs offices at the border posts in the Nacala Corridor Region are mostly housed within one room in the immigration office. However, they perform all the functions of customs processing including payment.

(1) Customs Operation Hours

Land borders are open for a limited time of the day. Many land borders in the Nacala Corridor Region are open from 6 am to 6 pm. Logistics operators should consider the border crossing time to fit the hours. Many of the customs offices in the Nacala Corridor Region have only one customs officer on duty and are not operational at lunch time. It is necessary for the borders to operate continually during the operational hours.

(2) Customs Passing Hours

Most of the transport operators apply to customs for clearance on site. This means that there is quite a high risk to increase the passing time. Table 4.6.4 shows the passing time for each customs post.

Because a reduction in processing time is important to facilitate logistics, one of the solutions is to stop at one location to process the documentation for both countries at the same time. OSBP (One Stop Border Post) is a facility housing both countries' border control agencies in one building.

Table 4.6.4 Land Border Posts and Average Customs Passing Hours

Province	Mozambican Side	Foreign Side	Foreign Country	Open Hours	Open Days	Number of Staff		Average Passing Time for Cargo Truck (hr)	Note
						Mozam-bican Side	Foreign Side		
Cabo Delgado	Namuiranga	Mwambo	Tanzania		7days/ week				Via Rovuma River. No public ferry.
	Negomane	Mesuguru			7days/ week				Unity Bridge
Niassa	Cobue	Malawi Port	Malawi		7days/ week				Via Lake Niassa
	Metangula	Malawi Port			7days/ week				No ferry operational
	Mandimba	Chiponde		6am-6pm	7days/ week	13	13	1.2	
	Entre Lagos	Nayuchi			7days/ week				Also with railway
Tete	Zobue	Mwanza		6am-9pm	7days/ week	14		0.3	
	Calomue	Dedza		6am-6pm	7days/ week				
	Cuchamano	Nyamapanda	Zimbabwe	6am-8pm	7days/ week	13		1.5	
	Cassacatiza		Zambia	6am-7pm	7days/ week	6		18.7	
Zambezia	Milange	Mulanje	Malawi	6am-6pm	7days/ week	8	8	2.0	
	Mutuara	Nsnaje			7days/ week				
Manica	Machipanda	Machipanda	Zimbabwe	6am-8pm	7days/ week	21		1.9	

Source: JICA Study Team based on Logistics Survey and other sources

(3) One Stop Border Posts

The African Development Bank (AfDB), on behalf of the New Partnership for Africa's Development (NEPAD) financed and managed NEPAD- Infrastructure Project Preparation Facility (NEPAD-IPPF) covering the costs of conducting the feasibility studies, engineering designs, bidding documents and development of legal frameworks for the Malawi/Zambia and Mozambique/Malawi One Stop Border Posts (OSBP) along the Nacala Corridor.

The project is going to prepare to undertake consultancy services for feasibility studies and detailed designs in readiness for the construction of two OSBPs / axle load control facilities between Malawi and Mozambique (Chiponde/Mandimba) and between Zambia and Malawi (Mwami/Mchinji). The design of the access roads and layout plan has been completed and the construction is expected to start.

4.7 Tourism Sector

4.7.1 Existing Conditions of Tourism Sector

(1) Tourist Arrivals in Mozambique

International visitor arrivals in Mozambique increased from 1.1 million people in 2006 to 1.8 million in 2010, and the number exceeded 2.0 million in 2011. The international visitor arrivals nearly doubled in five years. The number of holiday tourists is also increasing in Mozambique. It recorded 0.22 million persons in 2006 and 1.1 million in 2010. On the other hand, the number of visitors for other purposes such as conferences and business and visiting relatives and friends, has not changed so much in recent years. A half of the international visitors came from South Africa. Malawi and Zimbabwe which share border with Mozambique come in the 2nd and 3rd positions, followed by Swaziland and western countries such as UK, USA, Portugal and Germany.

The numbers of international guest arrivals and international guest bed nights, which are recorded at accommodations, have also increased recently in Mozambique. In the Nacala Corridor Region, although the number of international guest arrivals has not changed greatly from 26,333 (2006) to 25,979 (2011) the number of international guest bed nights has increased from 41,083 (2006) to 57,268 (2011). It can be said that approximately 10% of the international visitors to Mozambique visit the Nacala Corridor Region. Cabo Delgado had the most international guest arrivals in the Nacala Corridor Region accounting for 39% of the five provinces related to the Nacala Corridor Region, followed by Tete at 24% in 2011. However, in terms of international guest bed nights, Tete had the highest number in the Nacala Corridor Region accounting for 37% followed by Cabo Delgado with 30%. The number of foreign guest bed nights in Tete increased by more than five times between 2006 and 2011. This can be explained as although the number of visitors to Tete is less than Cabo Delgado the period of stay is longer. Foreign personnel working for the coal project is assumed to be the greatest factor.

The proportion of the five provinces related to the Nacala Corridor Region to national total in domestic guest arrivals and domestic guest bed nights are higher than those of international guests at 24% and 20% respectively.

Table 4.7.1 International/ Domestic Guest Arrival and Guest Bed Night in the Five Provinces related to the Nacala Corridor Region and Mozambique

Area	International Guest Arrival	International Guest Bed Night	Domestic Guest Arrival	Domestic Guest Bed Night
Total of Five Provinces related to the Nacala Corridor Region	25,979	57,268	66,693	125,804
	9.3%	*9.9%*	*24.0%*	*20.4%*
Total of other Provinces	252,254	522,081	211,063	489,928
Mozambique	278,233	579,349	277,756	615,732

Source: National Institute of Statistics (INE)

(2) Accommodations

The number of accommodations in Mozambique more than doubled from 17,740 in 2006 to 37,550 in 2010, which is an increase of 24% per year. The proportions by grade are 18% for 5-star and 4-star combined, 18% for 3-star, 25% for 2-star and 39% for 1-star accommodations. The Tourism Development Authority (INATUR) is responsible for giving grades to hotels.

In the Nacala Corridor Region, most of 4-star and 5-star hotels are located in Nampula and Cabo Delgado Provinces, and few 4-star hotels are located at Tete and Niassa Provinces.

(3) Tourism Resources and Products

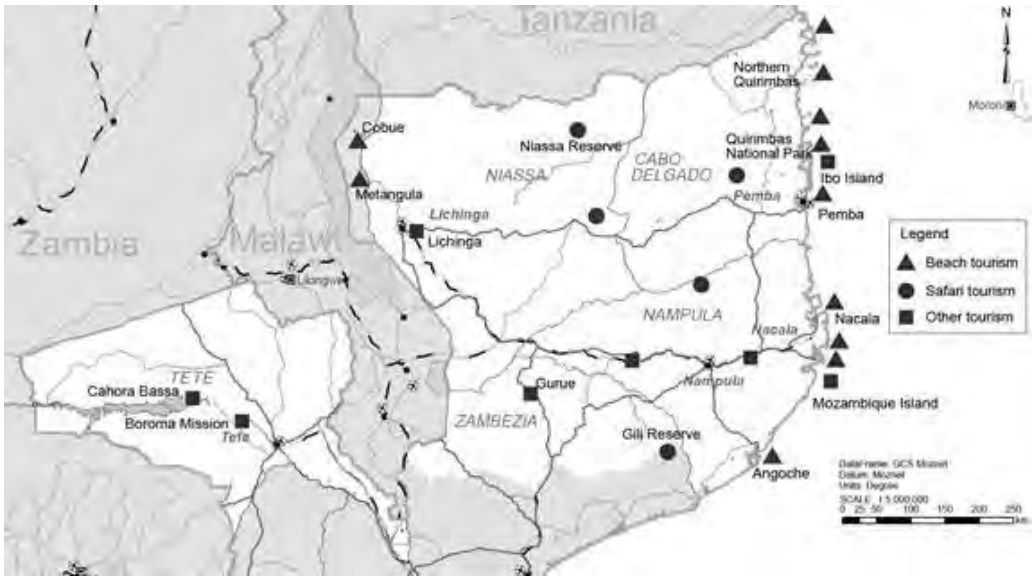
Major tourism resources in the Nacala Corridor Region are summarized in the following table.

Table 4.7.2 Major Tourist Resources in the Nacala Corridor Region

Province	Beach	Safari	Others
Nampula	Nacala Crusse & Jamali, Mossuril Angoche	Nampula-Montepuéz	Mozambique Island (history & culture) Ancient cave paintings in a number of districts
Cabo Delcado	Pemba Northern Quirimbas Southern Quirimbas	Quirimbas National Park	Ibo Island (history & culture)
Niassa	Lake Niassa (Metangula, Cóbuè)	Niassa Reserve	Lichinga (highland resort, camping)
Tete	-	-	Cahora Bassa (fishing, camping) Boroma Mission (history & culture)
Zambézia	-	Gilé Reserve	Gurué (highland resort, agro-tourism)

Source: JICA Study Team

The following figure shows the distribution of the tourism resources in the Nacala Corridor Region.



Source: JICA Study Team

Figure 4.7.1 Distribution of Tourism Resources in the Nacala Corridor Region

4.7.2 Policies and Plans for Tourism Development

The first national tourism development strategy titled "National Tourism Policy and Strategy" was approved in 1995 and Ministry of Tourism (MITUR) was established in 2000. "Tourism Policy and Implementation Strategy" and "Strategic Plan for Development of Tourism in Mozambique (2004-13)" were approved in 2003 and 2004, respectively. Additionally, all five provinces related to the Nacala Corridor Region have their own tourism development plans.

(1) Priority Areas for Tourism Investment and Anchor Projects

The Strategic Plan for Development of Tourism in Mozambique 2004-13 ("the Strategies" hereafter") designated 18 areas as "Priority Areas for Tourism Investment (PATI)" in order to promote investment in

the tourism sector. In the Nacala Corridor Region there is eight PATI as follows: Mozambique Island/ Nacala Zone in Nampula Province, Pemba/Quirimbas Zone and Northern Cabo Delgado Zone in Cabo Delgado Province, Lake Niassa Zone and Niassa Reserve Zone in Niassa Province, Cahora Bassa Zone in Tete Province, and Gilé/Pebane Zone and Gurué Zone in Zambézia Province.

(2) Arco Norte Project

Arco Norte Project, completed in May 2010 with the assistance of USAID, prepared a tourism development master plan for the northern three provinces of Niassa, Nampula and Cabo Delgado in preparation for investment attraction.

The Arco Norte Project proposed to set the following priority on source markets:

- Primary priority: South Africa, Portugal and Mozambique domestic as highest priority, and UK, Italy and France as the next priority
- Secondary priority: Brazil, Germany, China, India, Middle East, Netherlands, Spain and USA
- Future possibility: General routing and backpacking, mainly an extension of South Africa for European and South African over lander-backpackers, short/power breaks, cruises, charter holidays, mid-size meetings, conferences and events

(3) Tourism Interest Zones

Based on the existing proposals, the Ministry of Tourism (MITUR) designated seven Tourism Interest Zones (TIZs) in December 2010. Out of the seven TIZs, six sites are located in the Nacala Corridor Region as shown in the table below.

Table 4.7.3 Tourism Interest Zones in the Nacala Corridor Region

Province	Name of Place	Area (ha)
Niassa	Lichinga	100
	Metangula (Chiuanga Beach)	80
Cabo Delgado	Pemba Peninsula	1,081
	Pemba Bay	1,400
Nampula	Lumbo and Mozambique Island	1,087
	Matibane and Crusse and Jamali Islands	1,750

Source: Ministry Decree on Tourism Zones, December 2010

TIZs are to be managed by a TIZ management company in a manner similar to the management of industrial parks. TIZ sites are designated for tourism development purposes both by the central government and local governments. Investment approval procedures, therefore, would be swift and smooth, which is a major advantage for potential private investors.

In 2013, Crusse and Jamali Islands was declared Special Economic Zone (SEZ) and this area has become an Integrated Tourism Establishment Zone on SEZ regime.

(4) SADC Tourism Master Plan

The SADC region adopted the TFCA (Trans Frontier Conservation Areas) as a development option, to strengthen cross border management of natural resources for better conservation of biodiversity, improved livelihood of local communities and upgrading the SADC tourist destinations to green tourist destinations. TFCAs in the Nacala Corridor Region are Niassa-Selous on the Mozambique and Tanzania border and Liwonde-Lichinga on the Mozambique and Malawi border. Both of them are at the conceptual level.

4.8 Investment Promotion

4.8.1 Existing Conditions of Investment Promotion

(1) Investment Trend

Investments in Mozambique increased dramatically from the total investment of US$ 485 million in 2005 to US$ 2,853 million in 2011, an increase of 488%. In the Nacala Corridor Region an increase in the investments in the same period was even higher at 625%. Investments can show a large fluctuation reflecting the situation of some huge investments in particular sectors. For example, in 2010 there was one project of US$1.9 billion in the energy sector at Tete Province. This project affected the trend shown below with the share of investment for the five provinces related to the Nacala Corridor at an exceptionally high level of 74% in 2010.

Table 4.8.1 Amount of Investment in the Five Provinces related to the Nacala Corridor Region and Mozambique

Item	Foreign Direct Investment (million US$)	Domestic Direct Investment (million US$)	Loan (million US$)	Total (million US$)	Employment (persons)
Five Provinces related to the Nacala Corridor Region					
2005	14	8	65	87	2,603
2010	121	593	1,586	2,295	7,150
2011	207	35	392	633	6,200
Mozambique					
2005	165	36	284	485	15,133
2010	578	649	1,862	3,090	28,245
2011	974	229	1,648	2,853	33,871
Share of Five Provinces related to the Nacala Corridor Region					
2005	8.6	22.1	23.0	18.0	17.2
2010	20.9	91.4	85.0	74.3	25.3
2011	21.3	15.3	23.8	22.2	18.3

Source: Investment Promotion Centre (CPI)

Some tendencies of the investments include the energy sector generating little employment compared to its huge amount of investment, and the investment in 2011 was more capital intensive compared to the investment in 2005 as proved by the investment amount per employee increasing from US$ 32 thousand per person in 2005 to US$ 84 thousand in 2011.

Table 4.8.2 shows the amounts of approved investments in the five provinces related to the Nacala Corridor. Niassa Province and Zambezia Province have been increasing the investment amount steadily. Big fluctuations are observed in Cabo Delgado Province and Tete Province. The investments in Nampula Province have been decreasing.

China, South Africa and Portugal were the three leading countries of origin for investment in 2011, accounting for 32%, 26% and 11 % each of the total foreign direct investment amount.

Table 4.8.2 Amount of Investments Approved in the Five Provinces related to the Nacala Corridor Region

Province	2005	2010	2011
(In million US$)			
Cabo Delgado	14	108	10
Niassa	7	11	50
Nampula	37	30	19
Zamebzia	26	64	129
Tete	4	2,082	424
Total	*88*	*2,295*	*632*
(in %)			
Cabo Delgado	15.9	4.7	1.6
Niassa	8.0	0.5	7.9
Nampula	42.0	1.3	3.0
Zamebzia	29.5	2.8	20.4
Tete	4.5	90.7	67.1
Total	*100.0*	*100.0*	*100.0*

Source: JICA Study Team based on Investment Promotion Centre (CPI)

4.8.2 Laws and Incentive Measures on Investment Promotion

Laws related with investment promotion include the following three laws:

- Law on Investment (Law No. 3/93of 24th June) enacted in 1993: Law on Investment Promotion
- Regulation of the Investment Law (Decree No. 43/2009 of 21st August) enacted in 2009: Regulation on Special Economic Zone (SEZ)
- Code of Fiscal Benefit (Law No. 4/2009) enacted in 2009: Basic Law on Corporate Income Tax

The Law on Investment Promotion specifies a number of conditions for foreign direct investment (FDI). They determine not only basic conditions of investments, such as protection of property rights and remittance of funds abroad, but also the conditions of incentives, including minimum amount of investment, annual sales value, export value, employment of local people, qualifications required for foreign workers and duration of the incentive period.

There are two types of investment promotion zones: Industrial Free Zone (IFZ) and Special Economic Zones (SEZ). According to the Law of Investments (Law No.3/93), an IFZs is the area set aside exclusively for export production, whereas a SEZ is for general economic activity. Enterprises located in either an SEZ or IFZ are able to enjoy incentives like tax exemptions. An SEZ is a certain area designated by a boundary, but it usually does not have fences, where industries producing both domestic and export products can be located. An IFZ is an enclosed area and has a customs office there. The industries located in an IFZ must export more than 70% of their products. There is a category called "Isolated Free Zone enterprises". Under this regulation, an enterprise can hold IFZ status with lower incentive provided if they are approved.[7] Mozal is the only enterprise in operation with IFZ status. In 2009, the first SEZ in Mozambique was established in Nacala Municipality and Nacala-a-Velha District, with an area of 1,539 km^2. As of April 2015, there are a total of three SEZs in Mozambique and one integrated tourism zone on SEZ regime.

Main benefits of these zones are shown in the table below.

[7] Regulation of the Investment Law, Decree No.43/2009.

Table 4.8.3 Benefits of Investment Promotion Zones

	Industrial Free Zones		Special Economic Zones	
	Developers	Enterprises	Developers	Enterprises
Customs Duty and Value Added Tax Exemption (VAT is on both the import and on internal acquisitions)	Import of construction materials, machinery, equipment, accompanying spare and accessory parts and other goods used in the carrying out of the licenced IFZ activity	Import of goods and merchandise to be used in the implementation of projects and exploration of activities which have been authorized under the terms of the IFZ Regulations.	Import of construction materials, machinery, equipment, accompanying spare and accessory parts and other goods used in the carrying out of the licenced SEZ activity.	
Corporate Income Tax	a) exemption (first 10 years) b) 50% reduction (11th-15th years) c) 25% reduction (remaining life of the project)[8]		a) exemption (first 5 years) b) 50% reduction(6th-10th year) c) 25% reduction (remaining life of the project)	a) exemption (first 3 years) b) 50% reduction (4th-10th year) c) 25% reduction (11th-15th year)

Source: Law on Investment(Law no.3/93 of 24th June), Regulation on the Investment Law (Decree 20.43/2009 of 21 at August), Code of Fiscal Benefit (Law No.4/2009, 12th January)

4.8.3 Investment Climate

"Doing Business in 2014" published by the World Bank evaluated the investment attractiveness of Mozambique at 139 out of 189 countries, 7 ranks up from 146 in 2013, but 7 ranks down from 132 in 2011. The biggest reason for the decline was the increased difficulty in electricity connections: requirement of authorization for a connection by the Ministry of Energy. Although generally the indicators worsen from 2008 to 2014, it should be noted that "Protecting Investors" is good at 52th out of 189 countries, and "Starting Business" has raised its rank from 125th in 2008 up to 95th in 2014. The "Enterprise Survey 2007" conducted by the International Finance Corporation (IFC) listed the following as the five largest obstacles to investment: "informal competition", "limited access to finance", "tax rate", "crime, theft, uneasiness" and "transportation".

Table 4.8.4 Trend of "Doing Business" Indicators of Mozambique (Unit: Rank)

	2008	2009	2011	2012	2013	2014
Doing Business	-	141	132	139	146	142
Starting a Business	125	144	64	70	96	95
Dealing with Construction Permits	147	153	129	126	135	77
Employing Workers	162	161	-	-	-	-
Getting Electricity	-	-	159	172	174	171
Registering Property	126	149	150	156	155	152
Getting Credit	97	123	130	150	129	130
Protecting Investors	33	38	44	46	49	52
Paying Taxes	72	88	104	107	105	129
Trading across Border	140	140	133	136	134	131
Enforcing Contracts	138	124	131	131	132	145
Closing Business	134	133	134	143	147	155

Source: 2008 & 2009: Eeden, April 2009, "The Cost of Doing Business in Mozambique Relative to Other SADAC Countries, Research Note 10", Econex9 based on the data from the World Bank
2011: The World Bank "Doing Business 2012", 2013: The World Bank "Doing Business 2013",
2014: The World Bank "Doing Business 2014"

[8] In case of "Isolated Free Zone enterprises", the conditions are; first 5 years, 6th-10th years, and remaining life of the project respectively.

[9] Econox is an economic consultancy established in 2005. The head office of the company is located in Stellenbosch. (http://www.econex.co.za/)

4.8.4 Organisations related with Investment Promotion

There are two main governmental organisations in charge of investment promotion; the Investment Promotion Centre (*Centro de Promoção de Investimentos*: CPI) and the Special Economic Zones Office (*Gabinete das Zonas Económicas de Desenvolvimento Acelerado*: GAZEDA).

(1) Investment Promotion Centre (CPI)

CPI is one of the attached agencies under the Ministry of Economy and Finance (known as Ministry of Development and Planning, MPD until January 2015). The mission of CPI is to: "attract and retain substantial direct domestic and foreign investment to boost economic growth and wealth creation, including the promotion of public-private partnerships for economic and infrastructure development in order to foster inclusive social and economic development in Mozambique". Investments in mineral resources are not the responsibility of CPI but that of the Ministry of Mineral Resources and Energy (known as Ministry of Mineral Resources, MIREM until January 2015). CPI has its headquarters in Maputo with following five departments: 1) Project Management Service; 2) Information and Marketing Services; 3) Business Development Service; 4) Linkage Service and 5) Administration and Human Resources Services; and one delegation office in each province of Mozambique. The total number of employees in Mozambique is 48 including management personnel and other officers. In addition, CPI is planning to open overseas branch offices in China, Brazil, Saudi Arabia or UAE in the Middle East, and South Africa; and they are expected to be operational from 2015.

(2) Special Economic Zones Office (GAZEDA)

GAZEDA is another agency attached to Ministry of Economy and Finance that was established on the 8th of December 2007. The mission of GAZEDA is to promote and coordinate activities related to the establishment, development and management of Special Economic Zones (SEZ) and Free Industrial Zones (IFZ). GAZEDA employs 47 personnel including management. GAZEDA currently manages two areas for investment promotion which are the Beluluane IFZ in Maputo Province and the Nacala SEZ in Nampula Province. GAZEDA will be also responsible for promoting the development of the Mocuba SEZ in Zambezia Province. Besides the SEZs and the IFZ managed by GAZEDA, Crusse & Jamali integrated tourism zone on SEZ regime and the Manga-Mungassa SEZ are managed by private companies under the supervision of GAZEDA.

In this sense, GAZEDA is not simply another government agency for investment promotion in addition to CPI, but GAZEDA is the agency for preparing the conditions (physical, institutional and social conditions) to accommodate incoming investments for actual business operation including industrial production.

4.8.5 Special Economic Zones

(1) Nacala Special Economic Zone

There have been 68 projects approved by GAZEDA since 2009 as shown below. Those already in operation are 25 out of the 68.

Table 4.8.5 Number of Projects Approved for Nacala SEZ

Year	Number of Projects	Total Inestment Value (US$ million)	Number of Local workers
2009	11	151	4,679
2010	22	218	2,944
2011	8	132	445
2012	27	1,077	6,260
Total	68	1,578	14,328

Source: JICA Study Team based on GAZEDA Nacala SEZ Delegation Office

Service is the largest sector of investment accounting for 51%, followed by manufacturing (28%) and construction (12%). Brazil is the top country of origin accounting for 43%, followed by Portugal (5.1%) and Tanzania (3.8%).

A questionnaire survey was conducted targeting the companies located in Nacala SEZ in April 2013. Although the number of samples is low at 21, the information collected is indicative. The highest reason for locating in Nacala SEZ is its closeness to Nacala Port (62%), followed by strategic location (48%), advantages of SEZ (43%) and closeness to markets (33%). It seems Nacala SEZ is offering an attractive opportunity to investors in different ways. Those who think of Nacala as competitive were 12 (7 "fairly competitive" and 5 "competitive") out of 15. GAZEDA's performance was judged favourably with "excellent" and "good" combined accounting for 55% for efficiency and speed in the investment application process and 59% for efficiency in responding to requests and inquiries. Some problems were also pointed out. In terms of infrastructure, water was cited by 15 companies (71%) as a problem, followed by electricity (62%), solid waste (62%), roads (52%), sewerage (52%) and telecommunication (48%). Another problem was the quality of the labour force. The companies which judged labour force as "terrible" and "bad" were 2 and 9, both of which combined account for 58%. The residential environment and the law and order situation was evaluated as either "terrible" or "bad" by 47% and 53% respectively.

(2) Crusse and Jamali Integrated Tourism Establishment Zone

Crusse and Jamali has been declared as Special Economic Zone by Decree no. 47/2013, of 30th August 2013. It is located in Nampula Province District of Mossuril, 14 km southeast from Nacala and occupies an area of 1,750 ha.

(3) Mocuba SEZ

The establishment of Mocuba SEZ was approved in May 2014. Mocuba SEZ covers an area of 10,727 km^2 including Mocuba District as well as Munhamade AP in Lugela District. A nineteen ha site within Mocuba SEZ has already been transformed into IFZ to focus on export. A public tender has been launched by GAZEDA in March 2015 in order to select the Developer for the Mocuba IFZ.

(4) Manga-Mungassa SEZ

The Manga-Mungassa SEZ is located 12 km from Beira Port and was set up in July 2012. Manga-Mungassa SEZ occupies an area of 217 ha. A Chinese company called Dingsheng International Investment manages the SEZ and has started its investment to build infrastructure in the SEZ.

Chapter 5 Existing Conditions of Infrastructure

5.1 Roads

5.1.1 Road System and Road Policies

The classified roads in Mozambique consist of national roads (primary and secondary) and regional roads (tertiary and vicinal roads). These roads are administrated by the National Road Administration (ANE). Urban roads and unclassified roads fall under the jurisdiction of the municipal councils and the district administrations respectively. Urban roads are classified into four categories (primary, secondary, tertiary and unclassified such as footpaths) as well. In short, the road transport system in Mozambique operates at following three levels:

- In the three east-west corridors (Maputo, Beira and Nacala) and the main north-south corridor that runs from south to north
- In major urban areas and particularly in the vicinity of ports
- In rural areas that feed the main corridors

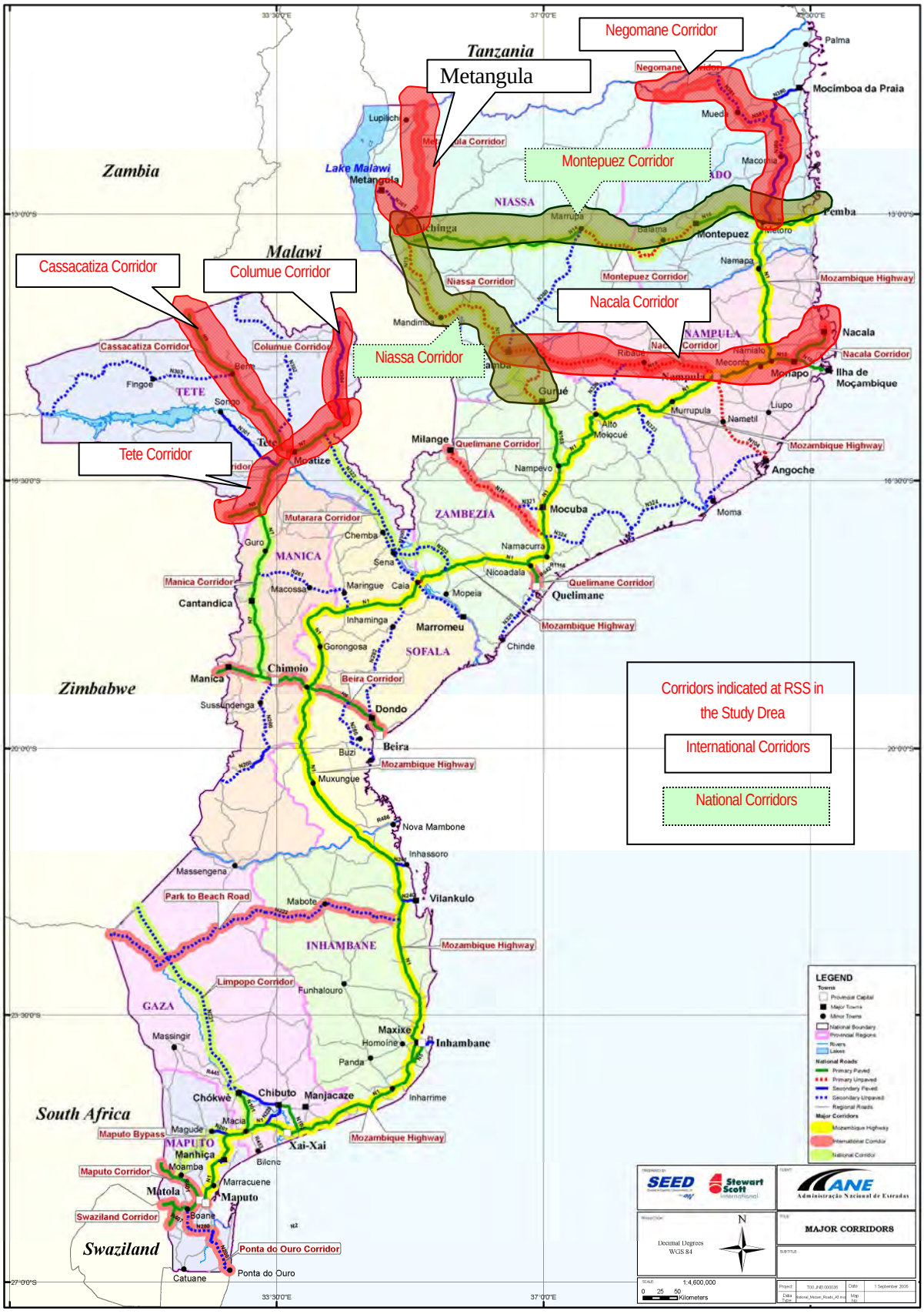
Figure 5.1.1 shows the entire corridors of Mozambique and highlighted corridors which are located in the Nacala Corridor Region.

The Government of Mozambique and ANE are well aware of the importance of both a well-developed road system and the need to proceed with that development in a rational and systematic manner. To this end, ANE and, the Road Fund under the guidance of the Ministry of Public Works and Housing (MOPH, currently known as Ministry of Public Works, Housing and Water Resources), prepared a Road Sector Strategies 2007 - 2014[1](RSS). The RSS takes a medium to long term perspective.

This strategy presents the themes that should govern the planning and development of the road sector. The main themes from the earlier strategies are as below:

- Sustainability: the policy that what is upgraded and rehabilitated continues to be maintained
- Connectivity: the policy of identifying critical road links between important points and focusing development efforts to enhance these links
- Accessibility: the policy of providing minimal or better access to all inhabitants of the country

[1] The RSS is normally a 5-year plan; however the end of previous RSS was extended from 2011 to 2014 due to non-attainment of goal levels.



Source: ANE, with highlights by the JICA Study Team

Figure 5.1.1 Road Corridors Identified by RSS

5.1.2 Existing Road Conditions

(1) Road Network

The current Mozambique classified road network is estimated at around 30,000 km, of which less than 20% are paved. Of the paved roads, the majority (88%) were estimated to be in good to fair conditions, however only 57% of the unpaved roads were estimated to be fully travelable throughout the year. Urban roads are also mostly unpaved with only 500 km of the urban road being paved in the whole of Mozambique. Out of the 3,000 km of urban road, 2,500 km (77%) is still unpaved according to Road Sector Strategy 2007-11 report.

In the Nacala Corridor Region currently, almost all trunk roads pass through the centre of cities and towns. However despite the fact that most trips are pedestrian, there are no proper pedestrian facilities and the pedestrians are exposing themselves to the risk of traffic accidents. The total road network in the five provinces is 21,327 km composed of the primary road (3,718 km), secondary (2,826 km), tertiary (8,127 km), and non-classified (2,446 km) as shown in Table 5.1.1. Out of the total road network8,426 km (40%) is in good travelable conditions, 6,869 km (32%) is in normal conditions, 3,512 km (20%) in poor conditions, 1,652 km (8%) in very poor conditions and the remaining 5% are impassable. Hence the internal access roads continue to be a barrier to the pursuit of economic activities in various parts of the country.

Table 5.1.1 Road Network in the Five Provinces

Classification	Nampula			Niassa			Cabo Delgado		
	Paved	Unpaved	Total	Paved	Unpaved	Total	Paved	Unpaved	Total
Primary	492	495	987	376	367	743	282	135	417
	49.85%	50.15%	100.00%	50.61%	49.39%	100.00%	67.63%	32.37%	100.00%
Secondary		166	166	106	240	346	240	125	365
	0.00%	100.00%	100.00%	30.64%	69.36%	100.00%	65.75%	34.25%	100.00%
Tertiary		1925	1,925	107	1836	1,943	91	1637	1,728
	0.00%	100.00%	100.00%	5.51%	94.49%	100.00%	5.27%	94.73%	100.00%
Vicinal		935	935	483	966	1,449		417	417
	0.00%	100.00%	100.00%	33.33%	66.67%	100.00%	0.00%	100.00%	100.00%
Non-classified Road		503	503	42	499	541	21	717	738
	0.00%	100.00%	100.00%	7.76%	92.24%	100.00%	2.85%	97.15%	100.00%
Total	492	4,024	4,516	1,114	3,908	5,022	634	3,031	3,665
Classification	Zambezia			Tete			Total		
	Paved	Unpaved	Total	Paved	Unpaved	Total	Paved	Unpaved	Total
Primary	730	301	1,031	540		540	2,420	1,298	3,718
	70.81%	29.19%	100.00%	100.00%	0.00%	100.00%	65.09%	34.91%	100.00%
Secondary		720	720	287	942	1,229	633	2,193	2,826
	0.00%	100.00%	100.00%	23.35%	76.65%	100.00%	22.40%	77.60%	100.00%
Tertiary	16	1727	1,743		788	788	214	7,913	8,127
	0.92%	99.08%	100.00%	0.00%	100.00%	100.00%	2.63%	97.37%	100.00%
Vicinal	15	981	996		413	413	498	3,712	4,210
	1.51%	98.49%	100.00%	0.00%	100.00%	100.00%	11.83%	88.17%	100.00%
Non-classified Road		664	664			0	63	2,383	2,446
	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%	2.58%	97.42%	100.00%
Total	761	4,393	5,154	827	2,143	2,970	3,828	17,499	21,327

Source: ANE, data as of 2005
Note: Separate data for paved and unpaved road is not available after 2006.

(2) Road Maintenance

Periodic and routine maintenance of primary, secondary and tertiary roads is under the direct responsibility of the Directorate of Maintenance (DIMAN) and Provincial Delegation (DPANE) of ANE. Actual engineering works in DIMAN are outsourced to consultant firms and routine/periodic works for road maintenance are also outsourced to contractors with 2-year contracts.

In the Nacala Corridor Region, the length of paved roads has been on the increase in recent years and it is expected more in the near future. It is necessary to strengthen the capacity (both government and private sectors) of paved road maintenance in inland provinces.

5.1.3 Existing Programmes and Projects for Roads

Given this situation, the following projects and programmes are on-going:

- Common Basket Fund and Sector Budget Support: EU, SIDA, etc.
- Major Road Improvement : 14 projects in the five provinces
- Road Maintenance Programmes and Projects
  - Project for Capacity Development for Road Maintenance - JICA (2011-2014)
  - Concession Programme for Road Maintenance in Tete Province (2010-2040)
- Rural Road Investment Programme - AFCAP Programme – TRL (2008-2013)
- District Road Programme
  - Agriculture Sector Programme Support II (Rural Roads Component) (ASPS II) - DANIDA
  - Programme for Road Access to Agricultural Markets - PROMER - IFAD
  - Programme of Roads under the Promotion of Fishing Craft-ProPESCA - IFAD
- Axle Load Control Programme

A long list of road improvement projects is proposed by both PRISE (Integrated Road Sector Programme) 2011-2014 and PII (Integrated Investment Programme) 2012-2015.

Proposed road improvement projects by both PRISE and PII are listed in Table 5.1.2. Current status of each planned road project is categorized as follows:

- A: Project is already committed to, however actual funding is not realised yet
- B: Feasibility study or detailed design has been finished and ANE expects its appraisal
- C: ANE plans to develop this section, however, it still seeks a source of project funding

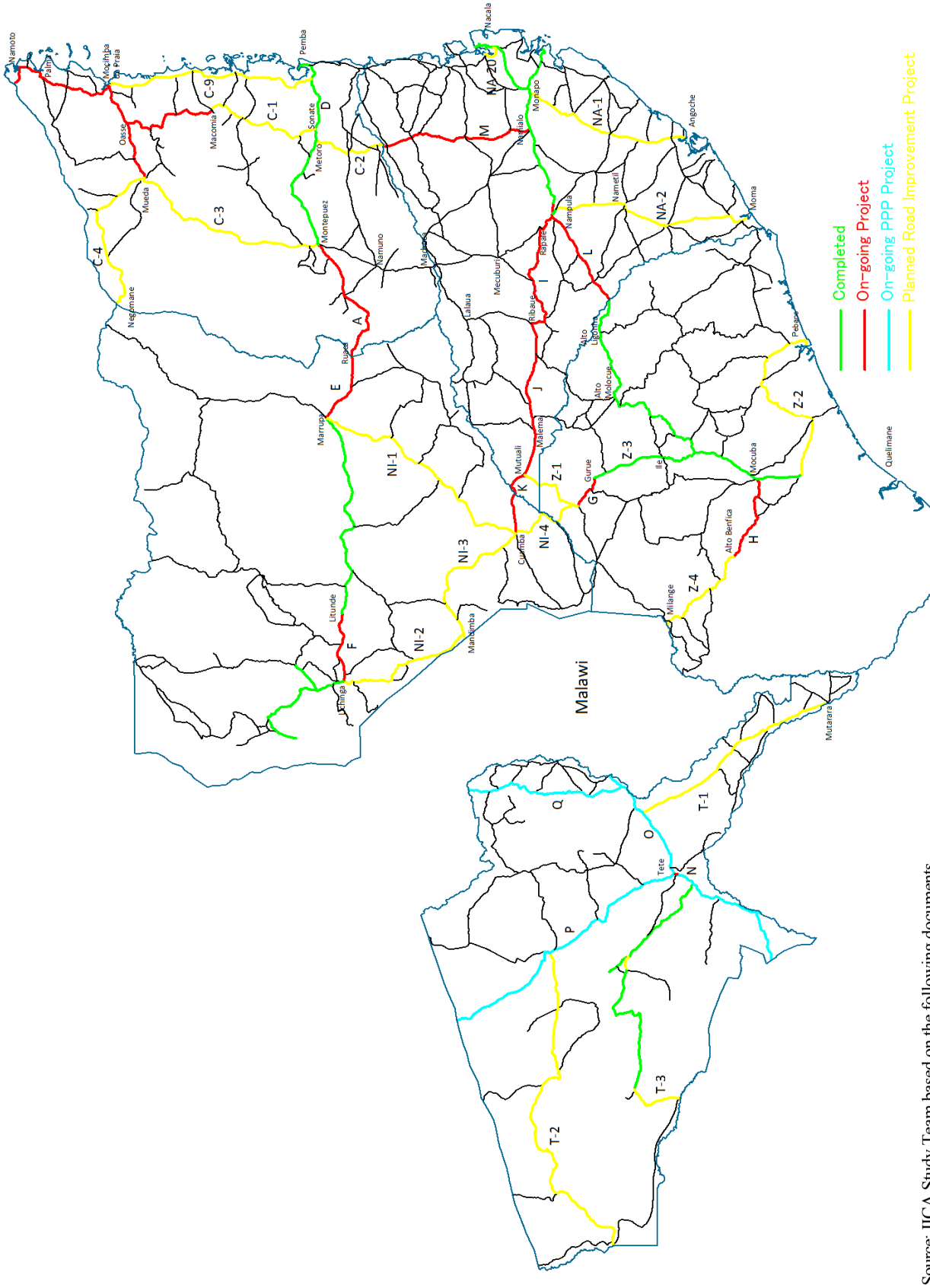
Normally, once a project has been committed to, one or two years are spent for the procurement procedure of a supervision consultant and that of a contractor.[2] Furthermore, three years are usually required to complete the civil works.

[2] The main reason for this situation is that government officers in the implementation agencies are not familiar with development partners' rules and regulations regarding the procurement.

Table 5.1.2 Road Projects included by PRISE and PII for the Nacala Corridor Region

Classification (Route No.)	Location	Code	Corridor	Proposed By	Length (km)	Current Status
N380: Sunate -Macomia	Cabo-Delgado	C-1	Negomane Corridor	PII 2012 - 2015	113	A: Finding for partner
N1: Rio Lúrio- Metoro	Cabo-Delgado	C-2	Mozanbique Highway	PII 2012 - 2015	74	C: Commited by GOC
R698: Mueda -Montepuéz	Cabo Delgado	C-3		PII 2012 - 2015	216	A: Finding for partner
N381/R1251: Negomane - Mueda	Cabo Delgado	C-4	Nagomane Corridor	PRISE	175	C: Commited by AfDB
R762: Pemba - Mocimboa da Praia	Cabo Delgado	C-9		-	192	C: Commited by Anadarko (Private fund)
N360: Cuamba -Marrupa	Niassa	NI-1		PII 2012 - 2015	249	A: Finding for partner
N13: Lichinga - Mandimba	Niassa	NI-2	Niassa Corridor	PRISE	150	C: Commited by AfDB and GOJ
N13: Mandimba - Cuamba	Niassa	NI-3	Nacala Corridor, Niassa Corridor	PRISE	152	C: Commited by AfDB
R657: Magige - Cuamba	Niassa	NI-4	Niassa Corridor	PRISE	90	C: Commited by GOP
N103: Magige-Lioma Mutuali-Lioma	Zambézia	Z-1		PII 2012 - 2015	67	A: Finding for partner
N325,N324: Malei-Olinga-Pebane	Zambézia	Z-2		PII 2012 - 2015	191	A: Finding for partner
N103: Rehabiritation of Existing 13 Bridge	Zambézia	Z-3	Niassa Corridor	-	-	C: Waiting for fund (GOJ)
N11: Milange - Alto Benfica	Zambézia	Z-4	Quelimane Corridor	PRISE	94	C: Commited by EU
R689: Monapo - Angoche	Nampula	NA-1		PII 2012 - 2015	173	A: Finding for partner
N104: Nampula-Namitil	Nampula	NA-2		PII 2012 - 2015 PRISE	60	C: Commted by Korean Exim
R683, R680, N324 & N320: Nametil - Chalaua-Moma	Nampula	NA-2		PII 2012 - 2015 PRISE	159	A: Finding for partner
R703: Nacala - Nacala Velha	Nampula	NA-20		-	18	C: Commited by WB
N322: Madamba - Mutarara	Tete	T-1	Mutarara Corridor	PII 2012 - 2012	350	A: Finding for partner
N303: Bene-Figoe - Zumbo	Tete	T-2		PII 2012 - 2012	348	A: Finding for partner
R602: Mphende - Mukumbura	Tete	T-3		PRISE	50	C: Commited

Note: "Code" in this table is consistent with the ID in the Figure 5.1.1.
Source: PRISE, Integrated Road Sector Programme 2011-2014, and PII, Integrated Investment Programme 2012-2015



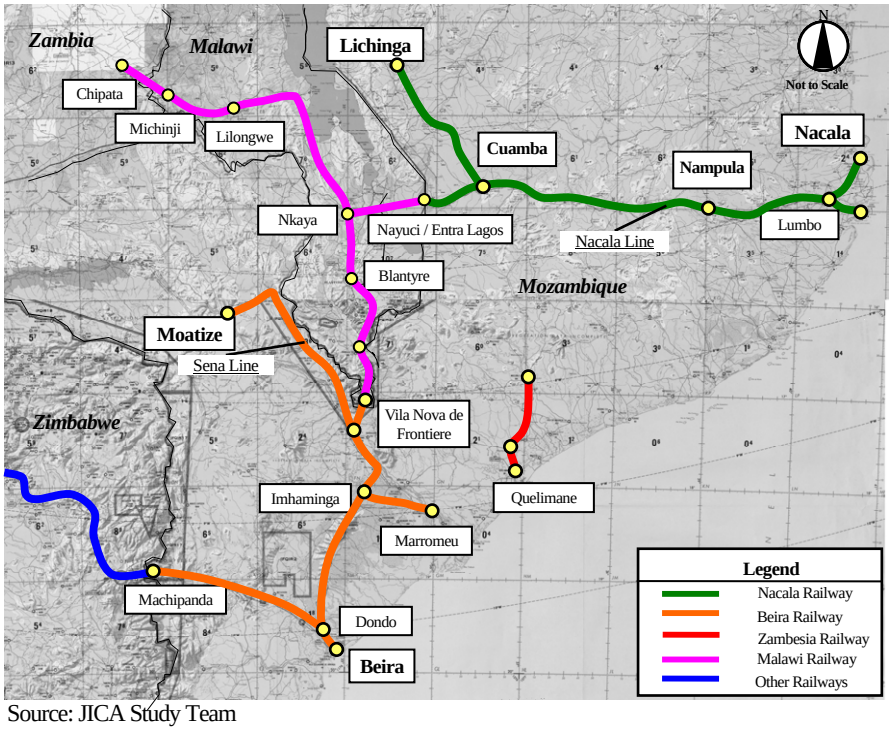
Source: JICA Study Team based on the following documents
1) Ponto de Situacao das Principais Obras do Pes 2012
2) Programa Integrado do Sector de Estradas 2012-2014, Draft
3) PII, Integrated Investment Programme 2012-2015

Figure 5.1.2 Road Projects included by PRISE and PII for the Nacala Corridor Region

5.2 Railways

5.2.1 Existing Conditions of Railways in Mozambique

The Mozambique railway system is divided into four largely independent sub-networks: Nacala Railway, Beira Railway, Maputo Railway and Zambézia Railway (Quelimane). They do not form a national network because the Mozambique railway was constructed for the purposes of exporting mineral resources, which are produced in the interior of southern Africa, and importing goods from the ports to the interior. The railway map of Nacala Railway and Beira Railway, which pass through the Nacala Corridor Region is shown below.



Source: JICA Study Team

Figure 5.2.1 Railway Routes Surrounding the Nacala Corridor Region

On average, the Nacala Line operates one pair of passenger trains (six pairs a week) and one pair of cargo trains each day. The passenger train is limited to the section between Nampula and Cuamba at the moment. The trains between Nacala and Blantyre (Malawi) carry general transit cargo in containers. These cargo trains do not have a regular train schedule, and run from time to time depending on the amount of cargo available. The Nacala Line links to the Malawi Railway and a transit cargo train is operated between the two countries. In 2014 the Malawi Railway was connected to Chipata in Zambia. The Lichinga Line does not operate passenger trains, and no cargo trains have been operated since the beginning of 2012 up to the survey date. However there are on-going projects in Niassa Province for industrial tree planting and use of the railway is desirable to transport wood products from Lichinga to the outside, probably to Nacala Port, as well as to other cities including Nampula and cities in Malawi. Tree planting companies have expected for years the railway line between Lichinga and Cuamba to be rehabilitated. In actuality, the rehabilitation work for Lichinga-Cuamba Line was started by Vale in March 2014.

The railway at Nacala Port and Namialo Station are shown below.

Source: Photo by JICA Study Team

Photo 5.2.1 Nacala Port

Source: Photo by JICA Study Team

Photo 5.2.2 Namialo Station

The Nacala Railway network consists of the following lines, totalling 919 km:

- The Nacala Line: from Nacala Port to the Malawi border at Entre Lagos (611.6 km)
- The Lichinga Line: from Cuamba to Lichinga (267 km)
- The Lumbo Line: from Monapo to Lumbo (not presently operational, 42 km)

All lines are single track and non-electrified. Almost all the sections of the Nacala Line have been rehabilitated with 40 kg/m rail and twin-block sleepers. The track is in sufficient condition for the traffic volume as of today which runs at an average speed of 30 km/h. Communication between the drivers of trains and the operation control centre in Nacala is carried out by signalling and through a satellite telecommunication system.

The railway line passes through the city centres of major cities in the Nacala Corridor Region such as Cuamba and Nampula dividing the major built-up areas.

Another line which passes through the Nacala Corridor Region is the Sena Line from Beira to Moatize (575km). This line connects with the railway to Malawi at Vila Nova da Fronteira. However this line is currently not operational.

(1) Operation Organisation of Nacala Railways

In the Nacala Railway, CDN (Corredor de Desenvolvimento do Norte, Northern Development Corridor) has owned the concession to operate for 15 years since January 2005, and the concession agreement will be renewed every 15 years. CDN was launched through investment from an American railway investment company and CFM (*Portos e Caminhos de Ferro de Moçambique*, Mozambique Ports and Railways). Presently, SDCN (*Sociedade de Desenvolvimento Corredor do Norte SA*, Nacala Corridor Development Company) owns 51% of its shares and CDN owns 49%. After acquisition of 51% of the shares of SDCN in 2010, Vale Mozambique S.A., a coal mining company (hereinafter "Vale"), raised its ownership of shares to 67% in 2011. Vale also owns 51% of the shares of SDCN, which is the operation and maintenance concessionaire of Malawi Railway.

(2) Status of Transportation of Nacala Railways

Nacala Railway is entirely a single track railway with few crossing stations. The longest distance between crossing stations is 102 km between Caramage and Iapala. Currently, the maximum number of trains operating per day is limited to three pairs, since the average speed is limited to 30 km/h.

Cargo Transport

Cargo traffic is classified into three different types, namely:

- Internal Traffic: Cargo transportation inside the country (Mozambique)
- Regional Traffic: Cargo transportation from Mozambique to the neighbouring countries, and vice-versa
- Transit Traffic: Cargo transportation in transit from Mozambique to Malawi and vice-versa

Main cargo items are classified as below:

- Upward (from Nacala to Cuamba, Lichinga and Entre Lagos / Malawi)
  : cement, fuel, wheat, salt, miscellaneous etc.
- Downward (from Entre Lagos / Malawi, Cuamba and Lichinga to Nacala)
  : cotton, sugar, beans, timber, tobacco etc.

The transit cargo upward is mainly to Malawi and it accounts for nearly 80% of the total upward traffic volume. Cargo trains have a maximum of 25 wagons with a total loading capacity of 1,000 tons.

The upward and downward cargo traffic volume in 2010 and 2011 are shown in Table 5.2.1 and the same for passenger traffic are shown in Table 5.2.2.

Table 5.2.1 Cargo Traffic Volume

(unit: ton/year)

Direction	Type of Cargo	2010	2011
Upward (from Nacala)	Internal Cargo	36,748	32,403
	Regional Cargo	4,998	2,590
	Transit Cargo	143,098	(no data)
	Total	**184,844**	**34,993**
Downward (to Nacala)	Internal Cargo	18,585	17,063
	Regional Cargo	8,741	10,564
	Transit Cargo	61,051	(no data)
	Total	**88,377**	**27,627**

Source: JICA Study Team

Table 5.2.2 Passenger Traffic Volume

(unit: pax/year)

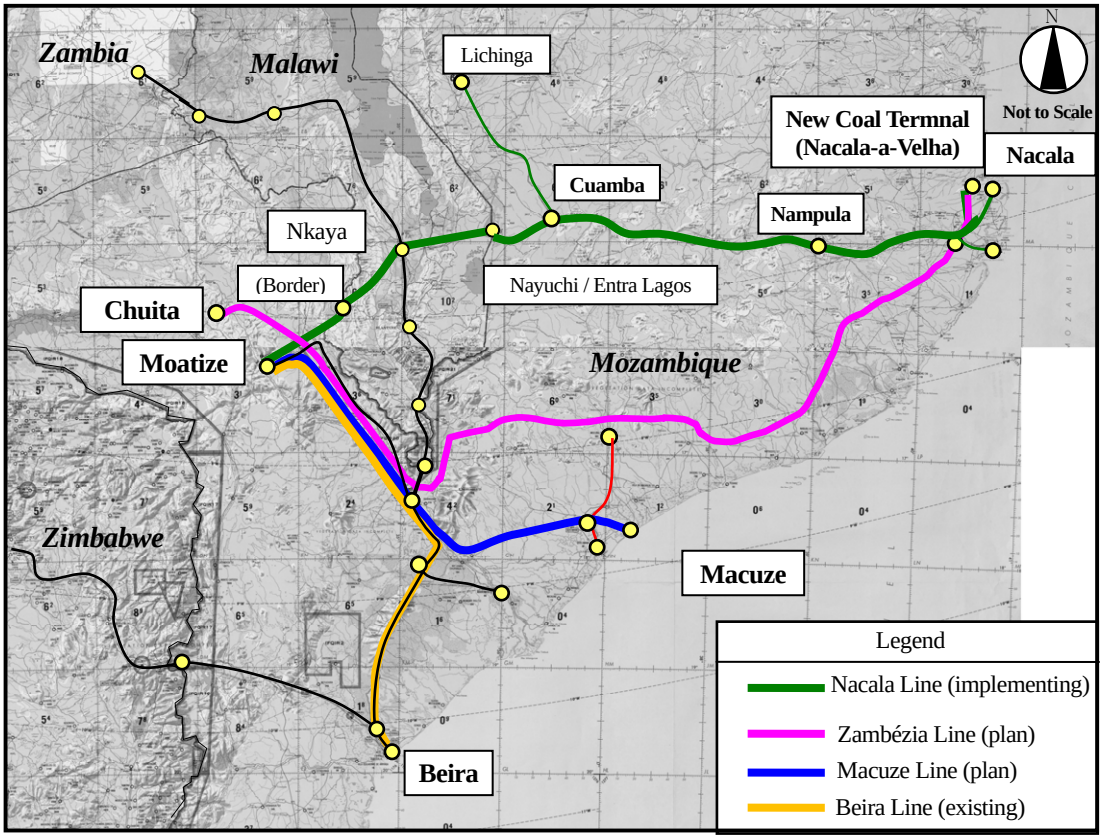
Direction	2010	2011
Upward	457,898	430,128
Downward	468,521	434,298
Total	**926,419**	**864,426**

Source: JICA Study Team

5.2.2 On-going and Planned Projects for Railways

Presently, the Government of Mozambique is planning three lines, in addition to the existing Beira Line, to transport coal from Tete Province to the ports on the Indian Ocean.

- Nacala Line : Tete (Moatize) to Nacala Port passing through Malawi
- Zambézia Line : Tete (Chuita) to Nacala Port via Zambézia Province detouring south of Malawi
- Macuze Line : Tete (Moatize) to Macuze Port in Zambézia Province
- Beira Line (existing): Tete (Moatize) to Beira Port



Source: JICA Study Team based on CFM

Figure 5.2.2 Coal Transportation Railways

Specifications and current status for each corridor are shown in Table 5.2.3.

Table 5.2.3 Specifications and Current Status for Each Corridor

Name of Port	Nacala Railway	Zambézia Railway	Macuze Railway	Beira Railway
Network Capacity Upper Column: First Capacity Lower Column in a Parenthesis: Eventual Capacity	22 Million Ton per Annum (MTPA) (30 MTPA)	40 MTPA (60 MTPA)	25 MTPA (50 MTPA)	6.5 MTPA
Type of Work	Rehabilitation of existing line and construction of new line	Construction of new line	Construction of new line and new port in Macuze	Rehabilitation of existing line
Route Length	913km	1,100km	520km	575km
Completion Year	2015	2015	2017	2012
Current Status (As of May 2013)	Under construction	Pre-F/S was completed. Under negotiation with GoM and Concessionaire	Under selection of concessionaire	Under operation

Source: JICA Study Team

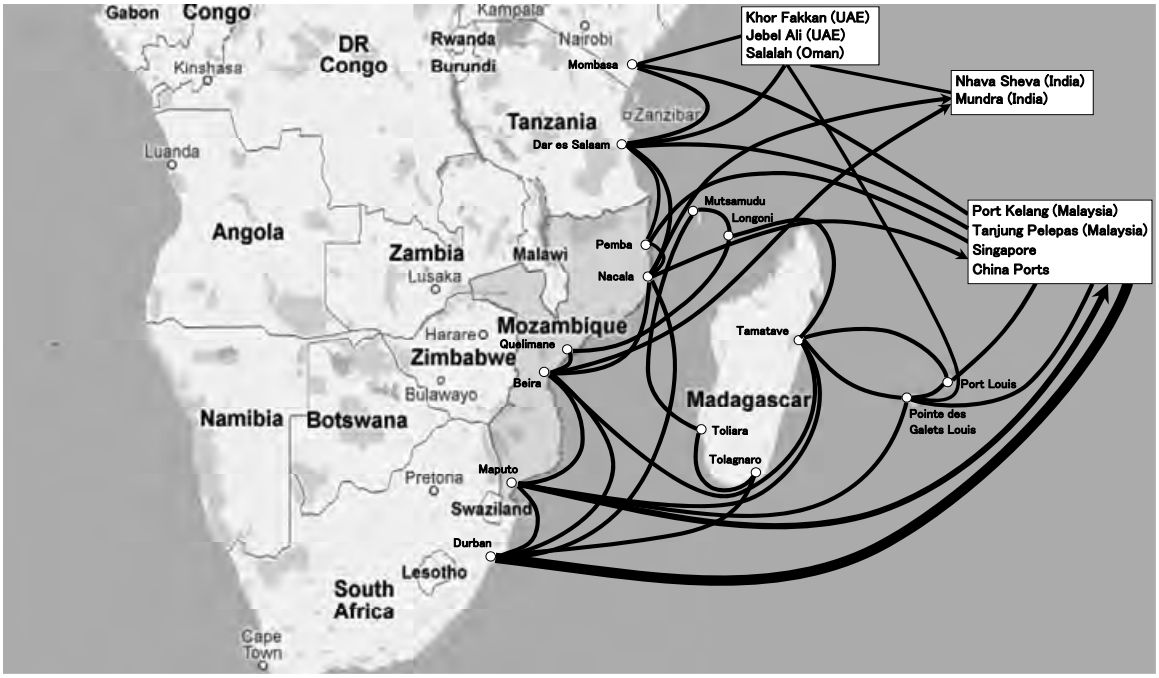
5.3 Ports

5.3.1 Mozambique Ports

(1) Overview

Mozambique ports have the roles of not only international trade for import and export and cabotage transport (domestic sea lanes) but also significant access for the land locked countries in the Southern African Region. The determining factor for ship transport is the ports and the water depth related to the ship draft. Under this vision, all Mozambique ports proceeded management transformation of CFM (*Portos e Caminhos de Ferro*, Mozambique Ports and Railways) for privatization. The international trade has been increasing due to the country's and SADC's commercial trade growth but the cabotage transport has been reducing drastically. Among the various reasons are the total lack of a national fleet, restricting legislation and absence of incentive etc.

Under the above situation and progress, Mozambique has owned and operated the ports of Maputo, Beira, Quelimane, Nacala and Pemba as the public gate-ports for the major international trade. In addition, there are the privately operated berths for mineral and ore/bulk terminals. In respect of the international container traffic to/from Mozambique, the majority of container shipments are currently moving via Durban by feeder service and directly by the loop of Asia, India and Middle-East service. As far as the main liner services are concerned, the services for East Asia constitute the majority due to Mozambican ports' geographical position on the east coast of the African continent, and traditionally close trade relationships with Asian countries. In some trade lanes for East Asia, Mozambican ports are combined with Indian Ocean island ports as they are located on the routes from Asia. In the trade lanes for the Middle East/South Asia, the Kenyan and Tanzanian ports are combined.



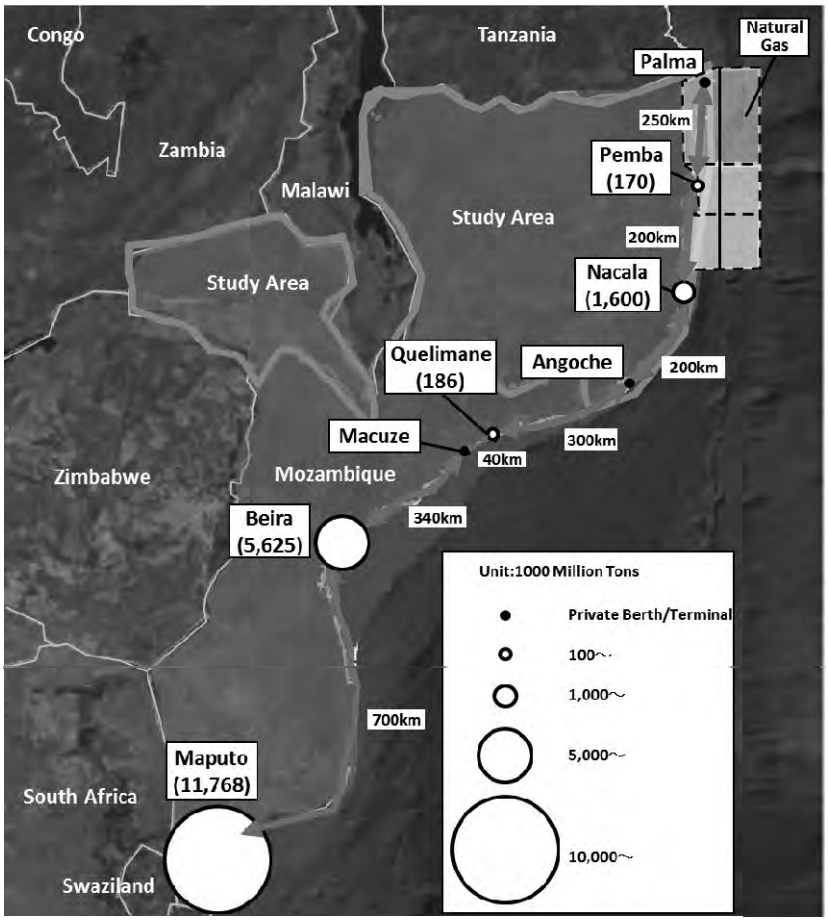
Source: Shipping lines HP – Sailing schedule

Figure 5.3.1 Liner Service covering the Ports around Mozambique

(2) Cargo Throughput

Cargo throughput in 2011 by port and transport mode is shown in Figure 5.3.2.

Currently, almost 100% of the handled cargo by the ports in Mozambique is for international trade with 10.4 million tons for export and 8.7 million tons for import including the transit cargoes. It is apparent that Mozambique ports have contributed significantly to the international trade of the land locked countries in the Southern African Region. Nacala Port has the third largest cargo throughput in Mozambique. The Nacala Corridor Region has two major public ports, namely Nacala Port and Pemba Port. Since natural gas has been found along the coast of the northern part of Mozambique, Palma will be a base for LNG production in the short-term. There is also a potential to develop gas related industry in the hinterland of Palma.



Source: JICA Study Team

Figure 5.3.2 Location of Ports and Cargo Throughput in Mozambique Ports

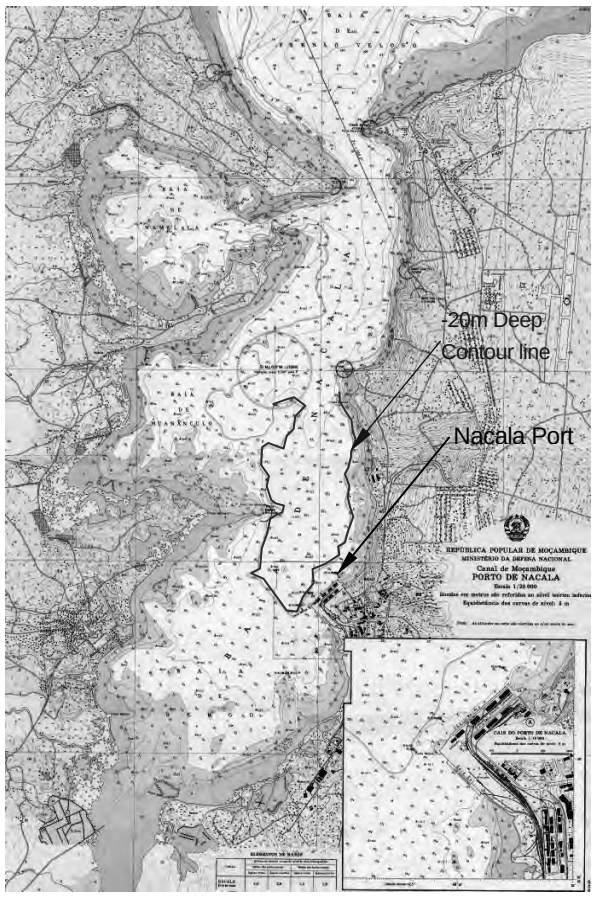
5.3.2 Nacala Port

(1) Overview

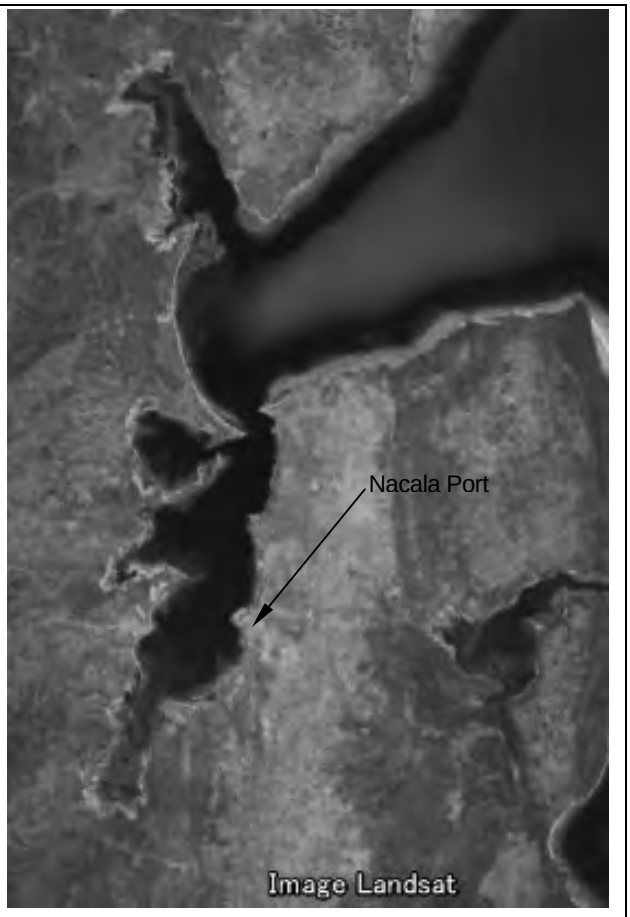
Nacala Port is located in the deep water bay of Nacala in Nampula Province, the most populated Province in Mozambique. Nacala Port is about 1,500 km north-east of Maputo, 850 km north-east of Beira and 860 km south of Dar es Salaam. Nacala Port is located on the east shore of Nacala bay and is a natural deep-sea port. A new coal terminal planned by Vale Mozambique S.A. (hereinafter "Vale") will be on the opposite shore near Nacala-a-Velha and will have 20m of water depth.

Development of the northern provinces in Mozambique is one of the prioritized strategies of the Government of Mozambique, and a variety of industrial development projects are on-going or planned, which include agricultural development in Nampula, forestry development in Niassa, and SEZ development in Nacala. Nacala Port which has an advantage of water depth and is the 2nd deepest port in south-eastern Africa mainly contributes to the cargo movements in northern Mozambique. Also, Nacala Port has great potential to develop deep quays without major dredging work.

At present, the volume of transit cargo from/to Malawi is small due to the poor condition of the Nacala Corridor but is expected to increase along with improvement of the corridor under the current and future projects. Furthermore, the planned development and expansion of coal mining projects in Tete Province is expected to bring a large amount of cargoes to Nacala Port. Together with other transportation projects planned in the Nacala Corridor, the Nacala Port is expected to greatly increase its handling volume and, as a result, contribute to the regional economy.



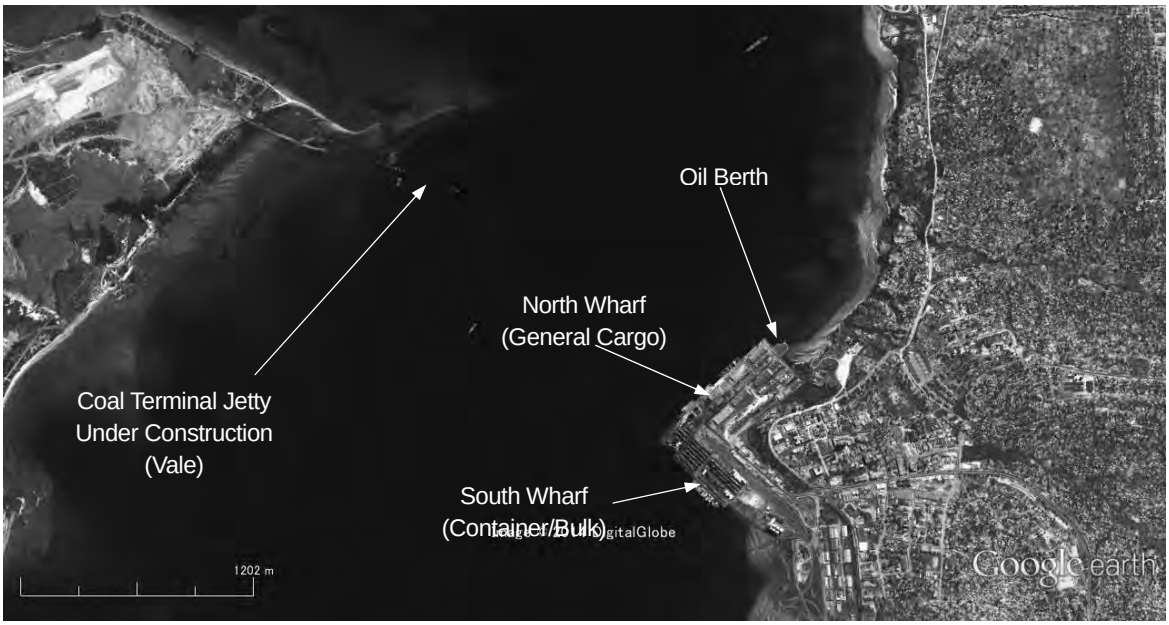
Ministerio de Mozambique, Canal de Mozambique, Porto de Nacala, 49611-M



Google earth image 2014

Source: Navigation Chart & Google earth

Figure 5.3.3 Nacala Bay



Source: Google earth 2014

Figure 5.3.4 Nacala Port

(2) Port Facility and Cargo Handling Capacity

Nacala Port consists of the south and north wharves with the container terminal, general cargo wharf, bulk cargo wharf, warehouses, liquid bulk handling facility and rail ramp.

The north wharf has a quay of 620 m in length, of which the north part is dedicated for liquid bulk handling. A four kilometre long pipeline connects the terminal and storage tanks. The north part the quay of 312.5 m has a water depth of 10 m and is used for berthing of the tankers, bulk carriers (for fertilizer and plaster) and conversional vessels. The remaining part of the north wharf has 7.5 m depth for berthing mainly conventional vessels handling general cargo.

The south wharf has a quay of 372 m and is capable of accommodating berthing of two container vessels at the same time. The large bulk carriers are occasionally berthed at the south wharf as the depth is 14 m.

The specifications and capacity of the wharves are as shown in Table 5.3.1.

Table 5.3.1 Specification/Capacity of the North and South Wharves

Item	North Wharf	South Wharf
Quay Length	620m (4 quays)	372m (2 quays)
Draft	10m (312.5m) 7.5m (307.5m)	14m
Cargo Type	General cargo	Container/Bulk
Handling Capacity	2.4 million ton/year	124,000 TEU
Warehouses	8 warehouses (50,000 ton each)	-
Container Storage	-	4,982 TEU 48 Reefer plugs
Equipment	4 Electric quay cranes 3 Payloaders 3 Forklifts (2.5 – 3.0 t)	4 Reachstackers (45 t) 3 Toplifters (45 t) 1 Sidelifter (9 t) 1 RMG (25 t)

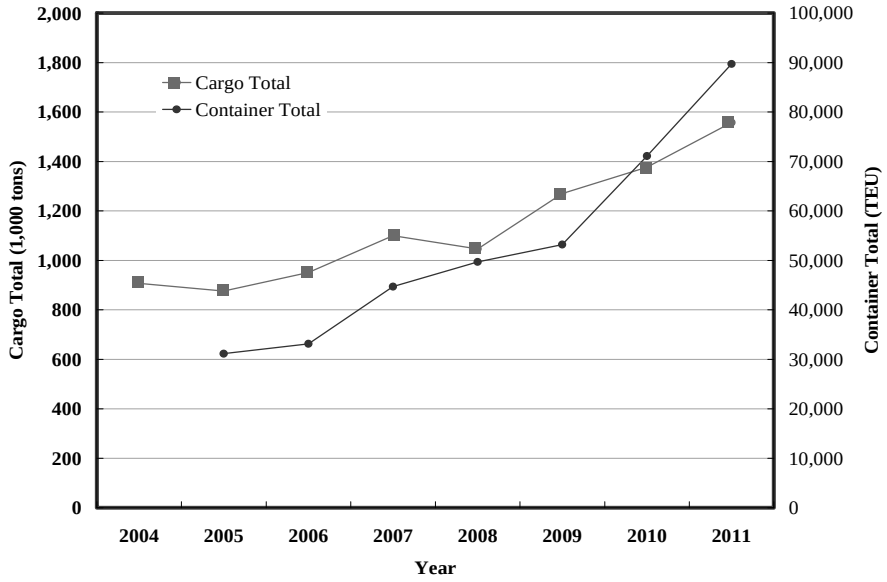
Source: CDN

(3) Cargo Throughput and Vessel Traffic

1) Cargo Throughput

According to the statistics of CDN, Nacala Port handled 1,557,000 tons in 2011 against 1,376,000 for same period in 2010, which shows an increase of about 13%. The containerized cargo also has increased with an annual growth rate of about 20% for 2009 - 2010. Major items of general cargoes are fuel, clinker, bulk wheat, corn, fertilizer, scrap, machines, sugar, gypsum, cement, rice and frozen fish. The historical movements with the transportation modes and the major handling commodities are as shown in Table 5.3.2.

More than 95% of the cargoes are international related, which means the domestic cargo is less than 5%. The import is larger than the export in volume. The container traffic is balanced between export and import.



Source: CDN

Figure 5.3.5 Cargo Throughput of Nacala Port

Table 5.3.2 Details of Cargo Throughput of Nacala Port (2010 & 2011)

Domestic Cargo			International Cargo			Transit - Malawi			Transshipment & Transfer		
Item	2010	2011	Item	2010	2011	Item	2010	2011	Item	2010	2011
Loading	**(27.0)**	**(29.6)**	**Export**	**(335.8)**	**(333.2)**	**Loading**	**(48.9)**	**(88.8)**	**Transshipment**	**(99.8)**	**(138.8)**
Oil	19.7	25.4	Corn		29.0	Container	40.7	74.4	Container	99.8	113.8
Container	7.3	4.2	Scrap Metal	8.0	3.0	Sugar	8.2	6.1	Wheat	0.0	25.0
			Container	327.8	301.2	Scrap Metal	0.0	8.3			
Unloading	**(25.7)**	**(8.5)**	**Import**	**(654.4)**	**(811.8)**	**Unloading**	**(185.0)**	**(125.6)**	**Transfer**	**(0.0)**	**(23.2)**
Fuel	3.0	0.7	Oil	132.3	166.9	Oil	12.3	0.0	Container	0.0	23.2
Container	21.4	7.8	Rice	9.8	4.2	Fertilizer	36.9	14.3			
Miscellaneous	1.3	0.0	Wheat	63.0	59.1	Soybean Oil	0.0	2.7			
			Soybean Oil	0.0	2.0	Wheat	97.6	70.9			
			Oil Palm	49.8	66.9	Container	38.2	37.7			
			Frozen Fish	1.7	1.2						
			Plastering Material	2.4	5.5						
			Clinker	158.5	134.9						
			Cement	4.6	5.0						
			Machinery	0.8	6.3						
			Container	229.5	359.2						
			Miscellaneous	2.0	0.6						
Total	**(52.7)**	**(38.1)**	**Total**	**(990.2)**	**(1,145.0)**	**Total**	**(233.9)**	**(214.4)**	**Total**	**(99.8)**	**(162.0)**

Grand Total 2010	**1,376.6**
Grand Total 2011	**1,559.5**

(Unit: x 1,000 tons)

Source: CFM

2) Vessel Traffic

In 2011, Nacala Port had 287 vessel calls, which includes 155 container vessels and 23 bulk carriers (both international). International and domestic voyages increased over 4% in 2011. The terminal had 78 calls by tankers including 26 domestic voyages. As of 2011, the international bulk carriers increased over 53% compared to 2010. The calling record with the voyage mode is shown in Table 5.3.3 below.

Table 5.3.3 Calling Record by the Voyage Mode

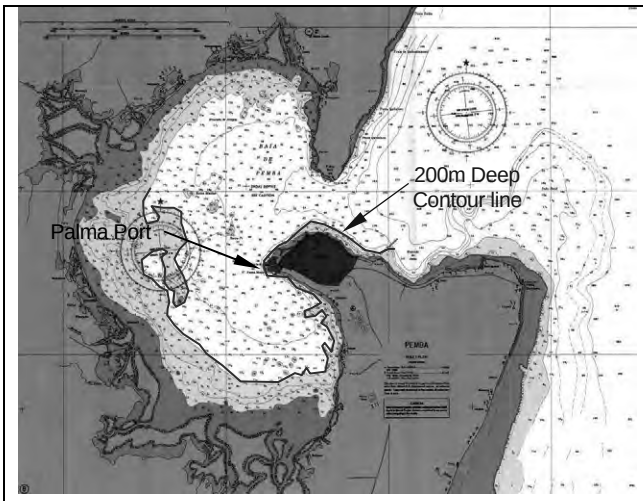
	Vessel	2010	2011	Increase Rate
1	**Domestic**	**25**	**26**	4%
1.1	General Cargo	1	0	-100%
1.2	Container	0	0	0%
1.3	Others	0	0	0%
1.4	Tanker	24	26	8%
2	**International**	**249**	**261**	5%
2.1	General Cargo	24	18	-25%
2.2	Bulk	15	23	53%
2.3	Others	8	10	25%
2.4	Fishing	5	3	-40%
2.5	Container	145	155	7%
2.6	Tanker	52	52	0%
	Total	**274**	**287**	5%

Source : CDN annual report 2011

5.3.3 Pemba Port

(1) Overview

Pemba Port is located 200km north of Nacala Port. CFM has been directly responsible for the port operation and management. Pemba Port is well-sheltered inside Pemba Bay and has 20m depth including the port access channel.



AFRICA-EAST COAST, PLANS IN MOZAMBIQUE,
From Mozambique and US Charts to 1986, 61182

Google Earth image 2014

Source: Navigation Chart & Google Earth

Figure 5.3.6 Pemba Bay

(2) Port Facility and Cargo Handling Capacity

The layout of port facilities is shown in Figure 5.3.7. The port has only one jetty, of which the length and width are 185m and 70m respectively. Water depth alongside the jetty is 7.5m (12m at high tide). The tide level difference is 4.4m. The jetty is connected to the land by a 79m bridge. The jetty was constructed in 1957 and refurbished in 1996, but the reinforcing materials have partially deteriorated.

The port provides a warehouse (1,700m^2), container yard (which is being expanded to 7,000m^2) and reach stackers for container handling at the yard. There is no quay crane provided.

In addition, Bollore, which is one of the offshore gas development companies, has constructed a jetty for supply boats that work with the offshore rigs/platforms (120m in length and 40m long access road).

Source: Google earth 2014

Figure 5.3.7 Pemba Port

In 2011, a total of 65 commercial cargo vessels called at the port, all of which were general cargo vessels except for three tankers. In addition, the calling of supply boats and other vessels relating to the gas development project at Rovuma basin has been increasing recently.

The cargo throughput has increased to 169,659 tons consisting of 118,833 tons for the containerized cargo and 50,826 tons for the non-containerized cargo. The international cargo constitutes the majority at more than 80%. The growth rate for 2010-2011 was recorded as 29% due to increased export of timber and imports relating to the gas development. The record of cargo commodities and handling weight are shown in Table 5.3.4.

Table 5.3.4 Details of Cargo Throughput of Pemba Port (2010 & 2011)

Domestic Cargo			International Cargo		
Item	**2010**	**2011**	**Item**	**2010**	**2011**
Loading	**(23.4)**	**(18.9)**	**Export**	**(65.2)**	**(89.3)**
Container	3.3	0.8	Container	65.2	88.8
Miscellaneous	20.1	18.1	Miscellaneous	0.0	0.5
Unloading	**(13.1)**	**(10.4)**	**Import**	**(29.2)**	**(51.2)**
Fuel	4.9	3.3	Container	22.3	26.3
Container	0.6	0.8	M. Transport	0.0	0.1
Miscellaneous	7.6	6.3	Miscellaneous	6.9	24.8
Total	**(36.5)**	**(29.3)**	**Total**	**(94.4)**	**(140.5)**

Grand Total 2010	**130.9**
Grand Total 2011	**169.8**

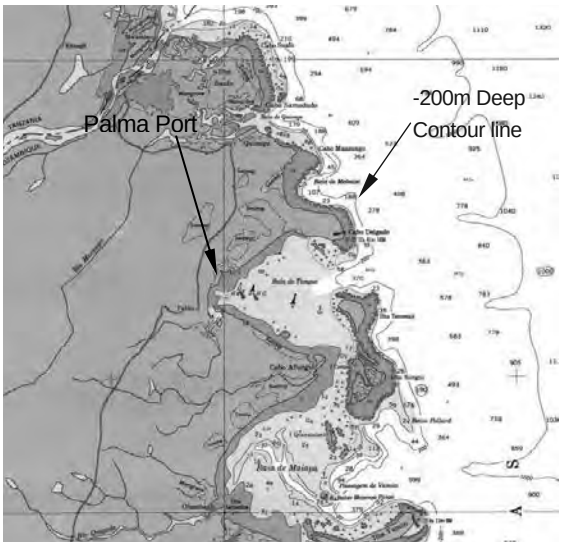
(Unit: x 1,000 tons)

Source: CFM

5.3.4 Palma Port

(1) Overview

Palma Port is located 400km north of Nacala Port and 30km south of the Tanzania border. There are currently no port facilities, but some small fishermen's boats are observed along the shoreline near the village. In the village, there is an approximately 1,000m long runway (unpaved) for small aircraft, however, there is no airport building at the aircraft runway.



AFRICA-EAST COAST, INDIAN OCEAN-MOZAMBIQUECHANNEL, Muchinga Bay to Porto do Ibo, 61180

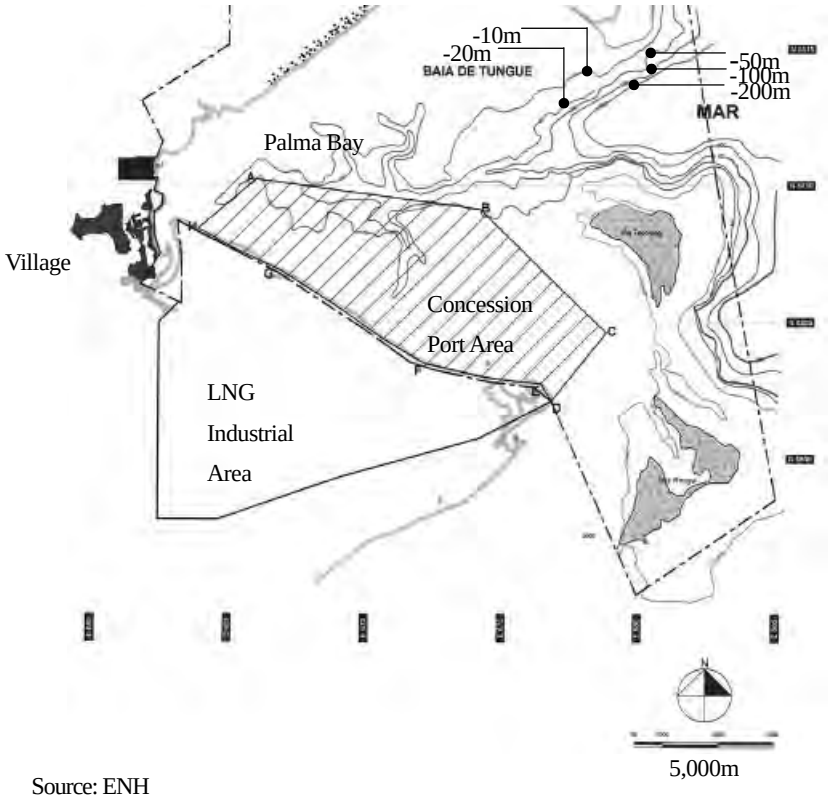
Google earth Image 2014

Source: Navigation Chart & Google earth

Figure 5.3.8 Palma Bay

As shown on the Figure 5.3.8, the bay is deep in the middle. The -100m deep contour line extends into the middle of the bay, and the depth immediately becomes more shallow toward the end of the bay. The -10m contour line lies very close to the end of the bay and lies 100-200m from the shoreline. A small village is located at the west end of the bay.

The south shore shallow area of the bay is planned for the new port development area (6,000ha) for which PCD (Portos de Cabo Delgado) has been given the concession contract. The concession contract for the land area facing this port area (7,000ha) has been given to the natural gas developers to develop LNG plant facilities.



Source: ENH

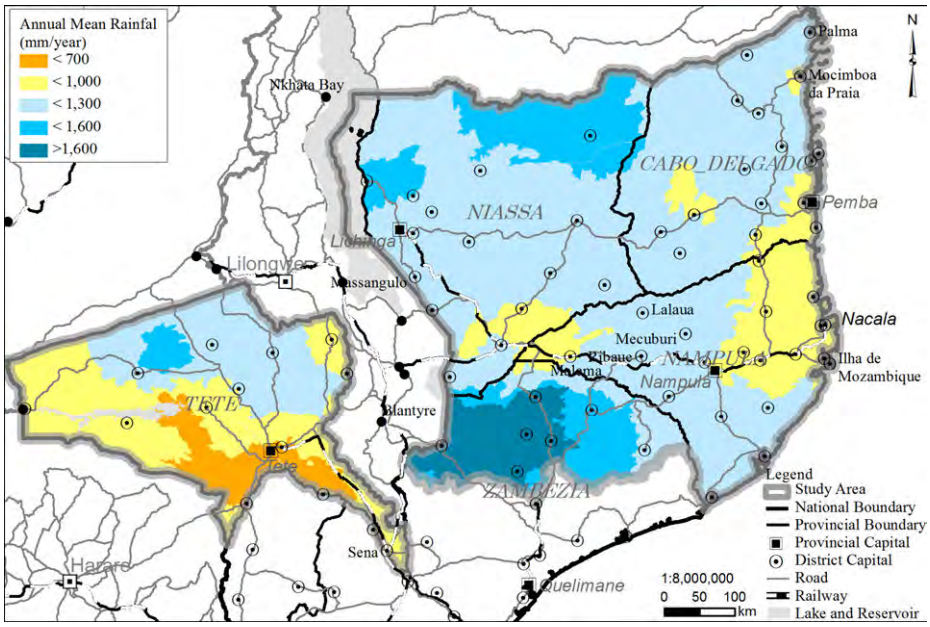
Figure 5.3.9 Water Depth of Palma Bay

5.4 Water Resources

5.4.1 Existing Conditions of Water Resources

(1) Climate

The climatic pattern is highly characterised by well-defined rainfall conditions and is strongly influenced by altitude, proximity to the sea and latitude. There are two distinct seasons, a warm and wet season from November to April, and a cool, dry season from May to October. The annual precipitation can vary dramatically from year to year. The annual mean rainfall of the Nacala Corridor Region is shown in Figure 5.4.1.



Source: JICA Study Team

Figure 5.4.1 Annual Mean Rainfall of the Nacala Corridor Region (mm/y)

(2) Basin Boundaries and Water Resources Administration

The river basins are managed by five administrations established by the Water Law in 1991 as follows:

- Administração Regional de Águas (Regional Water Management Administration) (ARA-Norte: ARA-N)
- ARA-Centro Norte (ARA-CN)
- ARA-Zambeze (ARA-Z)
- ARA-Centro (ARA-C)
- ARA-Sul (ARA-S)

The Nacala Corridor Region is located in ARA-N, ARA-CN and the northern part of ARA-Z. ARA Norte covers the area from the northern border to the border of the Lúrio River basin, ARA Centro Norte covers the area from the Lúrio River basin to the northeast border of the Zambeze River basin, and ARA Zambeze covers the Zambeze River basin as shown in Figure 5.4.2.

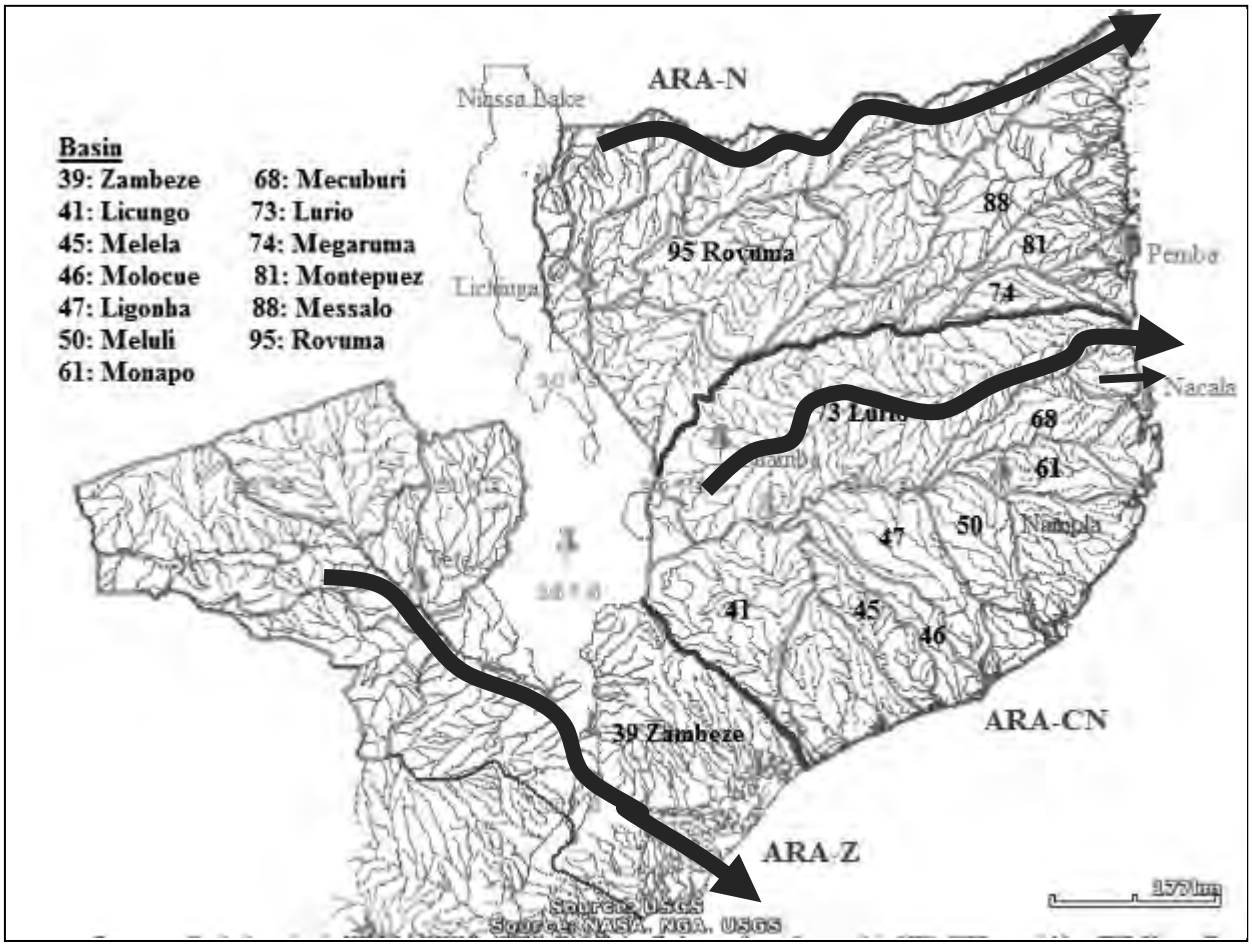


Figure 5.4.2 ARA Management Areas and Major River Basins in the Nacala Corridor Region

(3) Meteorological and Hydrological Observation Stations in the Nacala Corridor Region

It is reported that there are a total of 795 meteorological observation stations and 339 hydrological observation stations in ARA Norte, Centro Norte and Zambeze. Direcção Nacional de Águas: National Directorate of Water (DNA) used to have 695 meteorological stations and 339 hydrological stations. Other organisations such as the National Meteorological Institute (INAM). have meteorological stations only in town areas. However, most of them have malfunctioned in spite of the fact that the official count of inoperable stations is only about 35%. According to DNA, functioning observation stations total less than 100 for meteorology and 70 for hydrometric stations. DNA has started to establish the "HADSTRA" telemetric network observation system based on satellite communication in 2010.

Observation stations were selected at upstream, middle stream and downstream in each basin for the verification of existing reports.

Table 5.4.1 Meteorological and Hydrological Observation Stations in the Nacala Corridor Region

Area	Basin No. of DNA	Basin Area (km^2)	Meteorological Station (DNA)	Hydrological Station (DNA)
ARA-Norte	74 to 98	156,012	104 (96)	(70)
ARA-Centro Norte	40 to 73 & 99 to 104	187,100	361 (337)	(140)
ARA-Zambeze	39	140,000	330 (262)	(129)
Total	-	483,112	795 (695)	(339)

Source: DNA, arranged by JICA Study Team

Table 5.4.2 Meteorological and Hydrological Stations Managed by DNA

Area	Meteorological station	Hydrological station	Remarks
ARA-Norte	96	70	
Collected for analysis	6	6*	*: request: 7
ARA-Centro Norte	337	140	
Collected for analysis	28	44*	*: request: 53
ARA-Zambeze	262	129	
Collected for analysis	15	1*	*: request 8
Functioning station in 1996	127	76	

Source: DNA, arranged by JICA Study Team

5.4.2 Water Demand

(1) Methodology of Water Demand Estimation

Water demand is estimated by the following equation:

$$D_T = D_R + D_S + D_L + D_O$$

D_T: Total Demand,

D_R: Residential Water Demand is computed by multiplying the population by per capita demand which depends on the water system such as 150 l/day for House connections, 90 l/day for Yard Tap, 30 l/day for Public Stand Pipe.

D_S: Water Demand for Small Business, is computed multiplying D_R by the coefficient which differs by the place and year

D_L: Operational Loss, is computed by multiplying D_R by the coefficient which differs by the place and year

D_O: Other Huge Water Demand is computed by the required land area for the specific development by the basic units as follows. 400 m^3/ha for Industries for Food/Beverage, 100 m^3/ha for Industries for Metal/Machinery, 50 m^3/ha for Wood/Furniture, 150 m^3/ha for Hotel Industries.

The major dams and well in the Nacala Corridor Region are shown in the following figure.

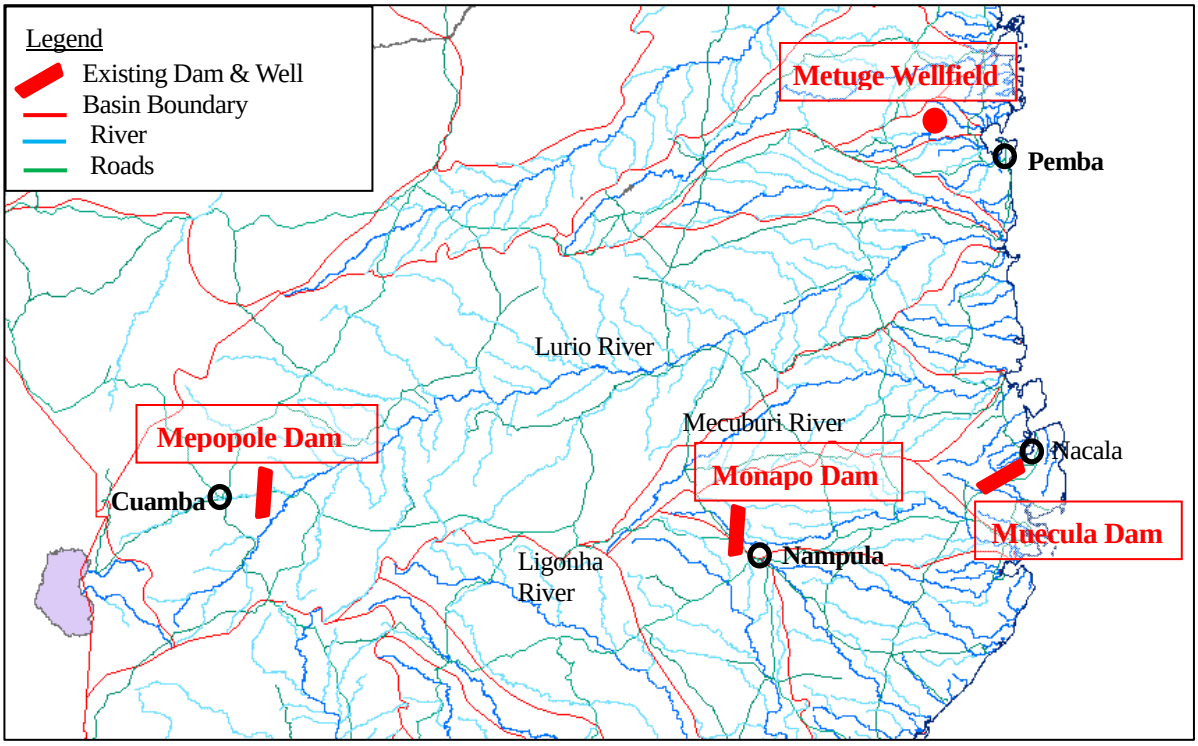


Figure 5.4.3 Existing Major Dams and Well in the Nacala Corridor Region

The total demand is expected to increase in line with the development of economic sectors and increase of population. The future water demand based on the existing projects in Greater Nampula Area, Nacala Bay Area, Cuamba City, Pemba City, and Lichinga City for the years 2020 and 2029 are estimated as shown in the this sections.

(2) Nampla City - Monapo River Basin (Basin No. 61)

Monapo River Dam, which is the water source for Nampula City is located on Monapo River 9km from the city centre of Nampula (see Figure 5.4.3). It has been supplying water with an average volume of 17,000m^3/day to Nampula City. But a water shortage will be coming soon for Nampula City. Consequently, urgent rehabilitation works on the intake facilities and water treatment facilities were scheduled to be completed by February 2013. However the works actually completed in early 2014. The capacity will be increased to 20,000m^3/day after the completion of rehabilitation.

Table 5.4.3 Water Source for Nampula City

Water Source	Location from City	Description	After Rehabilitation Intake Volume	Remarks
Existing Monapo Dam	9km	H=17.5m, L=330m Sv= 3.3Mil.m^3 EL=342m	2012: 17,000 m^3/day 2013: 20,000m^3/day	Under rehabilitation (intake & treatment facilities etc.)
Existing Total			**20,000m^3/day**	
Year	Population		Water demand (Max. m^3/day)	Coverage
2009	538,523 (semi-rural: 61%)		21,318*	52%
2020	837,429 (semi-rural: 61%)		69,541	77%
2029	1,245,996 (semi-rural: 61%)		132,732	90%

Sv=Effective storage volume of reservoir, EL: dam crest elevation
Source: Draft Feasibility Study Report-Nampula, July 2010, MCA & FIPAG
Source for water demand forecast: MCC Baker Report, 2006
*Water demand in 2009

- Domestic demand: 50.6%, 8,633 m^3/day
- Industrial/Commercial/ Institutional demand: 15.6%, 2,665 m^3/day
- Unaccounted for water: 27.7%, 4,724 m^3/day
- Operation loss: 6.1%, 1,032 m^3/day
- Total average day demand: 17,054m^3/day
- Maximum day demand=Average day demand x 1.25 (Max. day factor) in 2020 and 2029

(3) Nacala City – around Sanhute River Basin (Basin No. 63)

Muecula Dam (Nacala Dam), which is the water source for Nacala City, is located 28 km from the city centre on Muecula River (see Figure 5.4.3). It can supply water of 7,200m^3/day. In addition to the dam, there are six wells in operation, but the total supply volume is inadequate to meet the water demand. Accordingly, Muecula Dam is under rehabilitation by raising its crest. The water supply volume will be increased to about 17,000m^3/day after the rehabilitation of the dam. Furthermore, four additional wells in each of the two well fields are under construction to increase the supply. The total water supply volume is expected to be 33,000m^3/day once the rehabilitation is complete. Details are shown inTable 5.4.4.

Table 5.4.4 Water Source for Nacala Bay Area

Water Source Alternative	Location from city	Description	Intake Volume (m^3/day)	After Rehabilitation (m^3/day) in 2013	Remarks
Existing Muecula Dam	28km	H=17.5m, L=330m, Sv=5.3Mil.m^3, EL=75.5m	About 7,200	Ave. Intake: 17,000 Sv= 6.6Mil.m^3	Raising height of dam 4m. (completion date: May 2013)
Mutuzi Well field	6km	3 wells (EL=121m)	2,160	7,200	Additional 4 wells/well field 6⇒8 inches Artesian well, Iron content
M'paco Well field	4km	3 wells (EL=118m)	1,512	8,400	
Existing total			**10,372**	**33,000**	
Year	Population		Water demand (Max. m^3/day)		Coverage
2009	220,757 (rural: 22%)		24,055*		79%
2019	309,161 (rural: 22%)		43,557		89%
2029	434,314 (rural: 22%)		61,133		93%

Sv: effective storage volume of reservoir, EL: dam crest elevation, (EL): well field ground EL
Source: Final Feasibility Study Report-Nacala, December 2010, May 2013, MCA and interview with FIPAG
Source for water demand forecast: MCC Baker Report, 2006
*Water demand in 2009

- Domestic demand: 50%, 9,603 m^3/day
- Industrial/Commercial/Institutional demand: 10%, 1,921 m^3/day
- Unaccounted for water: 40%, 7,721 m^3/day
- Total (Average day demand): 19,244 m^3/day, Maximum day demand: 24,055 m^3/day (Max. day factor=1.25)

(4) Cuamba City - Lúrio River Basin (Basin No. 73)

Mepopolo Dam, which is the water source for Cuamba City, is located on the Mepopole River, a tributary of Lúrio River, about 30km from the city centre. It can supply water at 9,300m^3/day for Cuamba City, however this is also not sufficient for future water demand. Details are shown in Table 5.4.5.

Table 5.4.5 Water Source for Cuamba City

Water Source Alternative	Location from city	Description	Intake Volume (m^3/day)	After Rehabilitation (m^3/day)	Remarks
Mepopole Dam	30km	H=22m L=330m, Sv=2.9Mm^3 EL=994m	9,300	Intake: 10,800	Raising height of dam 4m. Charged by groundwater
Existing total					**11,000m^3/day**
Year	Population		Water demand (Max. m^3/day)		Coverage
2009	94,314		1,641?		7%
2015	114,545		6,789		65%
2029	166,850		9,342		75%

Sv: effective storage volume of reservoir, EL: dam crest elevation
Source: ASNANI Study- Vol. V-Cuamba. (ASNANI: Projeto Integrado de Abastecimento de Água e Saneamento para Nampula e Niassa)
Source for water demand forecast: MCC Baker Report, 2006
Maximum day demand=Average day demand x 1.25 (Max. day factor) in 2015 and 2029

(5) Tete City - Zambeze River Basin (Basin No. 61)

The only water source for Tete City is groundwater that is located in Nhartanda Valley. It has sufficient volume of approximately 19,000m^3/day to supply Tete's water demand with its service coverage of 90%.

Currently, a Master Plan for Water Supply Development with a target year of 2037 is being carried out by FIPAG, which is financed by Vale Mozambique, S.A. The study team has been asking FIPAG for information regarding the initial findings and expected completion date of the master plan, however, no information was disclosed as of this date.

(6) Pemba City - Muaguide River Basin (Basin No. 78)

Groundwater from the Metuge Wellfield is the water source for Pemba City and presently 9,600m^3/day of water is pumped from the well. However, the well is not sufficient to meet the current and future water demands. According to the recharge volume, it is estimated that groundwater can be withdrawn at approximately 60,000m^3/day if the infrastructure is prepared. Details are shown in Table 5.4.6.

Table 5.4.6 Water Source for Pemba City

Water Source	River	Location	Description	Intake Volume etc.
Metuge Wellfield	Muaguide River Basin	40km from city	6 wells functional High content of iron	Max.14,160m^3/day Ave. 9,600 m^3/day
Existing total				**14,160m^3/day**
Year	Population		Water Demand (max. m^3/day)	Coverage
2009	153,029		10,385*	66%
2020	262,622		23,498	80%
2029	408,547		40,446	90%

Coverage: house and yard tap connections account for 34% in 2020 and 41% in 2029
Source: MCA & FIPAG, Feasibility Study Report-Pemba, May 2010 and Additional groundwater investigation, Pemba, January 2012.
Source for water demand forecast: MCC Baker Report, 2006
*Water demand in 2009
- Domestic demand: 42.5%, 4,415 m^3/day
- Industrial/Commercial/ Institutional demand: 15.8%, 1,645 m^3/day
- Unaccounted for water: 38.8%, 4,029 m^3/day
- Operation loss: 2.9%, 296 m^3/day
- Total demand:10,385m^3/day
- Maximum day demand=Average day demand x 1.25 (Max. day factor) in 2020 and 2029

(7) Lichinga City - Rovuma River Basin (Basin No. 95)

The water source for Lichinga City is Locumue Dam (Mini Cabora Dam), with a water supply capacity of 5,000m^3/day, which is located on the Locumue River about 8 km from the city centre. However this is inadequate to meet the future water demand. No groundwater aquifer is expected to be found in or around Lichinga City. Details are shown in Table 5.4.7.

Table 5.4.7 Water Source for Lichinga City

Water Source	River	Location	Description	Intake Volume
Existing Mini Cabora Dam	Locumue River	9km from city	H=17m, L=560m Sv=1.9million m^3 EL=1,318m	Max.5,000m^3/day for 2009
Existing-total				**Max.5,000m^3/day**
Year	Population		Water demand (Max. m^3/day)	Coverage
2009	12,281		2,265	-
2015	31,366		12,914	60%
2029	51,366		22,831	75%

H: dam height, L: dam crest length, Sv: effective storage volume of reservoir,
EL: dam crest elevation
Source: Integrated Project of Water Supply and Sanitation for the Provinces of Niassa and Nampla-Study on Water Supply and Sanitation for Four Cities-Feasibility Report (ASNANI Study June, 2008)-Vol. IV-Lichinga
Source for water demand forecast: MCC Baker Report, 2006

5.5 Power Sector

5.5.1 Existing Conditions of Power Sector

(1) Overview of the Power Situation in the Nacala Corridor Region

The area of Mozambique is 799,380 km^2 with an estimated population of 22.9 million in 2011. The five provinces related to the Nacala Corridor Region (Niassa, Cabo Delgado, Nampula, Tete and Zambezia) cover around 490,000 km^2 with an estimated population of 13.4 million, representing 60% of the nation. The population is scattered over the region (the population density of Niassa, Cabo Delgado, and Tete Provinces are from 10 to 21 persons per km^2). Due to the vast area and low population density, it is difficult to extend the national power grid to the rural areas. As a result of this situation, rural areas that do not have access to electricity still rely on firewood and charcoal as the main energy sources.

Mozambique has a target to raise the household electrification rate to 15% in all provinces. However, this target has not been achieved yet. The current electrification rate of the five provinces related to the Nacala Corridor Region and the national average is shown in Table 5.5.1.

Table 5.5.1 Household Electrification Rate of the Five Provinces related to the Nacala Corridor Region

Province	Electrification Rate
Cabo Delgado	8.2%
Niassa	9 %
Nampula	13 %
Zambézia	7.3 %
Tete	10 %
National Average	16 %

Source: EDM, 2011, Annual Report

The target number of total electrified districts was planned to be increased from 104 in 2010, to 107 in 2011 and 125 in 2014. As of 2011, the number of electrified districts was 107, which corresponds to 84% of the total number of districts (128) in the country.

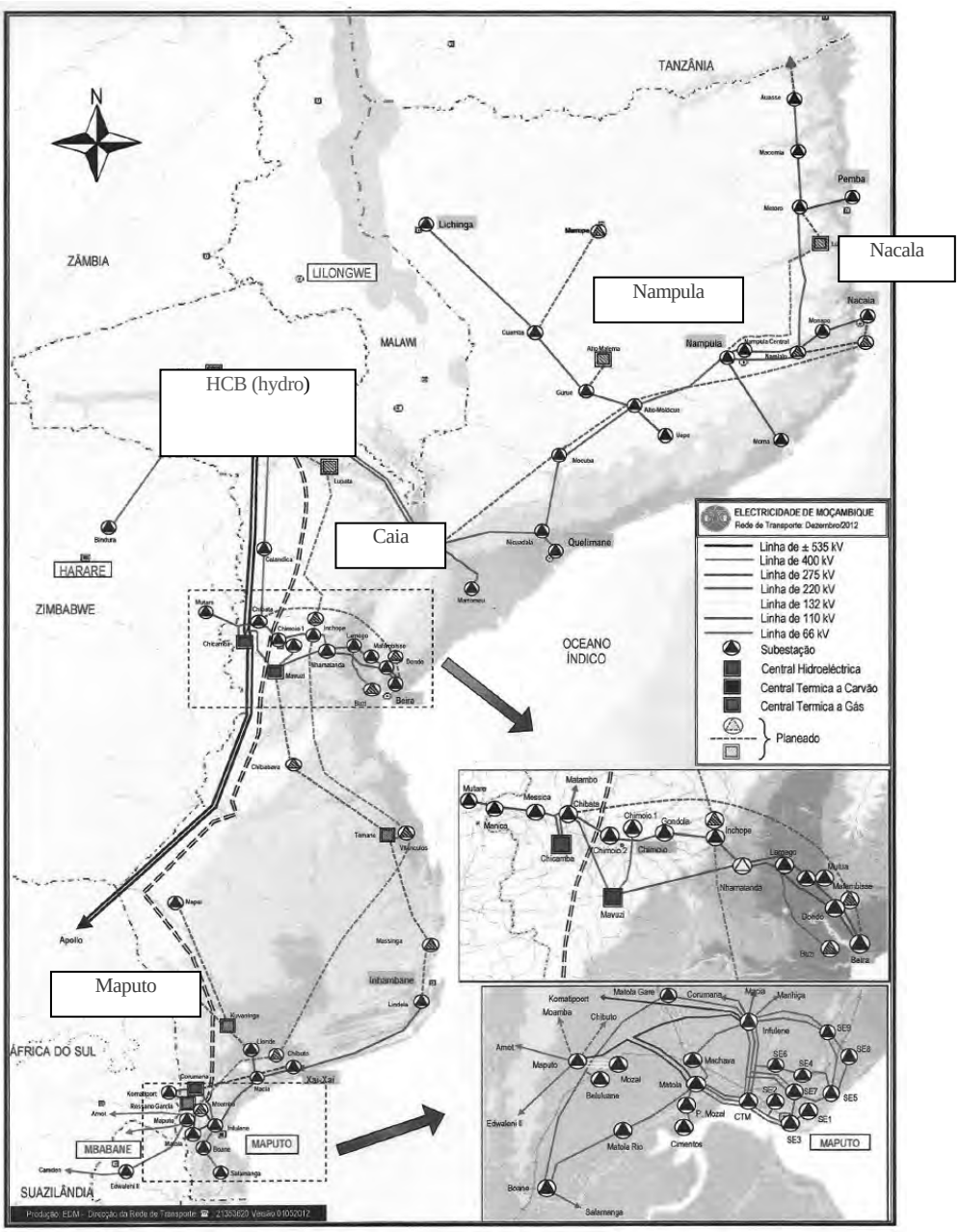
(2) Government Organisation Responsible for Electric Power

Electricidade de Moçambique (hereinafter "EDM") is a state-owned company responsible for power generation, transmission, and distribution. The total number of staff is 3,500. It is a subordinate organisation of the Ministry of Mineral Resources and Energy (known as Ministry of Energy (ME) until January 2015).

(3) Current Situation of Power Generation and Transmission Facilities

Installed capacity of EDM power stations in the country was 28.4 MW in 2012, which consists of 1.85 MW of hydro and 26.57 MW of thermal. This capacity is not enough to supply the country. The remaining power used in the country is purchased from the "Hidroeléctrica de Cahora Bassa" (hereinafter "HCB"), which is a company owned by the governments of Mozambique and Portugal. In order to raise the self-sufficiency rate, EDM has plans to deploy new hydro power plants and put in line thermal power plants (IPP).

Currently, the standard voltages of transmission lines are 220 kV, 110 kV and 33 kV. The 110 kV line has been extend to 2,530 km, which amounts to 50% of the total length of transmission lines in the country. The main distribution line voltage is 33 kV and it is stepped down to 22 kV, 11 kV, 6.6 kV, and 0.4 kV (66 kV is also used, but only in Tete). There is a tendency to extend the existing 33 kV transmission line in order to expand the electrification area. It has been confirmed that some of the 33 kV lines extend more than 100 km and in such cases, power loss is a great concern.



Source: EDM, 2012, National Grid Network 2

Figure 5.5.1 National Grid Network (2012)

Current and planned power generation facilities are shown in Tables 5.5.2 and 5.5.3. The present and future balances of power demand and supply are shown in Chapter 15.5.1 and Figure 15.5.1.

Table 5.5.2 List of Power Generating Installations (EDM Jurisdiction)

Type of Generation	Power Station	Installed Year	Status	Nominal capacity (MW)
Hydro Power	Cuamba	1989	Operational	1.1
	Lichinga	1983	Operational	0.75
Sub Total (Hydro)				**1.85**
Gas	None	None	None	0
Sub Total (Gas)				**0**
Diesel	Angoche	1962	Operational	0.4
		1979	Operational	0.51
	Central nova (New)	1999	Operational	2.4
	Lichinga	1975	Operational	0.56
		1979	Operational	0.52
		2002	Operational	0.204
	Lionde	1974	Operational	1.48
	Tete	1991	Operational	0.82
	Mocuba	1979	Operational	0.42
	Cuamba	1979	Operational	0.42
	Nacala	1966	Operational	1.5
	Nampula	1965	Operational	2.4
		1971	Operational	2
		1971	Operational	2
	Pemba	1964	Operational	0.92
		2002	Operational	1.46
		1985	Operational	5.12
Total				**23.13**

Source: EDM, Annual Report

Table 5.5.3 List of Power Generating Installations (Outside Jurisdiction of EDM)

Type of Generation	Power Station	Installed Year	Status	Nominal capacity (MW)
Hydro Power Station	Cahora Bassa (HCB)	1974	Operational	2,075
	Cahora Bassa Norte (HCB & CEZA)	*2017*	*Pre-FS*	*1,245*
	Mphanda Nkuwa (Campbell & Correia)	*2017*	*On-going*	*1,500*
	(extension)	*2020*	*On-going*	*750*
	Lúrio (2)	*2020*	*On-going*	*120*
	Alto Malema (EDM+IPP)	*2020*	*On-going*	*120*
	Mugeba	*2023*	*Pre-FS*	*100*
	Boroma	*2023*	*Pre-FS*	*200*
	Lupata	*2023*	*Pre-FS*	*600*
Total (including planned projects)				**6,710**

Note: Installations shown in italic character are planned projects.
Source: EDM, Annual Report

5.5.2 Situation of Power Supply

(1) Substation Transformers

The peak load conditions of the main substations in the five provinces related to the Nacala Corridor Region, excluding Tete, is as shown in Table 5.5.4. The peak demand at "Nampula 220" was recorded at 84% of the main transformer capacity in December 2012 and in "Nampula Central" it is already reaching its rated capacity. Nevertheless, there are plans to expand the existing distribution area that will lead to over load of substations in Nampula.

Table 5.5.4 Load Conditions of Substation Transformers

System Operation Center ATNO substation load condition (Peak)

Substaion	Transformer Number	2005~2012 Pontencial	Load Rate (%)
Nampula 220kV	TR01	100MVA (80MW)	83.9%
	TR02	100MVA (80MW)	83.9%
Nampula Central	TR101	35MVA (28MW)	**100.0%**
	TR31	10MVA (8MW)	**96.0%**
	TR32	10MVA (8MW)	**96.0%**
Monapo	TR101	16MVA (12.8MW)	48.1%
	TR31	10MVA (8MW)	16.0%
Nacala Port	TR101	35MVA (28MW)	43.0%
	TR102	35MVA (28MW)	43.0%
	TR31	10MVA (8MW)	46.0%
	TR32	10MVA (8MW)	29.0%
Pemba	TR01	16MVA (12.8MW)	66.8%
Cuamba	TR01	16MVA (12.8MW)	19.4%
Lichinga	TR01	16MVA (12.8MW)	41.2%
Metoro	TR1	10MVA (8MW)	32.0%
Macomia	TR1	16MVA (12.8MW)	16.9%

Distribution TR for city side

Source: EDM, Substation survey result

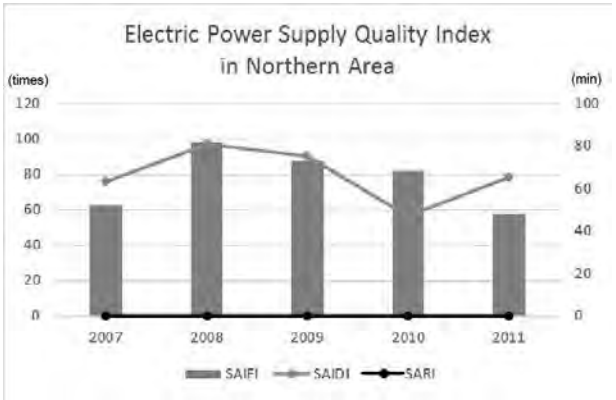
(2) Transmission Line

The current load conditions of transmission lines from "Nampula 220" to "Nampula Central" is 80%.

(3) Quality of Electricity

Electric power supply system reliability is evaluated by indexes, such as "System Average Interruption Duration Index" (hereinafter "SAIDI"), "System Average Interruption Frequency Index" (hereinafter "SAIFI") and "System Average Restoration time Index" (hereinafter "SARI").

Above indexes for the Northern Distribution Area, which covers the five provinces related to the Nacala Corridor Region, is marked as; SAIDI 47 min 7 seconds, SAIFI 82 times, SARI 34 seconds. It was reported during the study mission in Nampula (May 2013) that they had black outs due to power supply failure averaging once every two days.



Source: EDM Statistic (SAIFI left / SAIDI & SARI right unit), 2010

Figure 5.5.2 Index of Power Quality in the Northern Region of Mozambique

Most of electrical faults occurred on the 110 kV Transmission lines and transformers. The load conditions of the Nampula Central substation transformer is already overloaded due to distribution expansion projects. Moreover, most substation facilities are over 30 years old, and the substations have no back up facilities.

5.6 Telecommunications Sector

5.6.1 Existing Conditions of Telecommunications Sector in Mozambique

(1) Organisations in Telecommunications Sector

The regulator of the telecommunications sector, including Internet service, is the Instituto Nacional das Comunicações de Moçambique (INCM) and it reports to the Ministry of Transport and Communications (MTC).

In the telecommunications market in Mozambique, fixed telephone service is provided by Telecomunicações de Moçambique (TDM) and cellular mobile phone service is provided by Mozambique Cellular (mcel), Vodacom and Movitel. Movitel is the latest carrier in this market. It obtained its license in January 2011 and launched its official operation in May 2012. This company is a joint venture between a Vietnamese GSM Carrier called Viettel (70%), SPI (29%) and a local investor, Invespark (1%).

For Internet service, in addition to being provided by the above four companies, there are 25 Internet Service Providers with the major ones being Tvcabo and Teledata. An Internet exchange called Mox-IX has been in service since 2002 for effective Internet traffic routing. It is located in Centro de Informática, Universidade Eduardo Mondlane. There are 15 major Internet service providers including four telecommunications carriers' ISPs (Internet service providers) connected with Mox-IX.

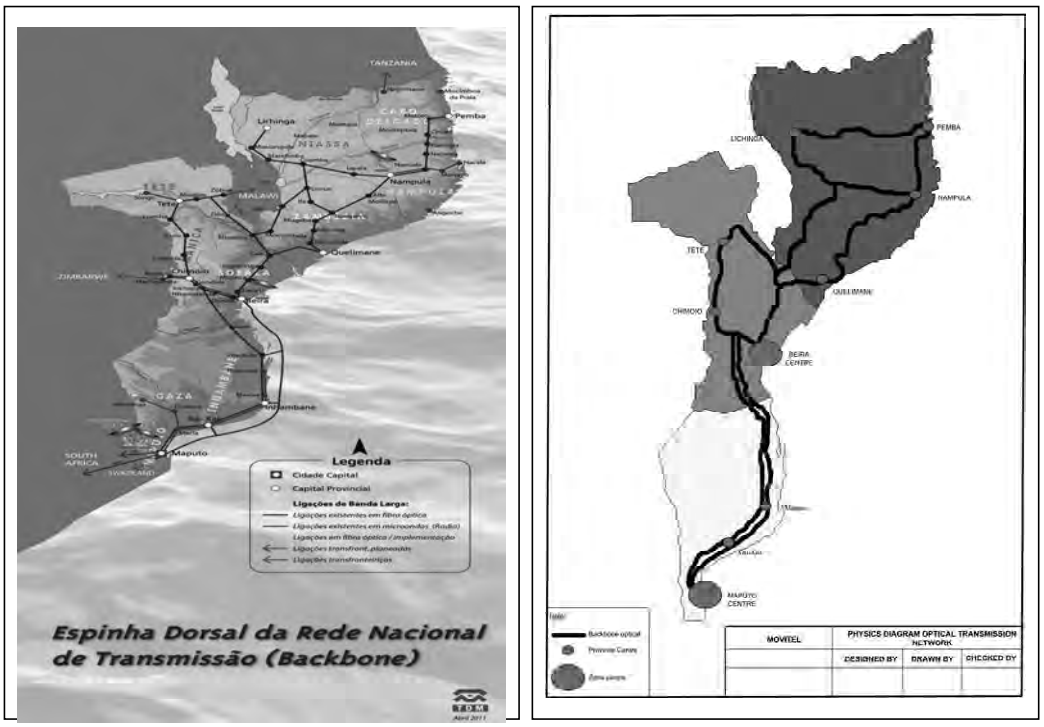
For the international backbone, submarine optical fibre cables called SEACOM and EASSy launched service in 2009. The capacities of the cables are 1.2 Tbps and 1.4 Tbps, respectively.

(2) Backbone Network

Regarding the backbone network of TDM, a fibre optic transmission system is already installed for all the five northern provinces with a physically redundant condition.

The length of fibre optic cable installed by Movitel accounts for 70% of the total length of fibre optic cable installed in Mozambique.

The backbone networks of TDM and Movitel are shown below.



Source: INCM

Figure 5.6.1 Backbone Network (Left: TDM, Right: Movitel)

(3) Coverage of Fixed Line Service

The teledensity for fixed line service has been stagnant for more than 10 years and has gradually decreased in recent years. On the other hand, cellular phone subscriptions per 100 inhabitants have been increasing, and are expected to increase more in the future. As for the number of Internet users, there are no official survey data available so far. In the reports of ITU (International Telecommunication Union) and others, data related to the number of Internet users and the percentage of Internet users are estimated figures. The index for "percentage of individuals using the internet in 2010" in the ITU report titled "Measuring the Information Society 2011" indicated 4.2%. On the other hand, Moz-IX estimated 0.38% in 2010 for the number of internet users per 100 inhabitants.

Table 5.6.1 Fixed Telephone and Mobile Subscription per 100 Inhabitants in Mozambique

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012.6
Fixed Telephone subscription per 100 inhabitants	0.34	0.38	0.38	0.39	0.43	0.40	NA	0.4	0.38	0.37
Mobile Cellular subscription per 100 inhabitants	2.6	3.39	8.35	12.6	16.8	20	28.5	30.9	33.5	40.6

Source: Mozambique INCM, ICT Sector Performance Review, 2009/2010 and ITU Report

(4) Coverage of Internet Service

Internet service coverage is still limited except for the areas covered by the communications carriers and Teledata, which is one of the major ISPs. Teledata's major customers are banks. Therefore, Teledata provides service for all provincial centres. The service area of other major ISPs, such as Tvcabo or Intra, is limited to Maputo, Beira and Nampula so far, although Tvcabo will commence

service in Pemba and Tete in September 2012. The coverage difference is mainly due to their business strategy. For example, Tvcabo is mainly providing cable TV service. Therefore, Tvcabo's area of focus is major cities, which is different from the target of Teledata. Except for the previously mentioned ISPs, other IPS service areas are limited to only Maputo.

5.6.2 Existing Conditions of Telecommunications Sector in the Nacala Corridor Region

The communication service covering all district levels is provided by mcel for the five northern provinces. Movitel commenced its service for more than 80% of the districts in Mozambique in May 2012 and the service has been available in all district capitals in Mozambique including the five provinces since May 2013.

There are areas where communication service is still not available in localities that are under administrative post levels. In order to fulfil communication services such as voice and data communications and Internet access for such localities, INCM is implementing the Universal Service Fund Projects. According to the plan of INCM, communications service will be available in all areas of Mozambique including localities in ten years.

The coverage of fixed telephone service by TDM in the five northern provinces is shown in the following table.

Table 5.6.2 Coverage of Fixed Telephone Service for District Centres in 2011 (TDM)

Provinces	Number of Districts Covered	Number of Districts	Coverage (%)
Cabo Delgado	17	17	100
Niassa	7	16	44
Nampula	21	21	100
Zambézia	17	17	100
Tete	9	13	69
Total of Northern 5 Provinces	71	84	84.5
Total of Mozambique	120	142	84.5

Source: INCM

5.6.3 On-going Projects for Telecommunications Sector

INCM is implementing projects that expedite Universal Access Service as a policy of the Government of Mozambique. The source of funds for the Universal Access Service Project is called the Universal Access Service Fund. The regulation for collection for the fund is collecting 1% of net profits of communication carriers and Internet service providers. It amounts to approximately 110 – 150 million Meticais per year. The fund is utilised for investment in communication facilities for the areas selected by INCM where no communication networks exist. The contractor, selected through a bidding process, is obligated to operate for 10 years in the selected areas including installation of network equipment and facilities. The on-going project is shown below.

Table 5.6.3 Outline of Universal Service Fund Project

No.	Contract Period	Objective Area (Province, Localities)	Service Type	No. of Users	Contractor	Contract Amount (Mt)
1	2011 06 – 10 years	21 localities in Gaza (2), Inhambane (3), Manica (4), Sofala (4), Tete (4), Niassa (4) province. Number of inhabitants of those localities are 254,691	Voice Communication, Data Communication, Internet Access	Within the specified localities, the Contractor is required to get the subscribers (The required number is not specified in the Contract)	mcel	170 mil Mt.
2	2012 06 – 10 years	22 localities in Maputo (3), Gaza (2), Inhambane (3), Zambézia (5), Nampula (5), Cabo-Delgado (4) provinces and 4 Repeater stations including Base Stations. Number of inhabitants of those localities are 353,022.	Voice Communication, Data Communication, Internet Access	Within the specified localities, the Contractor is required to get the subscribers (The required number is not specified in the Contract)	mcel	62 mil Mt.

Source: INCM

5.6.4 Planned Projects for Telecommunications Sector

Telecommunications carriers have not disclosed information related to specific planned projects. As general information, the carriers' planned projects are related to the enhancement of Quality of Service and improvement of the capacity of the network. Internet service providers (ISPs) should consider introduction of services related to server backup for the client, disaster recovery service.

As for the projects utilising the Universal Service Fund, the third project was announced in October 2012. At the time of the second project, the bidding price was lower than the first because there was competition. The contract price of the second project was approximately one third the price of the first project.

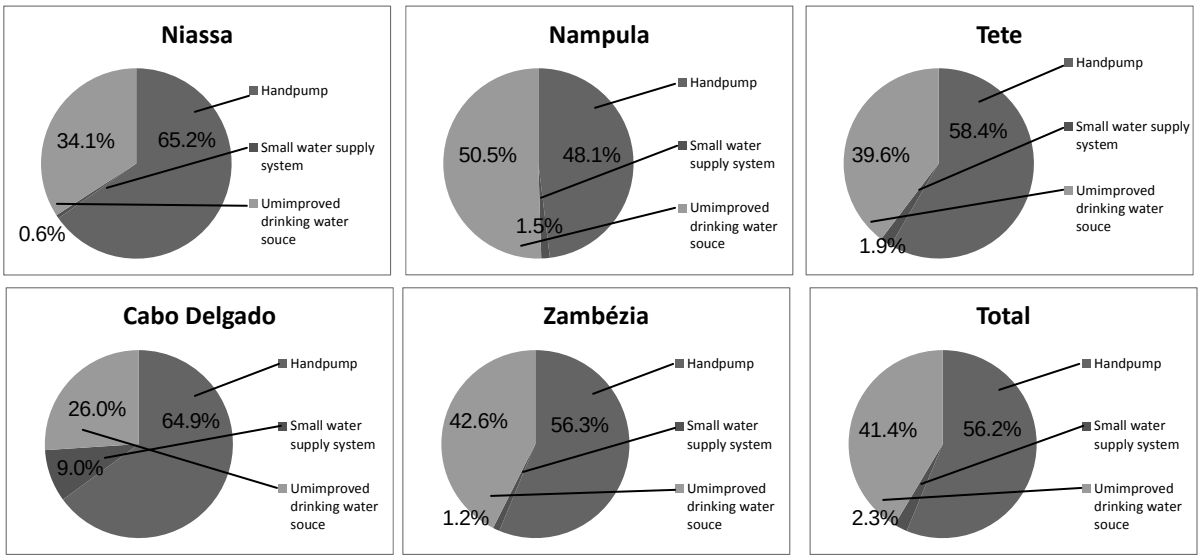
5.7 Rural Water Supply

5.7.1 Existing Conditions of Rural Water Supply

The potential of groundwater, which is the main source of water for rural water supply in the Nacala Corridor Region, is relatively low compared with other areas in Mozambique. In most areas, the average yield of a borehole is lower than $1m^3$ per hour or 17 litres per minute. Static water level in the Nacala Corridor Region is mostly only suitable for hand pumps. With regards to water quality, there are some areas, especially along the coastal area, where the water is salty. In addition, there are some areas where the water has a high iron and magnesium content.

The level of coverage of rural water supply in the Nacala Corridor Region is lower compared with the other provinces of Mozambique. The coverage in the Nacala Corridor Region was 58.6% while that in the rest of Mozambique was 76.6% in 2011. The highest coverage out of the five provinces was Cabo Delgado Province at 74.0%, followed by Niassa (65.9%), Tete (60.4%), Zambézia (57.4%) and Nampula (49.5%). It seems that less populated provinces have higher coverage. These ratios are based on an "Access" indicator used by DNA (National Water Directorate). The coverage ratios in these provinces rose in 2011 compared to 2010 except for Niassa Province, where the coverage ratio dropped due to calculations that excluded dried-up boreholes.

The conditions of rural water supply are classified into two categories: "improved drinking water source" and "unimproved drinking water source." The former comprises small water supply systems, borehole/protected dug wells with hand pumps and rainwater, whereas the latter includes unprotected dug wells, surface water and others. The majority of rural water supply in the Nacala Corridor Region is provided by borehole and protected dug wells with hand pump. The composition ranges between 65% and 48%: 65.2% in Niassa, 64.9% in Cabo Delgado, 58.4% in Tete, 56.3% in Zambézia, and 48.1% in Nampula. The average of the five provinces is 56.2%. Small water supply system used in the Nacala Corridor Region covers 2.3% in the rural area.



Source: DNA

Figure 5.7.1 Percentage of Service Population by Type of Water Facility

A small water supply system consists of a water source facility, transmission pipes, a water storage tank, distribution pipes and water taps. There are 93 small water supply systems in the Nacala

Corridor Region, 24 each in Nampula Province and Tete Province, 23 in Zambézia Province, 13 in Cabo Delgado Province and nine in Niassa Province. The system in full or partial operation account for 86% of the water storage facilities and 63% of the water source and pipeline facilities.

The borehole/protected hand dug wells which are not in operation account for 11.3% of the total with a range between 8.9% and 17.9% in the five provinces. Out of the three types of pumps approved by DNA, Afridev is most commonly used in the Nacala Corridor Region.

5.7.2 Rural Water Supply Maintenance System

(1) Small Water Supply Systems

Small water supply systems are under the control of local governments except for the ones located in provincial capitals which are controlled by the Water and Sanitation Infrastructure Authority (AIAS: Administração de Infraestruturas de Água e Saneamento).

(2) Boreholes and Hand Dug Wells with Hand Pumps

Operation and maintenance of boreholes and hand dug wells with hand pumps primarily rely on the establishment of water committees, who collect money for repairs and perform routine maintenance and minor repairs of hand pumps. The rate of existence of water committees is about 50% according to DNA data. The water committee is established at the time of construction but in many cases they do not function after the project period because they cannot collect fees from users or because major breakdowns occur.

There are different systems of maintenance and repair of hand pumps in place in the Nacala Corridor Region. In Nampula Province, the consultant contracted with the MCA (Millennium Challenge Account) project provides refresher training to local area mechanics, two each stationed at each administrative post of the seven districts. In Tete Province, there are activities undertaken by an NGO and local area mechanics separately. There seems to be a conflict arising from the difference in the charge level, the NGO charges only 15–20% of the repair cost to communities whereas the local mechanic charges the full cost. In Niassa Province, there are artisans licensed by DAS (Department of Water and Sanitation) and a mechanic selected from the local community.

The limited supply of spare parts for pumps is an obstacle. Spare parts are sold in different ways, at lower prices in provincial capitals such as Nampula and Lichinga and higher prices by local shops or local vendors. The price difference is huge, MT 15 to 75 for a U-seal in provincial capitals and MT 500 in the highest case by a local vendor. There are some cases in Tete and Niassa in which spare parts are imported from the Malawian market.

5.7.3 Rural Water Supply Policies and Organisations

The “National Water Policy” prepared by the government in 1994 emphasises the participation of communities in operation and maintenance of rural water supply facilities. As an initial endeavour, education activities called “PEC” were started. A modified approach called “PEC-Zonal” started in 2002 with NGOs and consultants on a contract basis as the main implementers, which was a reflection of the government’s privatisation policy. PEC-Zonal has been successful in enhancing the sustainability of the facilities and the capability of local governments, whereas it has some challenges such as the high cost of implementation and need for long-term evaluation.

The organisations engaged in rural water supply are DNA at the national level, DAS at the provincial level and SDPI (District Planning and Infrastructure Service) at the district level.

5.7.4 Existing Plans and Programmes for Rural Water Supply

The existing plans and programmes specific to rural water supply include the "National Water Policy" of 2007, the "Strategic Plan for Rural Water Supply and Sanitation (PESA-ASR) 2006–2015" of 2007, and the "Rural Water Supply Manual (MIPAR)" of 2001. There are a number of projects with international cooperation by JICA, SDC (Switzerland), UNICEF, AusAid, the Netherlands, MCA, Islamic Development Bank, DfID, AfDB and CIDA.

Chapter 6 Existing Conditions of Major Urban Centres

6.1 Introduction

Urban centres are very important elements of the spatial structure and places for social and economic activities in the Nacala Corridor Region. In this chapter, the present situation of major urban centres, including Nacala Bay Area (Nacala Municipality and Nacala-a-Velha), Greater Nampula, Cuamba and Lichinga and Pemba, are described.

6.2 Nacala Municipality and Nacala-a-Velha District

6.2.1 Present Situation in Nacala Municipality and Nacala-a-Velha District

The seaport of Nacala, the starting point of the Nacala Corridor, is situated on the eastern coast of Nacala Bay, belonging to Nacala Municipality. On the western coast of Nacala Bay, a large scale bulk port is under construction for the export of coal, to be operated by the mining company. The western coast of Nacala Bay mostly belongs to Nacala-a-Velha District. The combined area of Nacala and Nacala-a-Velha is designated as the Nacala SEZ (Special Economic Zone).

According to the census, Nacala Municipality had about 206,449 inhabitants in 2007, distributed over an area of around 370 km^2, with a density of 558 persons per km^2. The municipality area is managed by two administrative posts and 22 neighbourhoods (bairros). Among the 22 bairros, nine have rather rural characteristics. Nacala-a-Velha District consists of two administrative posts. The total population of the district was 88,807, of which 66,666 inhabitants, or 75.1% were in Nacala-a-Velha Administrative Post (AP) and the remaining 22,141, or 24.9%, lived in Covo (AP).

6.2.2 Urban Structure and Transport System for Nacala Municipality and Nacala-a-Velha District

In the entire area of the SEZ, the built-up area with a road network of secondary roads is limited to two locations, namely the city centres of Nacala and Nacala-a-Velha. The corridor line, or EN-12, approaches the SEZ from the south-west and turns to the north heading to the seaport of Nacala. Along this main access route to the port city, many factories have located recently enjoying the privileges of the SEZ. From the centre of Nacala, a paved road extends to the north up to the end of the peninsula where several resort facilities have been located. Near the middle of this road, the international airport is under construction. Several administrative buildings have been constructed in the area from the entrance point of the road to the gate of the airport.

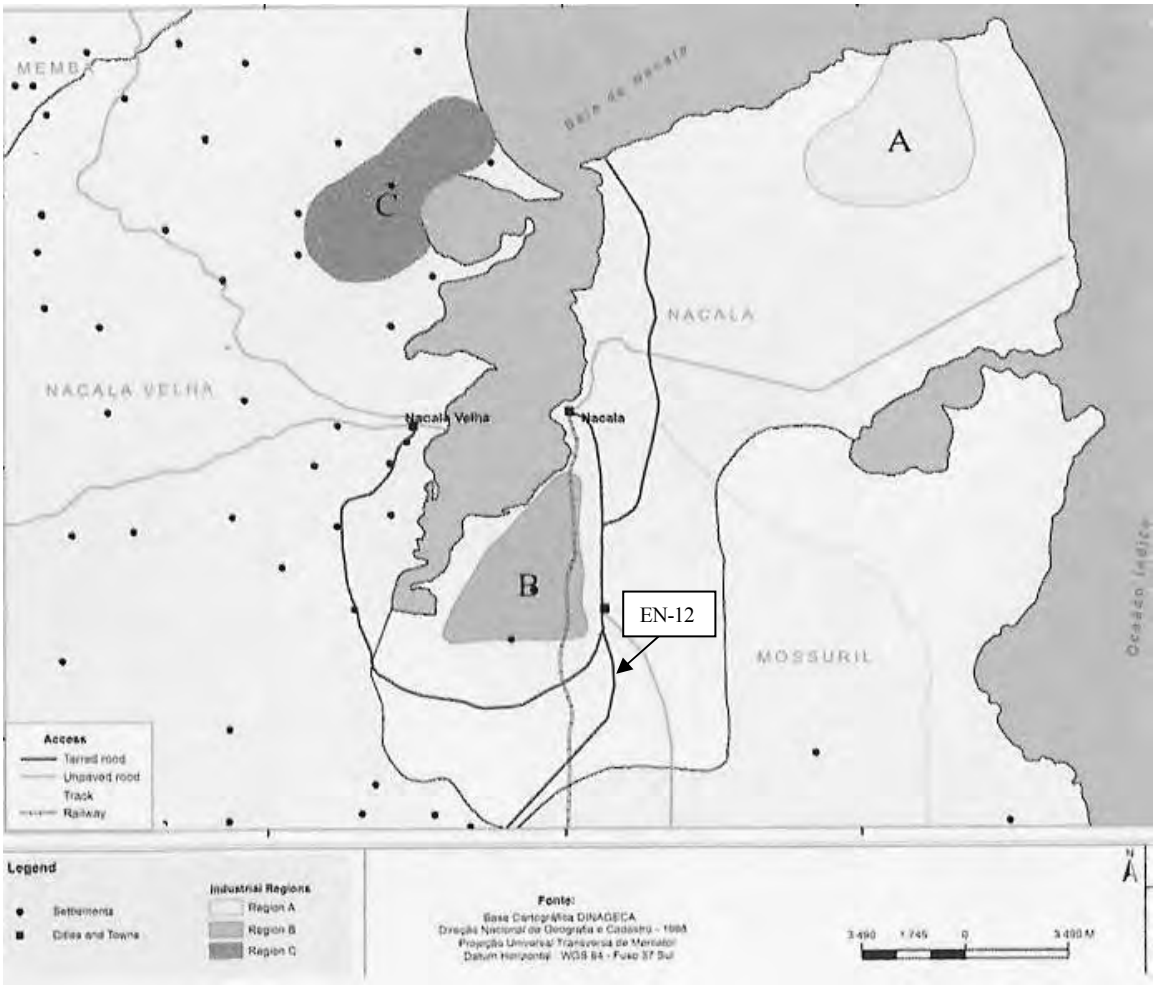
EN-12 has a junction at the south end of the bay, and the branch road extends to the city centre of Nacala-a-Velha, running along the west side of the coast. From the centre of Nacala-a-Velha, several roads head north and west, forming radials. The one heading to the north is linked to the

centre of Memba District, while the others head to rural areas and end without connecting to major roads. All of these roads are unpaved.

The city centre of Nacala is situated on the planned built-up area in the middle of the eastern coast of Nacala Bay. The planned built-up area is formed from the top of the hill to the port area. There are older manufacturing industries located in the flat areas near the port. The surrounding valleys of the planned area are mostly occupied by unplanned settlements, which suffer from occasional land slide and erosion, on top of the lack of necessary infrastructure.

Nacala-a-Velha is not yet affected by urbanization pressure, but will inevitably face a massive influx of population triggered by the start of operation of both the new port dedicated to the coal export and the railway connecting the port with the Nacala Corridor. Once the urbanization starts, it will be hard to accommodate the immigrants in the existing built-up area. The district is already experiencing a shortage of accommodation facilities for the newly arrived workers, as the construction of the bulk port brought many engineers and workers to the area.

Within the SEZ, GAZEDA plans to promote development of IFZs (Industrial Free Zones). The candidate sites defined by GAZEDA are shown in Figure 6.2.1 along with the main road networks.



Source: GAZEDA

Figure 6.2.1 Proposed Locations of Industrial Free Zones

6.2.3 Utilities for Nacala Municipality and Nacala-a-Velha District

The present water sources consist of both surface water (main system) and groundwater (secondary system). There is no sewerage system constructed in the area.

(1) Main System (Muecula Dam based Surface Water System)

The main system, developed in the mid-seventies, is Muecula Dam (Nacala Dam) located on Muecula River. This dam is being rehabilitated as ongoing construction works under MCA (Millennium Challenge Account) as a separate project independent of the short-term water supply system expansion. The rehabilitation works are aimed to expand the average capacity of the dam from 7,200 m^3/day to 17,000 m^3/day with a maximum capacity in the rainy season of 25,000 m^3/day. The rehabilitation works on the dam were expected to be completed in 2013. However although the rehabilitation of framework has been already completed, the rehabilitation of pipes from the dam to the water supply facilities was not completed as of May, 2014.

Water abstracted from the dam is treated by using chemically assisted filtration consisting of coagulation/flocculation and a sedimentation system followed by a pressure filter system and is then pumped to the city using 300/400 mm diameter transmission mains of 28 km total length and is then distributed to the Nacala Municipality area using a set of distribution centres. The current water treatment system is an abbreviated form of conventional water treatment that is considered as a black box and not appropriate for treatment of typical municipal water. So this treatment plant will be completely replaced by a new slow sand filter treatment plant (with a capacity of 25,000 m^3/day) as per the ongoing construction works of the MCA project (by 2014 at the latest).

This ongoing construction work also will provide an additional transmission main of 500mm diameter with a length of 19 km as the major component. At the intermediate pump station of this new transmission main an additional transmission main of 315 mm diameter with a length of about 20km is also being installed as a separate project component with funding from Vale to supply water to its facilities in Nacala-a-Velha and also to the city centre.

(2) Secondary System (Groundwater System in the Two Aquifer Areas of Mpaco and Mutuzi)

There are four boreholes, two each in both of the aquifer areas of Mpaco and Mutuzi that are in operation and their total production capacity is 4560 m^3/day (as of May 2013). Water produced is distributed with no treatment other than chlorination, typical for groundwater.

Accordingly, the total production capacity of the whole system (main and secondary) amounts to 11,760 m^3/day (7,200+4,560). Water from both Mpaco and Mutuzi aquifers are mixed with the main system. It is noted that water from the secondary system will continue to be distributed to the Nacala Municipality area only.

The project component for the secondary system regarding capacity expansion of Mpaco and Mutuzi aquifers that was initially planned under MCA finance has been modified with financing from the WB. Accordingly, the total production capacity from both of these aquifers will be developed to their maximum total safe yield capacity of about 16,000 m^3/day (15,600 m^3/day to be exact) in the short-term as the immediate water supply development for Nacala (to supply water to the current service area of Nacala Municipality).

As of May 2013, four additional boreholes have already been completed in Mpaco resulting in a

total of six boreholes (along with the two operational ones with total production capacity of 2,160 m^3/day) and the corresponding total production capacity of this aquifer has been increased to its maximum potential yield of about 8,400 m^3/day.

Similarly for Mutuzi, four additional boreholes have already been completed resulting in a total of six boreholes (along with the two operational ones with a total production capacity of 2400 m^3/day) with total maximum potential yield of about 7,200 m^3/day.

Not all of these eight additional new boreholes drilled in Mpaco and Mutizi are currently operational since the required submersible pumps are yet to be received for installation. Even when all wells become operational, the production capacity of the Mutuzi well-field will be limited to operation of only four boreholes (with two boreholes as standby) with a total production capacity of only 4,800 m^3/day due to the capacity limitation in the Mutuzi water transmission mains. As such, the total operational production capacity when all 10 boreholes are in operation (six in Mpaco and four in Mutuzi) would be about 13,200 m^3/day.

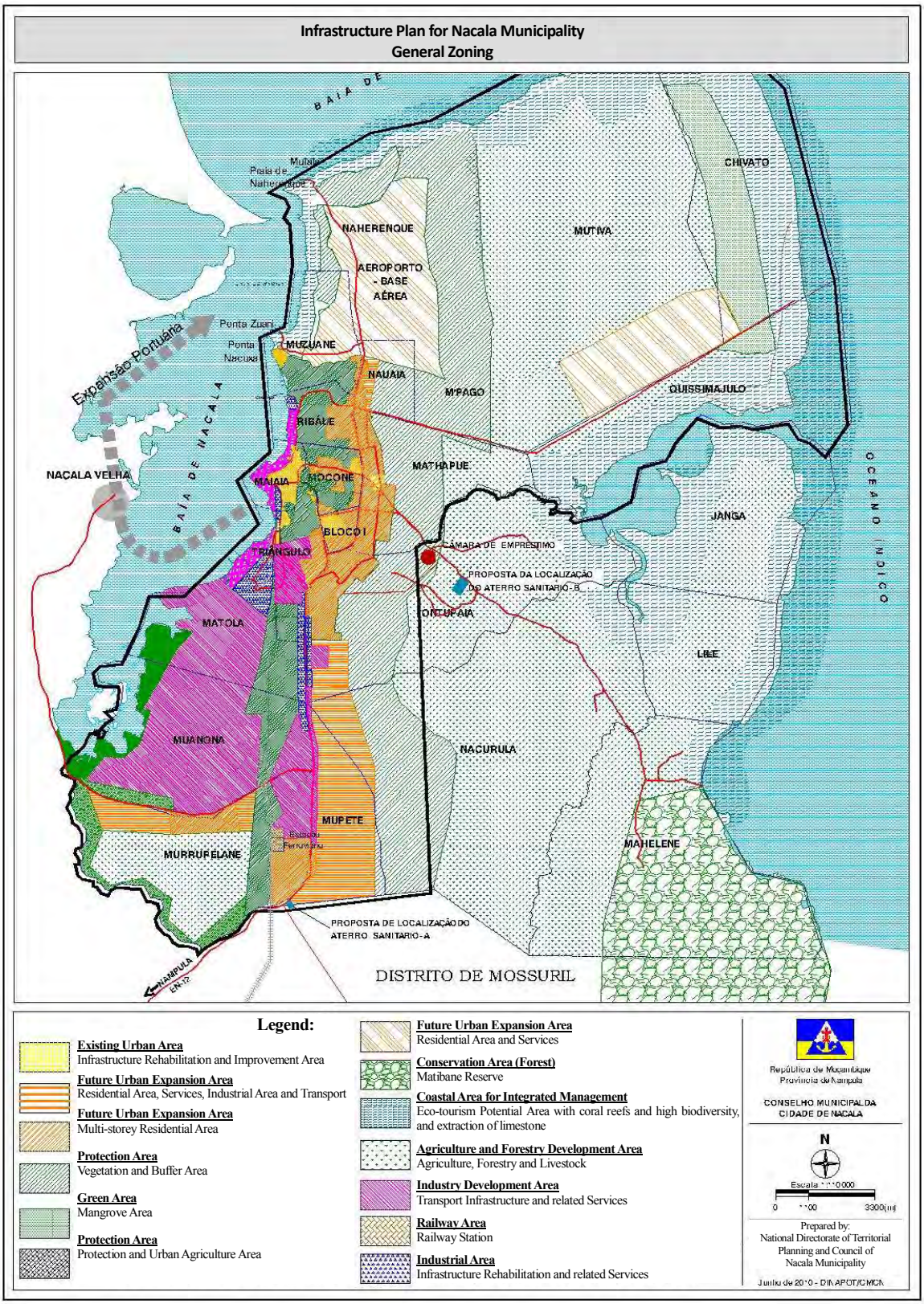
6.2.4 Planning Issues on Nacala Municipality and Nacala-a-Velha District

In both local governments in the Nacala SEZ, spatial plans were prepared and approved in 2010. However, these were prepared separately with different guidelines as the status of the local governments is different.

Being a district, the newly formulated spatial plan of Nacala-a-Velha is the Land Use Plan which is basically aimed for use in rural localities. Thus, it is widely pointed out that the effectiveness of the plan might be quite limited for the rapid urbanization expected to take place in Nacala-a-Velha. There is a need to formulate a more detailed spatial plan which can be usable to guide the urbanization with more specific designation of land use.

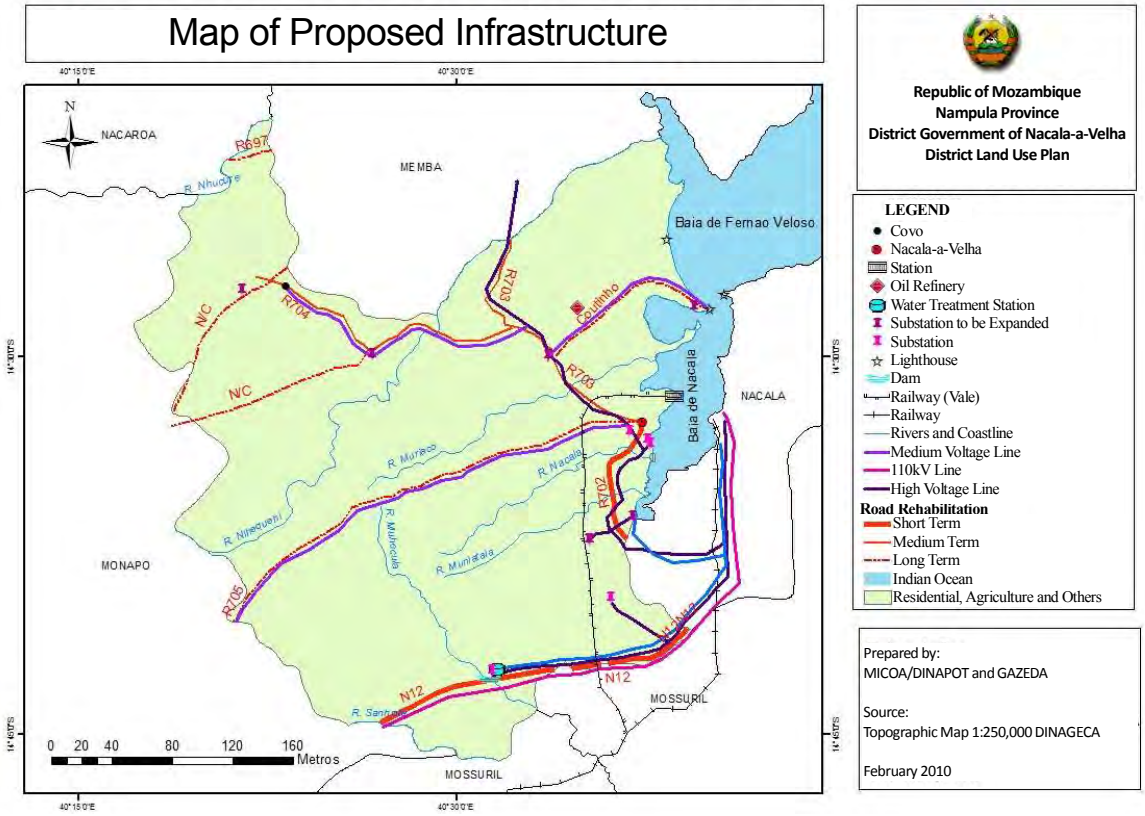
The spatial plan recently prepared for Nacala Municipality has a certain level of detailed information, as it is formulated as a Structure Plan. The plan, however, may need to be modified as the concept of the IFZ was still at an immature stage when the Structure Plan was formulated.

- Based on these facts mentioned above, there is a strong request from the local governments to formulate a structure plan for the entire SEZ, combining the territories of the two local administrations. This idea is fully supported by GAZEDA, as well as MICOA (Ministry of Coordination of Environmental Affairs, which is the Ministry of Land, Environment and Rural Development since January 2015) and other central government agencies. In the formulation of the Structure Plan, the following issues need to be taken into consideration:
- Identification of the future regional economic structure, which will necessarily be affected by the starting of operation of the coal industry, as well as various transport infrastructure including the airport, railway, and seaport,
- Restructuring of the transportation network to be suitable to the new composition of major transport facilities including the port, railway and airport,
- Identification of the sites of the IFZ equipped with reliable strategies for realisation as well as more detailed consideration for identification of the most promising types of industry, and
- Identification of residential space to be promoted, as well as improvement of unplanned areas.



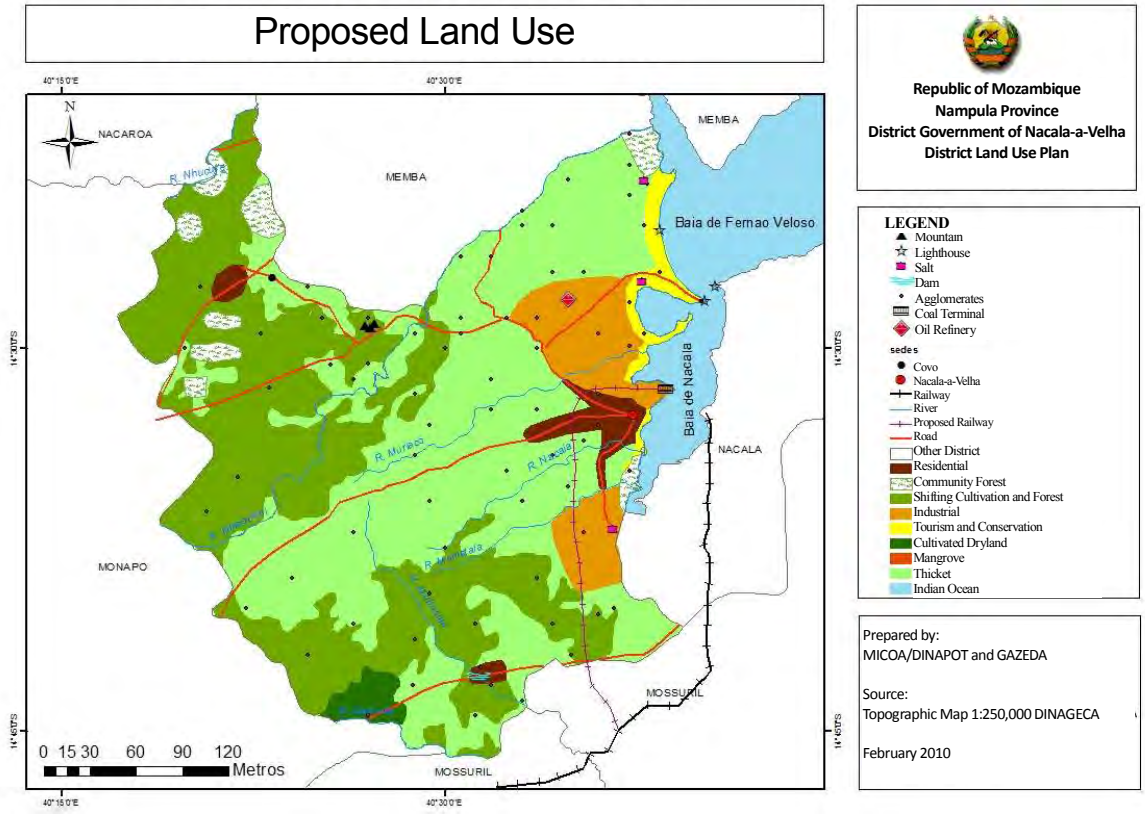
Source: Nacala Municipality, 2010

Figure 6.2.2 General Zoning Plan of the New Structure Plan for Nacala Municipality



Source: Nacala-a-Velha District Government, 2010

Figure 6.2.3 Future Infrastructures in the New Land Use Plan for Nacala-a-Velha District



Source: Nacala-a-Velha District Government, 2010

Figure 6.2.4 Future Land Use Zoning in the New Land Use Plan for Nacala-a-Velha District

6.2.5 Existing Condition of Solid Waste Management in Nacala Municipality

(1) Solid Waste Generation and Collection

The Nacala Municipality manages the collection, transport and dumping of solid waste generated within this area. Based on records kept on the solid waste collected in the Nacala Municipality, it is estimated that about 150 tons are collected daily on average. The Nacala Municipality officially manages two dumping sites. However, in addition, it is possible that solid waste which is discharged to other places. By the environmental management project funded by South Korea's Ministry of Environment, the total waste generation is estimated to be about 250 tons/day. Table 6.2.1 shows the physical composition of the collected solid wastes in Nacala. It shows that 27% of the total waste is non-combustible, which is discharged to open dumping sites without separating them from combustible waste.

Table 6.2.1 Physical Composition of the Collected Solid Waste in Nacala

Classification		Composition (%)
Combustible	Food	20.9
	Plastic	8.7
	Wood	9.6
	Textile	2.2
	Rubber	0.6
	Others (organic)	12.5
	Sub-Total	73.0
Non-Combustible	Metal	2.2
	Glass	0.8
	Others (inorganic)	24.0
	Sub-Total	27.0

Source: South Korean Ministry of Environment, Interim Report of Environment Management Master Plan (Waste), 2011

(2) Situation of Dumping Sites

Currently, the Nacala Municipality manages two places for dumping solid waste generated in Nacala City. Figure 6.2.5 shows the location of the dumping places.

The first dumping site is located about 15 km to the south of Nacala Port and is about 2 ha (200m × 100m) in size. The site is not fenced in. The land is not excavated at all and the landfill area is used for dumping wastes without any treatment, which is the most dangerous way of waste treatment. The types of waste vary from household waste to plastic, industrial waste, glass to construction waste. Although some waste are sometimes burned, this is not conducted by the municipal office. However, since there is no residents living around the area, there are no claims nor complaints at the present.

The second dumping site is located about 10km to the east of Nacala Port and has about 10 ha in size. This site also has no fence. Additionally, there is no landfill treatment area and the waste is just dumped into many holes. With the permission from the Nacala Municipality, any business operators can enter the area and can dump any types of waste other than hazardous materials.

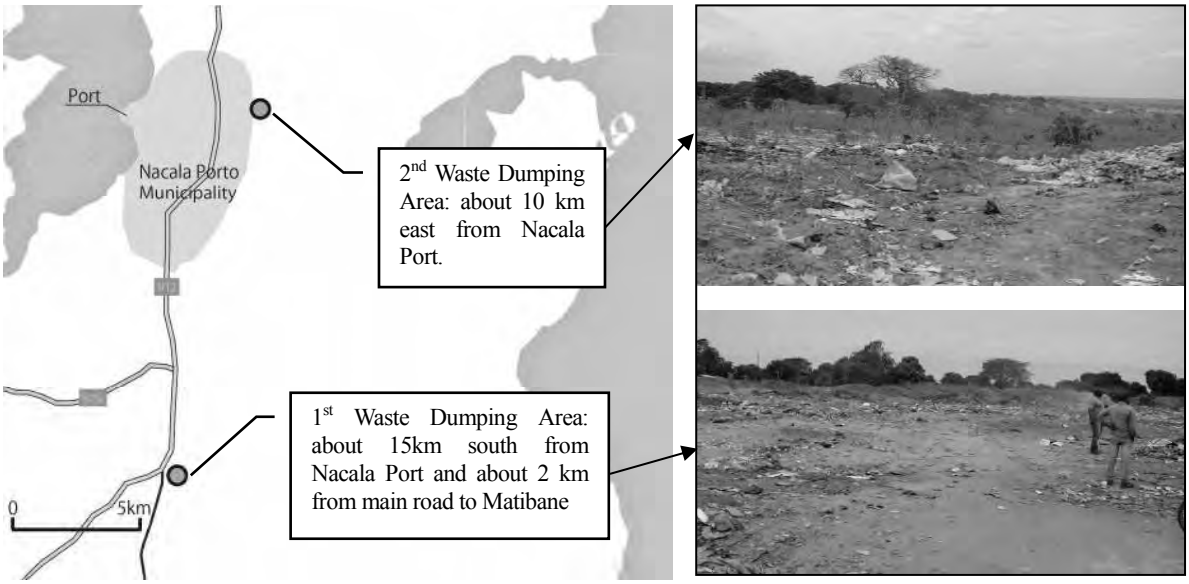


Figure 6.2.5 Location of Dumping Sites in Nacala Bay Area

(3) Situation of Staff and Equipment

The Nacala Municipality has the following staff and equipment:

Staff

- Sanitation Worker (Cleaning): approximately 200 staff (mostly female)
- Sanitation Worker (Collection): approximately 40 staff
- Technician: 2-3 staff

Equipment

- Container: 14 units
- Container Truck ($6m^3$): 2 units
- Tractor ($3m^3$): 3 units
- Automatic Collector Truck ($20\ m^3$): 1 unit
- Incinerator: none
- Other treatment equipment or hazardous materials storage: none

(4) Current Management System for Industrial Waste and Hazardous Materials

Hazardous materials are discharged in deep holes in the area which is determined by the Municipality, Police and Waste Management Department. However, medical wastes from hospitals are discharged to the dumping places with other domestic waste.

(5) Cost of Industrial Waste Treatment

Currently, the Nacala Municipality charges MT 700 per m^3 for the treatment of the industrial waste from business operators.

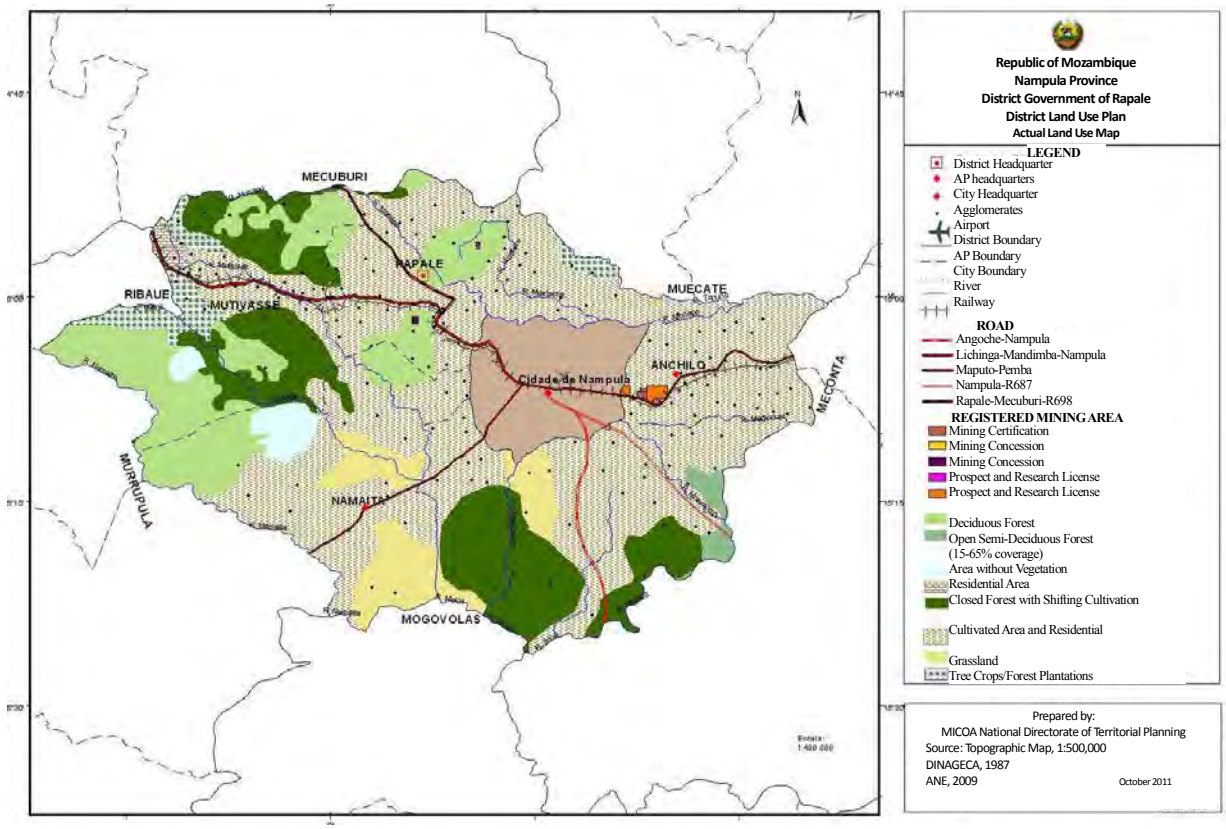
6.3 Nampula Municipality and Surroundings

6.3.1 Present Situation in Nampula Municipality and its Surroundings

Nampula is the capital city of Nampula Province, and is considered as a centre of the Northern Region. The Nampula urban area is the third largest in the country in terms of population and extension of infrastructure. The territory of Numpula Municipality is completely surrounded by Rapale District, which has its headquarters in Rapale AP. The city is located along the railway line from Nacala to Malawi and the road link with the Provinces of Zambézia and Cabo Delgado.

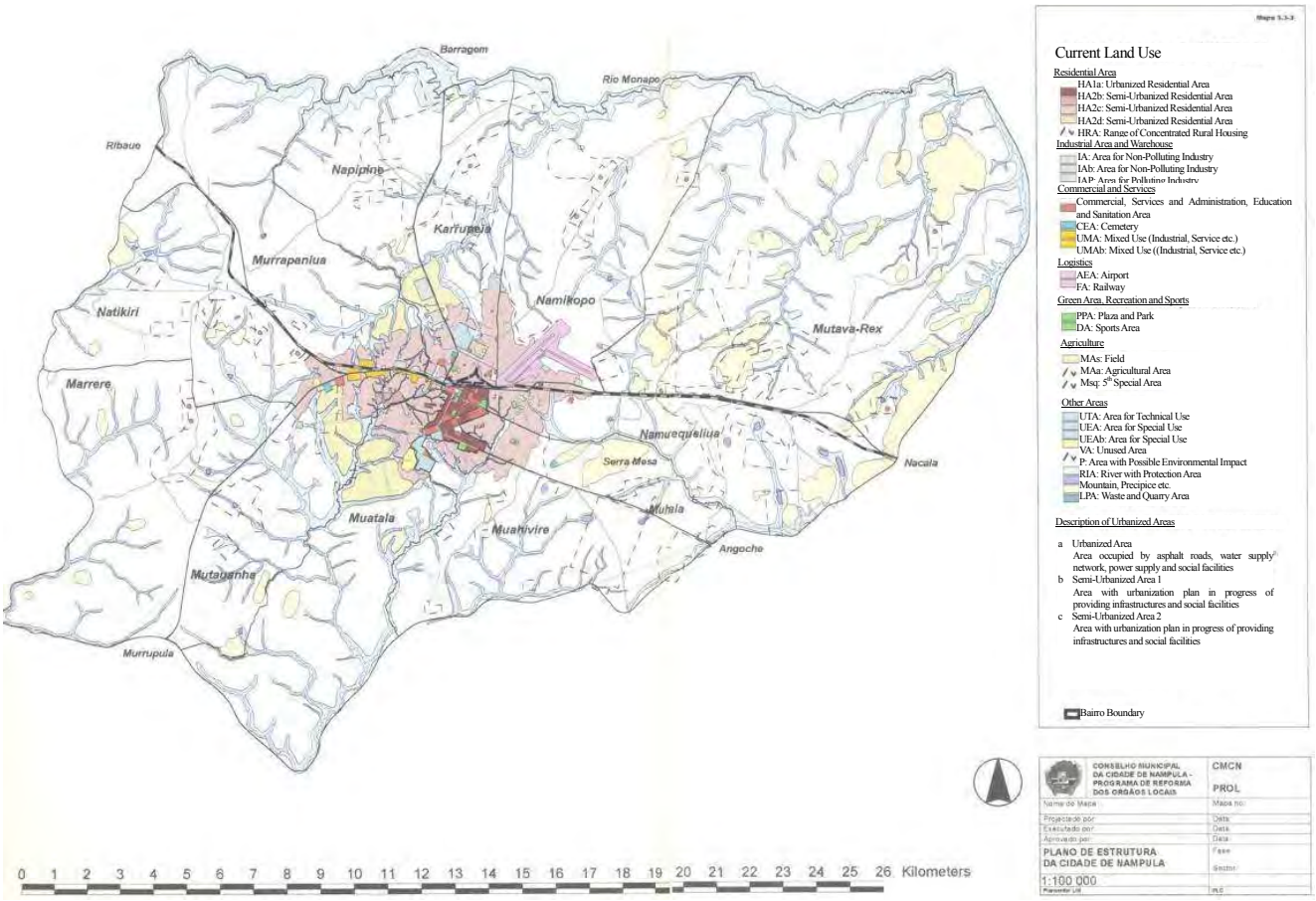
The municipal area is divided into six administrative posts, which are further divided into 18 neighbourhoods (bairros). The Central AP covers the cement city with six small neighbourhoods for the other posts, the administrative division is made radially and each neighbourhood extends from the boundary of the Central AP. According to the second census taken in 1997, the city of Nampula had about 303,000 inhabitants. The population increased by 4.6% per year and the third census taken in 2007 indicated a population of 477,771.

The Rapale District comprises four administrative posts including: Rapale, Mutivaze, Namaita and Anchilo. According to the 2007 population census, Rapale District was one of the most populous districts of Nampula Province with 203,733 inhabitants. The district population represents 8.3% of the provincial population representing a considerable population increase. The territorial distribution of the population in the district is rather irregular as the Anchilo AP had 75,543 inhabitants, corresponding to 59% of the population of the district.



Source: DINAPOT, MICOA, 2011

Figure 6.3.1 Current Land Use of Rapale District



Source: MCA, CENACARTA

Figure 6.3.2 Current Land Use of Nampula Municipality

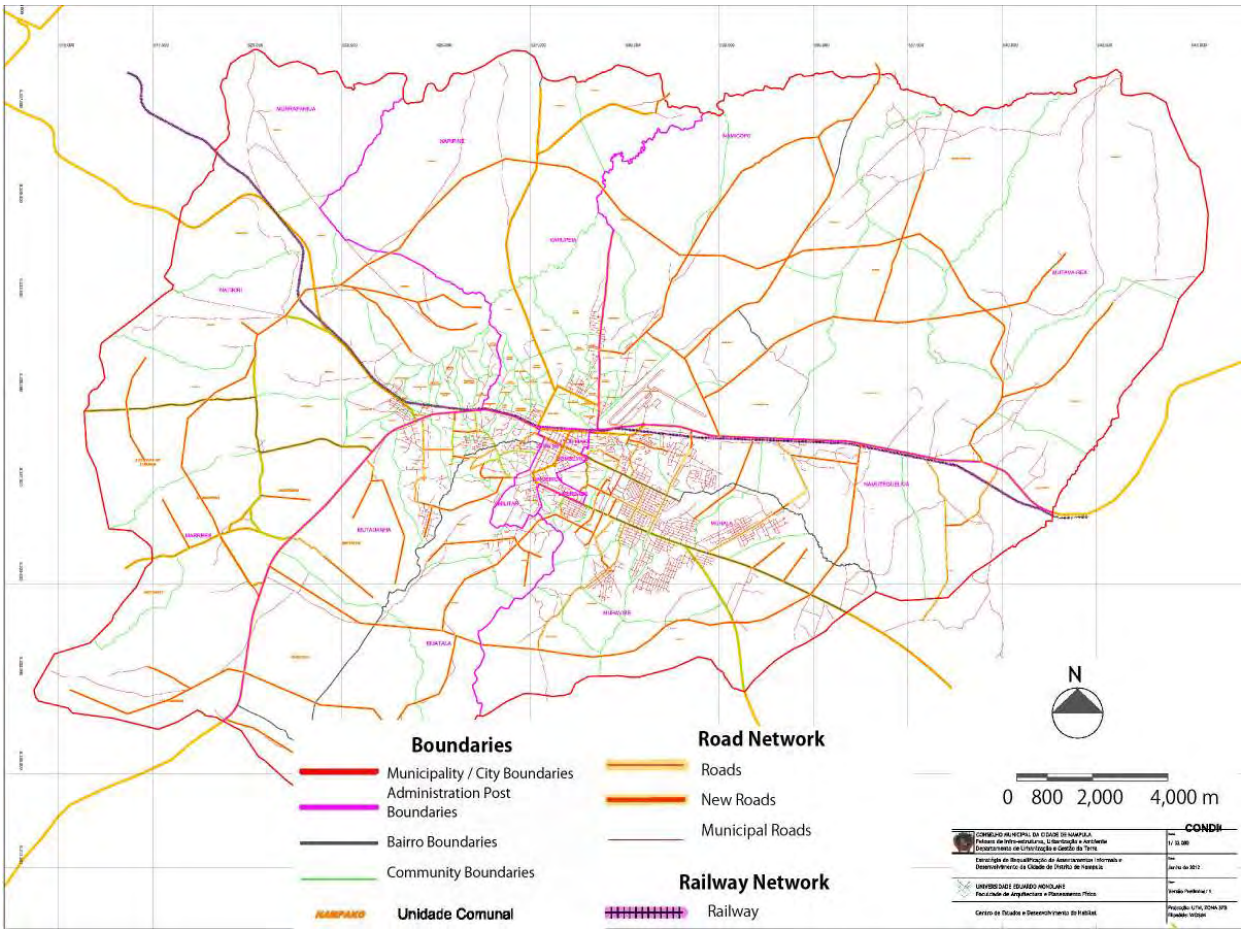
6.3.2 Urban Structure and Transport System for Nampula Municipality and its Surroundings

The present city centre of Nampula Municipality area is located in a planned area developed during the Portuguese era. This central built-up area is situated on a large high land prominence and surrounded by valleys which consist of rather gentle slopes. The fringe of the unplanned residential area is formed of hilly parts once again, and thus several housing developments have been planned by the municipal government. The area of unplanned settlements is significantly large and suffers from the risk of erosion and lack of infrastructures.

The railway runs on the ridge of the hill forming the city of Nampula. There is a railway station in the middle of the built-up area serving passengers as well as cargo. A shunting yard is located on the west side of the station, while the international airport of Nampula is situated north east and covers a large area. The planned built-up area is on the south side of the railway. Since the urbanization has taken place on the north side of the railway, these transport facilities are coming to be the major factor dividing the city area into two areas.

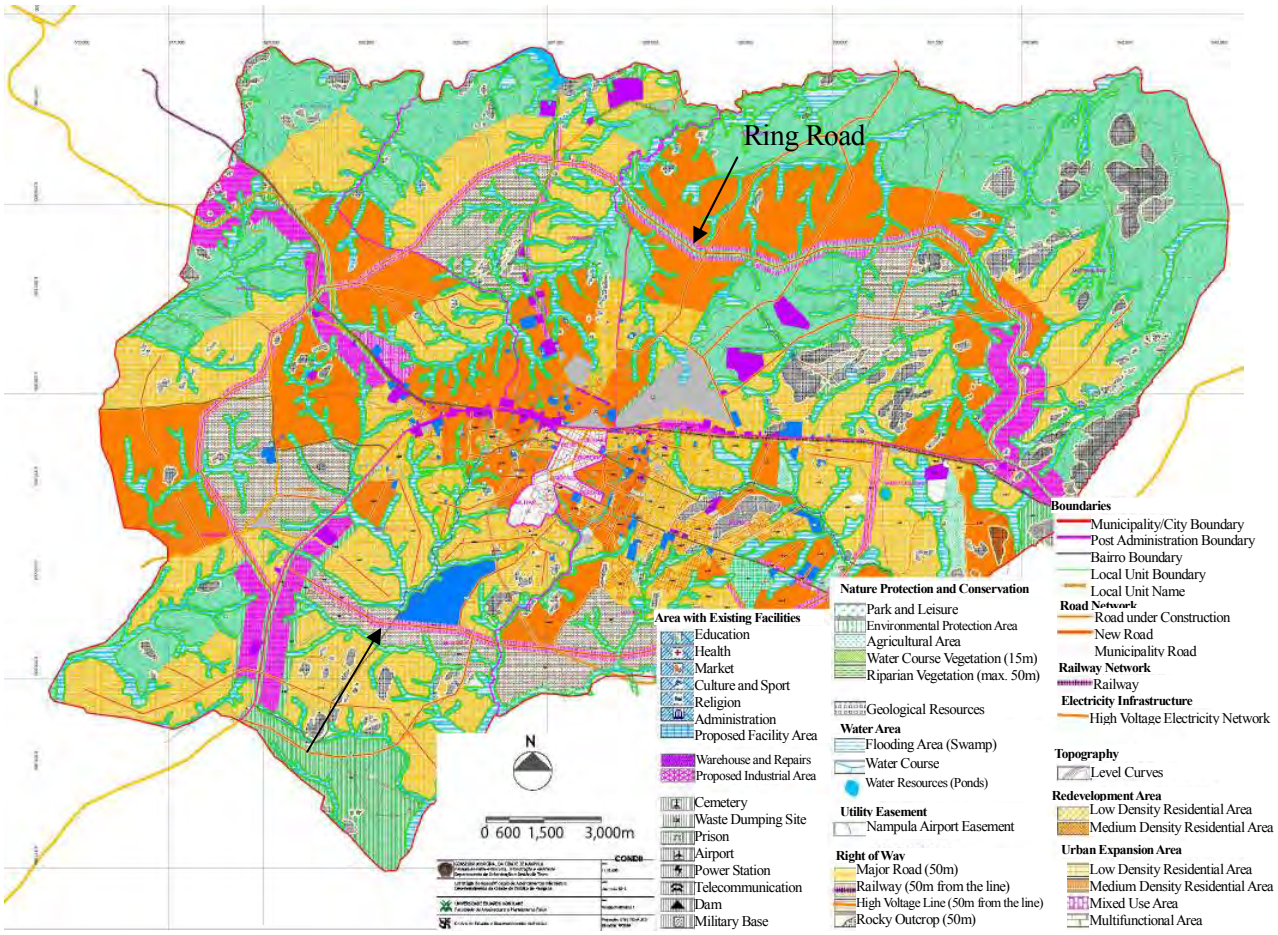
The national road (N-13) also runs in an east-west direction along the railway, and currently functions as a trunk urban route for both city dwellers and bypassing traffic. The road is facilitating the formation of the ribbon style sprawl, especially to the east to the area of Anchilo AP. Regarding the area to the west, the road separates into two directions: EN-13 to link with Cuamba, Lichinga, and Malawi, and EN-1 to the Central and Southern Regions.

There is a land use inventory map that was prepared as a part of the MCA programme for the territory of Nampula Municipality. This is followed by the formulation of the Partial Urbanization Plans with technical and financial assistance by various donors coordinated by the UN-HABITAT. The Partial Urbanizations are prepared for five areas covering almost all the territory of the municipality except for the central city part. The programme also covered the neighbouring bairros belonging to Rapale District along the three national roads stretching to the outside. The major outputs of the Partial Urbanization Plan are presented in Figure 6.3.3 and Figure 6.3.4.



Source: Nampula Municipality and UN-HABITAT

Figure 6.3.3 Transport Network Proposed in Partial Urbanization Plan



Source: Nampula Municipality and UN-HABITAT

Figure 6.3.4 Land Use Zoning Proposed in the Partial Urbanization Plan

6.3.3 Utilities for Nampula Municipality and its Surroundings

As of December 2011, the total number of house water connections in Nampula Municipality was 23,933. The total number of institutional, industrial, municipal and commercial connections was 743. Total number of public stand pipes was 453. Overall unaccounted for water for the whole year of 2011 was about 32%. There is no sewerage system developed yet in Nampula City.

Monapo Dam, built in 1959 along Monapo River located about 9km north of the city, is the sole water source for the Nampula Water Supply System. Live storage of the dam was estimated at 3.3 million m^3 (MCA F/S on water supply with target year 2029 dated 2010). The existing capacity of the system is 20,000 m^3/day that is supposed to become doubled to 40,000 m^3/day with the completion of the construction works for the water supply system upgrade and expansion (MCA) in early 2014. However, it turns out that this construction work does not enable the Monapo Dam to reserve an enough volume of water for supplying 40,000 m^3/day. Therefore, the construction of a small weir on the Meluli River and taking water from the Meluli River for providing to the reservoir of the Monapo Dam is required. This additional work will be conducted by the support of WASIS II Additional Package.

Water abstracted from the dam is treated with a conventional water treatment process that consists of chemical addition, rapid mixing, coagulation, flocculation, sedimentation and rapid sand filtration. Treated water is pumped to the city through two 400mm nominal diameter transmission

mains (one is an old asbestos cement pipeline and the other is a relatively new PVC pipeline) and distributed via two distribution centres; one serving the city centre area and the other the airport area.

The total length of the water distribution network is about 450 km and has expanded very rapidly since 2009, which resulted in achieving a service coverage ratio of 68% in 2011. Moreover, under the ongoing WASIS Project (WB) the distribution network will be expanded further to a total length of approximately 510 km by 2014. The primary areas targeted for expansion of the water distribution network are the two new residential development areas of Muhala and Muahivire.

Still, due to the capacity limitation, water supply service time is currently limited to 10 hr/day. It is further reported that there is very high demand for water supply service connections from residents. This is the reason behind progressing the expansion of the water distribution network even with the limitation in production capacity that resulted in rationing of water with limited service hours. The distribution network provides three types of residential service levels, house connections, yard tap connections, and public stand pipes (fountains/fontenários).

There is no significant groundwater aquifer area in Nampula. Accordingly, as the future water source, Monte Tiza Dam on the Meluli River, at least for the medium term, is contemplated by DNA.

6.3.4 Planning Issues for Nampula Municipality and its Surroundings

Being the capital city of Nampula Province, the city of Nampula has attracted economic investment in the commercial and manufacturing industries. This will continue to be so as the city has the third largest population in the country, and thus, will attract consumer oriented services and industries. In addition to the city's already strong economic base, overall economic activities will inevitably be stimulated by the start of full-scale operation of the Nacala Corridor. This will lead to the further expansion and integration of the Nampula economy to the surrounding areas, not limited to the neighbouring road-side communities, but also to the rural communities.

It is pointed out by the representatives of the local administration that there is a need for preparation of a Structure Plan for the city, which covers areas adjacent to the municipal boundary. It has already been identified in the course of the formulation of the Partial Urbanization Plans that at least three neighbouring towns along the national road are under the strong influence of the urbanization of Nampula Municipality area.

As shown in Figure 6.3.4, a ring road is proposed in the partial urbanization plan and widely accepted among the stakeholders in and around the city. On the other hand, there has been no discussion on the significance of the traffic load on the existing railway which is running across the city dividing the major built-up areas of the city. The major planning issue in the formulation of the Structure Plan for the wider Nampula area will be the realignment of the railway which matches the proposed ring road.

6.4 Cuamba Municipality

6.4.1 Present Situation in Cuamba Municipality

Cuamba Municiplity is located at the junction of the two railway lines: 1) the railway from Nacala to Malawi Border and 2) the railway from Lichinga to Cuamba. Cuamba is also located at the crossroad of three trunk roads: 1) Nampula-Cuamba, 2) Lichinga-Cuamba and 3) Marrupa-Cuamba. At present, all of these railway lines and trunk roads are in bad shape. However, since the upgrading of railways and trunk roads is underway, this transport situation would make Cuamba City strategically very important.

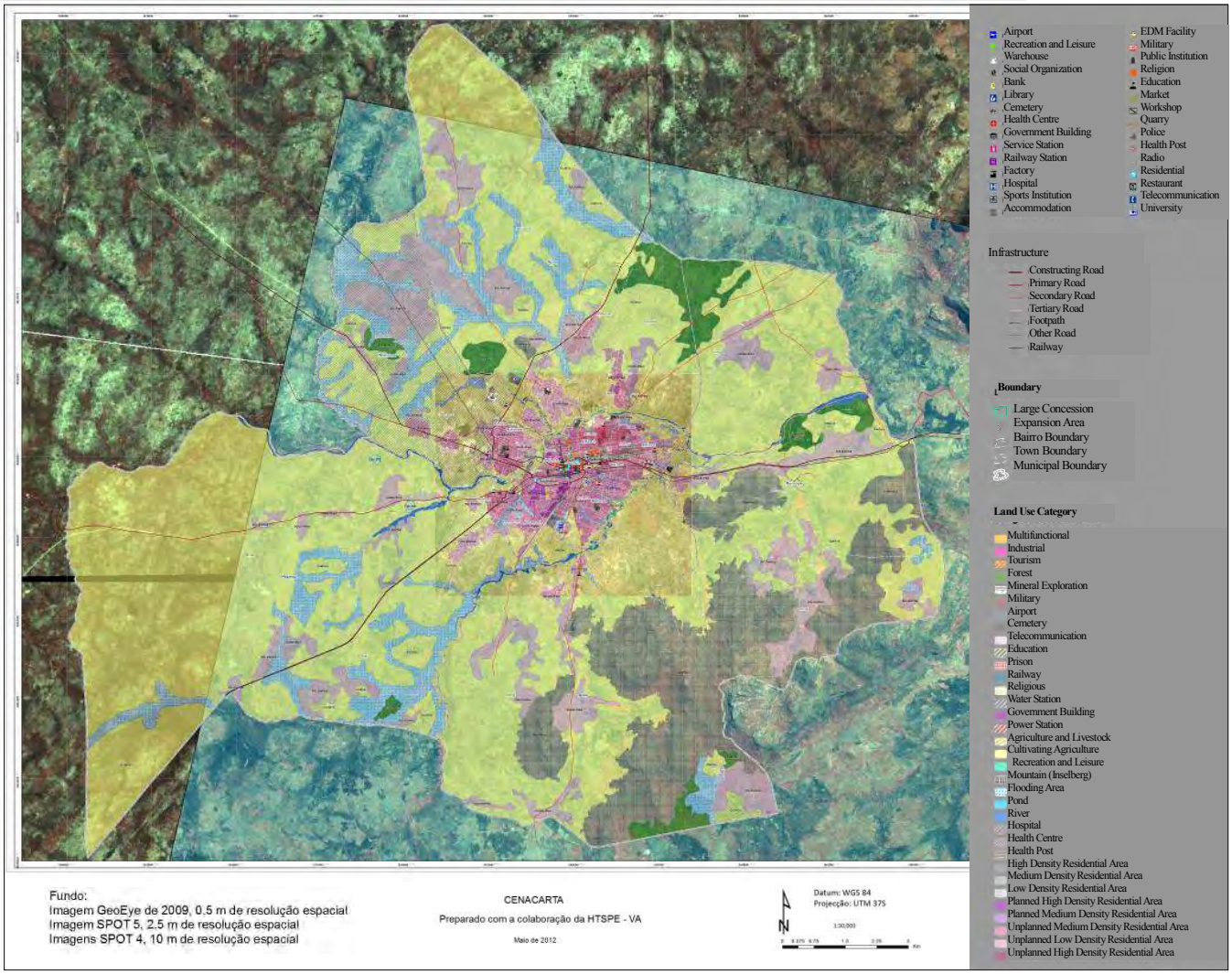
The speed of urbanization in Cuamba Municipality has not been so rapid. However, it has been considered that, a large change would happen to the urban areas of Cuamba soon after the completion of the ongoing road upgrading projects of Nampula-Cuamba, Cuamba-Mandimba and Mandimba-Lichinga. It has also been considered that the operation of coal railway transport from Tete to Nacala Port would also affect urbanization since the movement of non-coal cargoes would largely change.

A Structure Plan whose target year is 2008 was prepared for the Cuamba Municipality. A revision on the 2008 Structure Plan was completed in 2013. However, it has not been approved by the municipality assembly yet. For Cuamba Municipality, a Land Inventory Map was prepared as a part of MCA's programme as shown in Figure 6.4.1.

6.4.2 Urban Structure and Transport System for Cuamba Municipality

The city area is divided into the north side and the south side by the national road together with the railway. The city centre is located in the planned area on the north side. There is an airport located on the south side where density is lower than the north side built-up area. Despite the low density, the south side is mostly covered by private land occupation. The overall conditions of the south area are not ideal for housing use as it is located close to a swamp area. The expansion of the north side has been blocked by the river running in the north. The area beyond the river is mostly vacant with scarce private land occupation.

There is a road connecting to Marrupa branched from the one to Lichinga shortly after passing the built-up area to the north-west. This road will form a part of the Lichinga-Marrupa-Cuamba triangle, which has a large potential for agricultural development. There are several unplanned settlements along these main roads, but they are not yet contiguous with the main urban area of Cuamba.



Source: MCA, CENACARTA, 2012

Figure 6.4.1 Cuamba Land Inventory Map with Satellite Images (2009)

6.4.3 Utilities for Cuamba Municipality

The current water supply service coverage in Cuamba is low at only 18% with a service time of about 6 hr/day, which is lower than the case for both Nampula (coverage 68% with 10-hr/day service time) and Nacala (coverage 50% with 15-hr/day service time). As of November 2012 the total number of domestic connections was 1,397. The total number of institutional, industrial, municipal and commercial connections was 71. Total number of public stand pipes was 21. Overall unaccounted for water was 37%. There is no sewerage system developed in the city yet.

The current source of water in Cuamba is Mepopole River. Water is sourced from a weir intake located on the river and by the side of the hydroelectric power plant. There is also the Mepeope Dam located high up in the mountains in the upstream river reaches of this weir intake that was constructed for the hydro-electric power plant. This hydroelectric power plant is practically no longer operational except in case of emergency power requirement. This weir intake source is located about 30 km from the city and at an elevation of about 85m above the elevation of the city facilitating a gravity transmission main.

This water source at Mepopole Dam has adequate capacity to meet the short-term water demand

with some improvement works and such improvements are already planned in the just completed D/D (detailed engineering design) tendered (May 2013) for start of construction by 2014. The period of construction of the short-term improvement project is planned as 18 months. The maximum available capacity of this existing water source (Mepopole Dam) was determined to be about 8,000 m^3/day according to the D/D. No particular project component for distribution system expansion is included in the tendered project for construction.

6.4.4 Planning Issues for Cuamba Municipality

The urbanization of Cuamba has been rather calm. However, it is highly expected that the city of Cuamba will face rapid urbanization led by the business and services investment once the road improvement work between Cuamba and Nampula completes. There are many factors that attract investments in Cuamba as it is located in a strategic location. The city is a centre of farming areas with high productivity, which will become an important source of food for the cities of both the coastal and inland areas. In addition, the city is an important transport node where north, south, and west routes of the sub-corridors meet the Nacala Corridor. Combining these potentials, Cuamba is likely to change to a distribution and processing centre for the Nacala Corridor Region.

6.5 Other Major Urban Centres

6.5.1 Lichinga Municipality

(1) General Situation in Lichinga Municipality

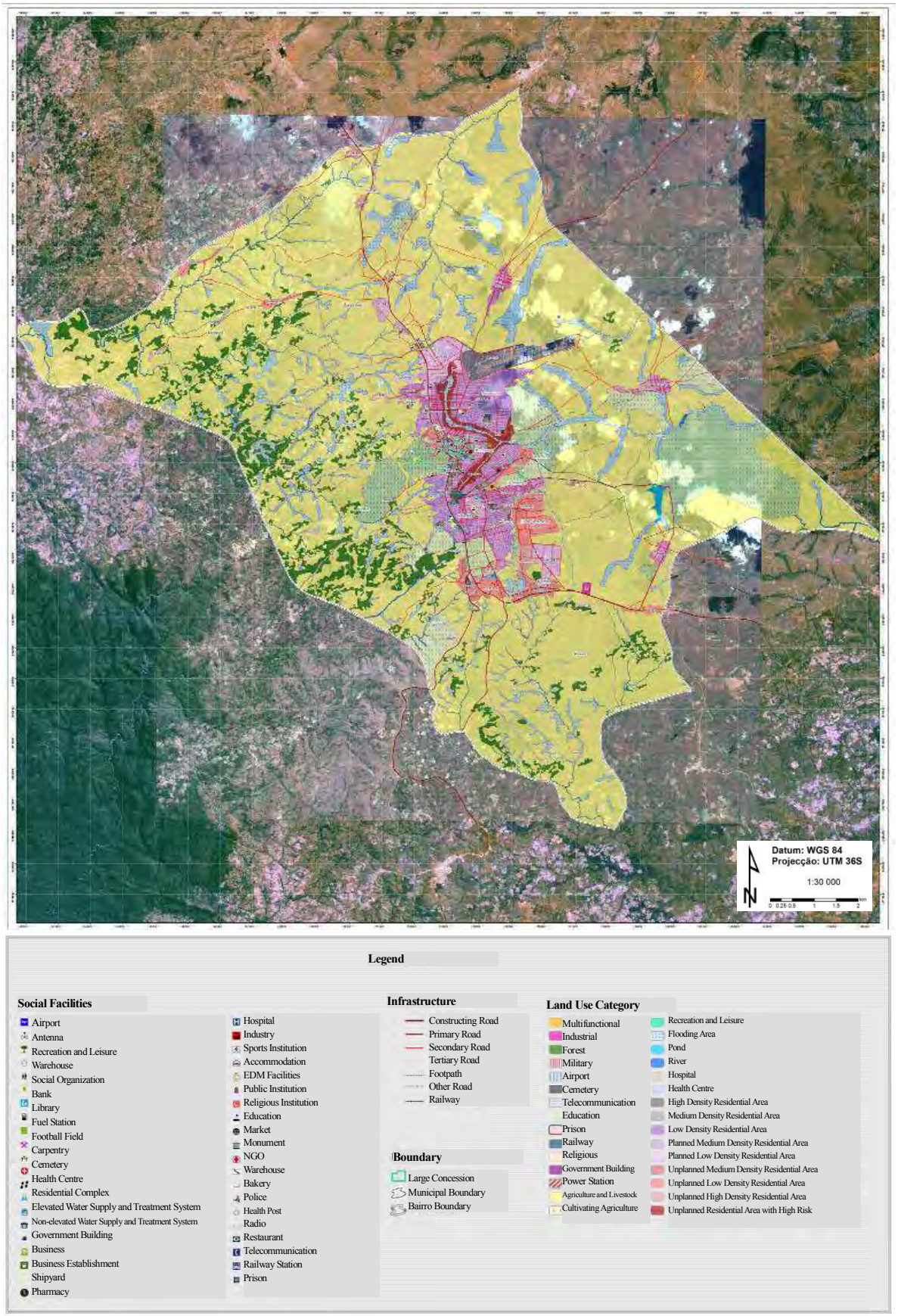
Lichinga Municipality is the capital of Niassa Province, which is located 50 km from the eastern shore of Niassa Lake. The urban area is on a high land with an altitude between 1,000 m and 1,400m. The annual temperature is 23℃ and the maximum annual temperature is 26℃, which is a comparatively cool climate in Mozambique.

Lichinga Municipality had a population of 142,331 as of 2007; it has a rapid annual growth rate of 6.60 % (average, 1997-2007). Although the population growth rate was moderate up to the early 1990's, it became rapid after the end of the civil war. This is assumed to be caused by the fact that many people who escaped and hid during the civil war came back to their own towns. The land area is 257km^2 and the population density is 573 persons/km^2.

Because its climate and soil are suitable for agriculture and forestry, most of the population works in the agro-forestry industry (cultivating corn, beans, potatoes, vegetables, livestock, and plantation). The agro-processing industry is not developed yet because of lack of fertilisers, farming skills, and facilities.

Niassa Lake and Niassa Reserve have a potential for tourism development in Niassa Province, but the industry is still underdeveloped. The city administration has plans to develop an industrial area north of the airport.

MCA developed an Inventory and Land Use Map from 2009 to 2013, as shown in Figure 6.5.1.



Source: MCA, 2013, "Report on Inventory and Land Use Map"

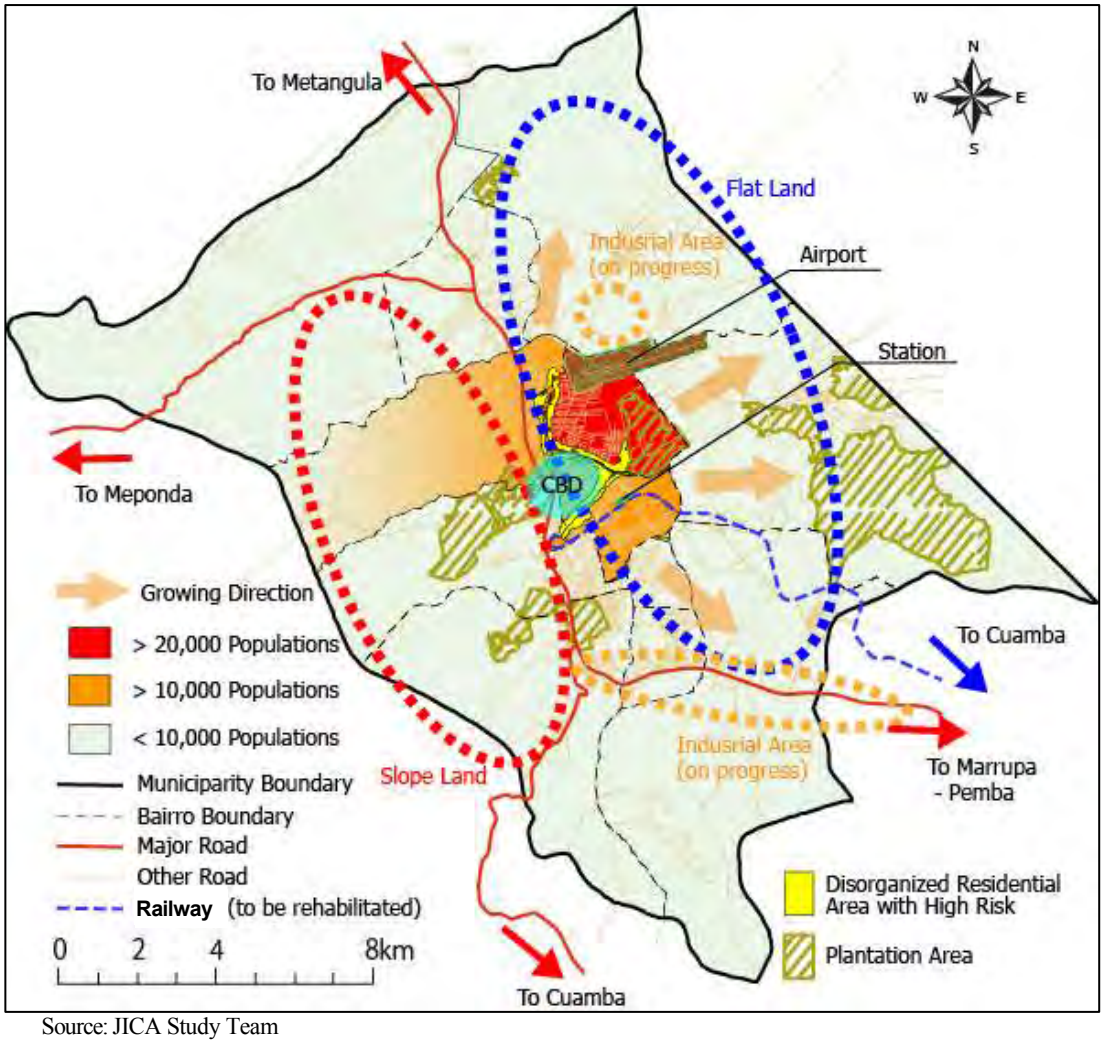
Figure 6.5.1 Inventory and Land Use Map in Lichinga

(2) Urban Structure and Planning Issues for Lichinga Municipality

Lichinga is an inland city on a hill. Its west side is on a slope, on the other hand, the east side is flat. Two provincial roads pass through the city area and almost all houses and buildings are located along these roads. There is a railway to be rehabilitated by concession of Vale in the near future. There are many unplanned houses around the railway station. The residential area may grow toward the east if there is an area with secondary road network.

The issues regarding urban development are summarized as follows:

- The current growth of population is much faster than experienced in this decade
- There is no revised structure plan to cope with the current urbanization pace. (DINAPOT is to review the revised structure plan if ready.)
- The road network and railway network are not well organized for the growing transportation demand
- The industrial base has not been developed but has potential for hotels and services for tourism and processing for agriculture and forestry products
- There is a disorganized residential area with high risk in the lower areas around the city centre (yellow coloured area in Figure 6.5.2)



Source: JICA Study Team

Figure 6.5.2 Current Basic Urban Structure of Lichinga

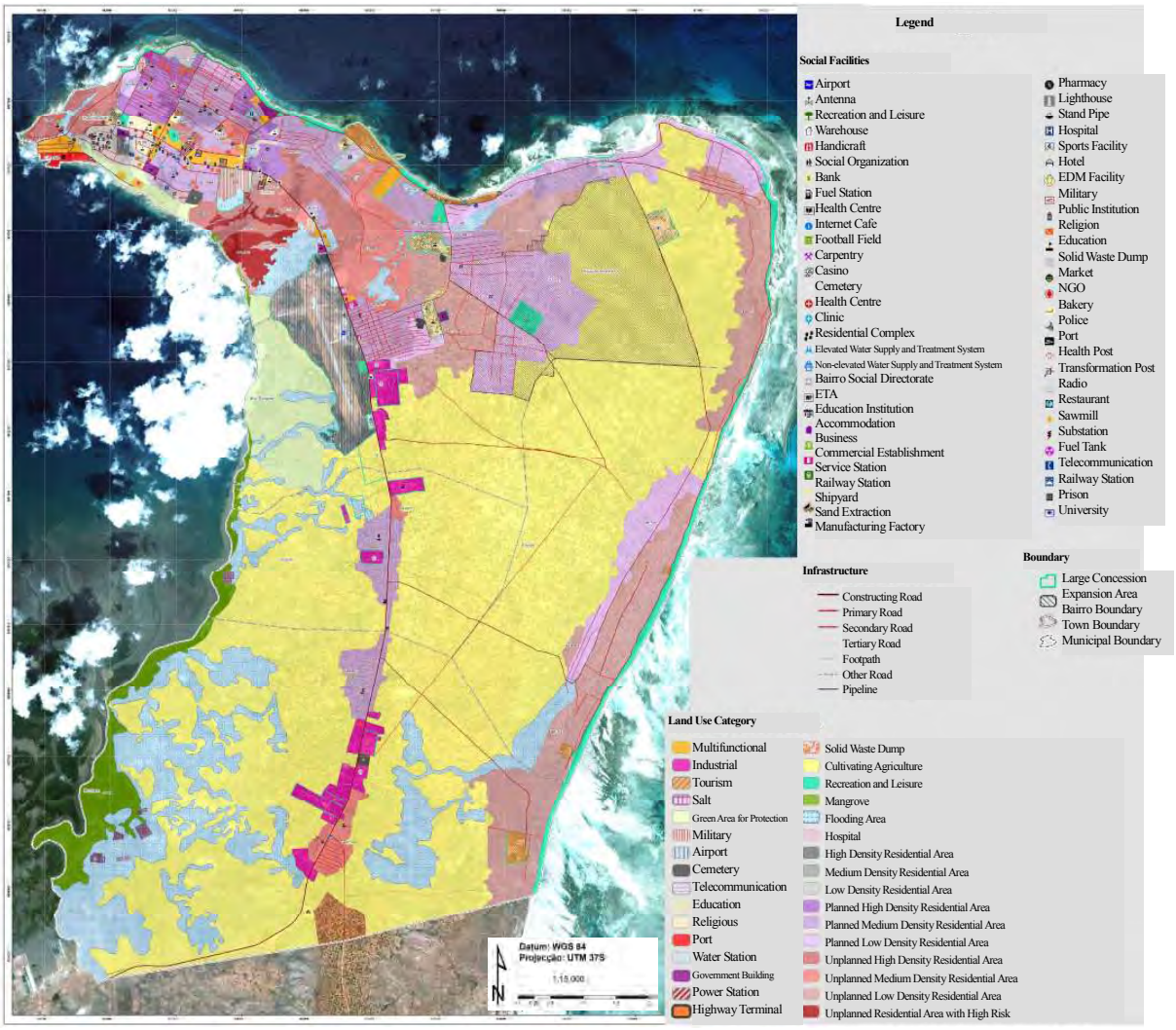
6.5.2 Pemba Municipality

(1) Present Situation in Pemba Municipality

Pemba Municipality is the capital of Cabo Delgado Province, located at the entrance of Pemba Bay. The population of the municipality was 138,716 in 2007 with an average annual growth rate of 6.34 % between 1997 and 2007. The main economic activities are fishery, tourism, and agriculture. The rural families produce cassava and corn for self-consumption, and sell at the local market when the crops are more than sufficient for their families. Fishing is also for self-consumption. The shipbuilding and cashew processing are growing as manufacturing industries. Residents have some sources of income from activities of small-scale commercial production sold in informal markets. These goods are mostly imported from Senegal, Malawi and other African countries. It is important to mention that they produce and sell the famous Makonde sculptures (black wood).

The tourism industry is currently in good shape, and some tourism facilities have been developed on the north and south-eastern coasts. Arco-Norte has a plan to develop a tourism complex in the south-eastern part of Pemba (see the section regarding the tourism sector).

MCA has developed an Inventory and Land Use Map from 2009 to 2013, as shown in Figure 6.5.3.



Source: MCA (millennium challenge account), 2013, "Report on Inventory and Land Use Map"

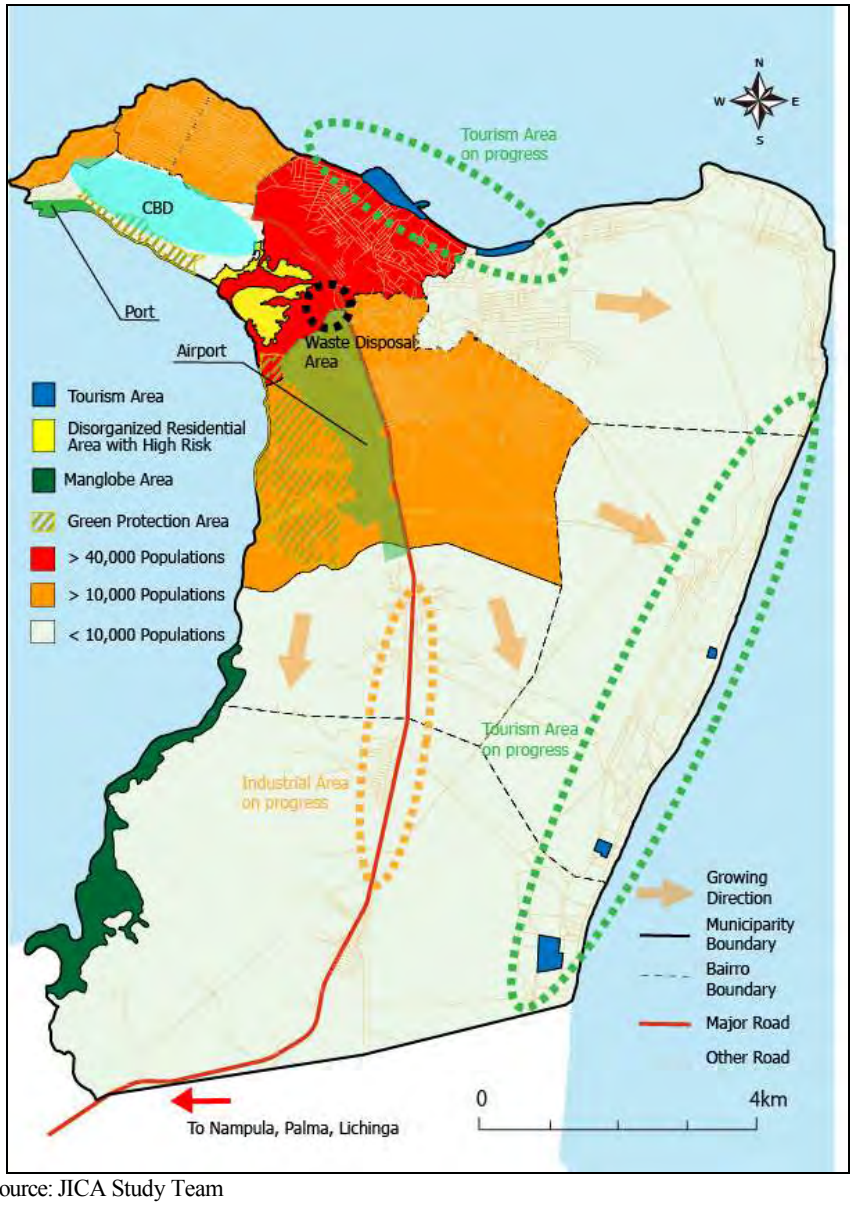
Figure 6.5.3 Inventory and Land Use Map for Pemba

(2) Urban Structure and Transport System for Pemba Municipality

The current basic urban structure is illustrated in Figure 6.5.4. Pemba fronts onto the Indian Ocean to the north, east, and west, and thus, the residential area may extend toward the south. The sea port of Pemba is one of the main points connecting the cities to the outside world. There is insufficient flat space behind the port.

The airport has become an international airport. However, there is a limitation on expansion because of the slope in the adjoining area. Therefore, there is a plan to construct a new airport near the southern part of Pemba Bay (25km from the city) to attract more international visitors.

Regarding the land access to the municipality, there is a road connecting with the national road network, which runs in a north to south direction through the peninsula. The city centre has a well-structured paved road network. In other areas, however, roads are not paved and have sandy layers, which are in poor condition in the rainy season.



Source: JICA Study Team

Figure 6.5.4 Current Basic Urban Structure of Pemba

Chapter 7 Existing Conditions of the Environment

7.1 Present Situations of the Environment

7.1.1 Forest Reserves and Deforestation

According to the FAO, 49.6% or about 39,022,000 ha of Mozambique are forested and, among those, 62,000 ha are classified as planted forest.

According to this statistical data of 2010, it can be said that the nation-wide forest cover is almost 50 %, but it is on a gradual decline. It is noted that no primary forest exists in Mozambique. Also it is noted that Mozambique is home to at least 5,692 species of vascular plants, of which 3.8% are endemic, and 4.2% of Mozambique is protected under IUCN categories I-V.

Deforestation is a serious problem in Mozambique, which is mainly caused by fuel wood collection shifting agriculture, forest fires, timber exports, and lack of land use plans. Fuel wood consumption, is estimated to be 250 times the amount extracted by logging operations. Though commercial logging is reported to be less than 25% of the legally permitted capacity, it is expected to be under-estimated. Major environmental impacts caused by deforestation can be: land degradation, exacerbated flooding, coastal erosion (mostly from loss of mangroves) and sedimentation.

Although the Forest Reserve Network of Mozambique was established for production of timber in the late 1950s, its objectives are already outdated. The current Forest Reserve Network offers a platform for establishing a forest conservation network to protect the biological diversity of the forest ecosystem.

7.1.2 Degradation of Marine and Coastal Resources

Major challenges in this field are coastal erosion, loss of mangroves, and declines in the marine resources including fish. Significant bottlenecks for sustainable fisheries are reported to be as follows: fishing by unlicensed operators, encroachment by industrial fishing vessels into inshore areas for semi-industrial and artisanal fishers, insufficient recording and reporting of catches, difficulties in controlling and monitoring the artisanal fisheries, and shortage of human resources and infrastructure for enforcement of fisheries laws and regulations. In addition, tankers which carry crude oils are reported to be causing sea contamination.

7.1.3 Land Degradation

The land degradation, especially of agricultural soil, due to soil erosion and desertification is a major problem in Mozambique. Abusive land use practices such as burning the fields for land clearance for cultivation and other purposes are said to be the main cause for land degradation. Forest fire is a serious issue with approximately 40% of the country affected each year; whereas the

effect in the northern, western and central parts of Mozambique are the most serious with 74% of these areas burned annually.

7.1.4 Inadequate Management of Water Resources, Water Pollution and Sanitation

Mozambique has abundant surface water resources. However, since the distribution is uneven, regional cooperation is necessary. Although the resources are abundant, the major challenges of the country are to provide adequate water for agricultural and industrial use. In addition, water pollution can be a problem in certain areas because of industrial and agricultural activities, sewage and waste which is mostly discharged without treatment. Artisanal mining is recognised to cause large-scale erosion and silting in some areas. In urban settings, agricultural sewage treatment is not sufficient, exposing people to potential outbreaks of disease.

7.1.5 Loss of Biodiversity and Ecosystem Services

There is great diversity of wildlife in Mozambique, although the number of mammals greatly declined during the civil war. Many areas in the country have outstanding ecosystems, and they should be treated with attention while the county develops. Within the Nacala Corridor Region, degradation of the ecosystem stands out in Nampula.

In the rural areas of Mozambique, people depend on wood for fuel. Mangroves are being removed and changed into rice farms or housing land. Offshore, corals are threatened by damaging fishing practices.

7.1.6 Air Pollution (indoor and outdoor air pollution)

Indoor air pollution is mostly caused by wood fuels, and it affects especially women and children working indoors. In some areas, outdoor air pollution is occurring due to mining activities (dust, SO_2, lead, arsenic and other smelter gas substances).

7.1.7 Chemical Load

Releases of chemicals and heavy metals are caused by industrial and artisanal mining activities and agricultural activities with chemicals and fertilisers, which are mainly commercial. Rivers are the main pathways for these chemicals to reach the coastal environment. Water samples collected in Monapo River tested positive for various pesticide residues, including DDT, lindane, and hexachlorobenzene.

7.1.8 Illegal and Unsustainable Wildlife Use, and Human Wildlife Conflict

In Mozambique, the loss of habitat is causing humans and wildlife to share smaller living spaces more than ever. Both sides are losing in the conflicts, such as in and around the delta of the Zambezi River, where crocodiles and hippopotamuses are frequently coming face to face with humans, while poaching and other illegal activities put wild species in danger. There are also concerns that the current extent of resources use may not be sustainable, and harvest of, for example, fish and other resources is already diminishing (such as sand oysters in Quirimbas National Park), which will lead to decline of local people's income.

7.1.9 Desertification due to Drought and Land Clearing Practices

The causes of drought and desertification are both natural and anthropogenic. The natural causes are climate driven, deriving from reduction of precipitation or change in the precipitation regime. The anthropogenic (or human) causes are excessive use of soil for agriculture, over-grazing, bush fires, fire wood collection, charcoal production and industrial forestry. Poverty of communities can cause the excessive dependence on the land resources, leading to expansion of human-caused factors.

7.1.10 Agriculture

Small-scale farmers' extensive farming practices and charcoal making for cash income cause deforestation. Furthermore, such deforestation causes sedimentation of rivers that flow into the sea, degrading sea grasses and coral reefs.

7.1.11 Disaster Risks

Mozambique is regularly affected by tropical cyclones, drought and other disasters every year. Rural people and natural resources are especially vulnerable to disasters such as flood and drought. In addition, the country's long coastline makes the country vulnerable to the change in sea level.

Mozambique's Action Plan for the Reduction of Absolute Poverty (APRAP 2006-2009) has identified natural disaster management as a cross cutting objective of poverty reduction in the country. The government's action plan for reducing the impact of disasters includes various means for risk reduction, such as advance warning systems for floods and cyclones. Table below summarises the overview of the natural disaster events that have occurred during the past 30 years in Mozambique.

In the Nacala Corridor Region, Cyclone "Nadia" struck Nacala in March 1994 with maximum waves as high as over 6 m, and it damaged the berth walls of Nacala Port due to a ship's surging caused by the waves.

Table 7.1.1 Overview of Natural Disasters in Mozambique (1980 -2010)

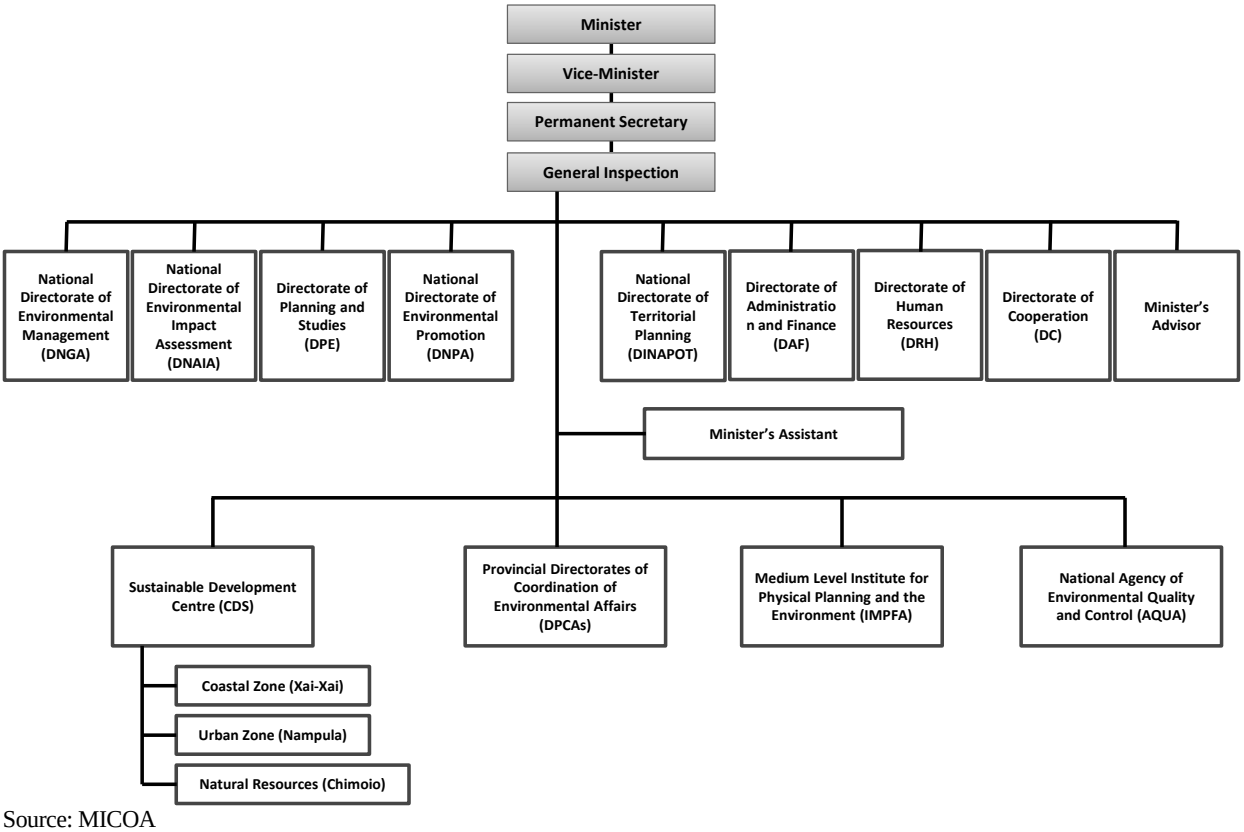
No. of events:	75
No. of casualties:	104,840
Average killed per year:	3,382
No. of people affected:	23,317,164
Average affected per year:	752,167
Economic Damage (US$ X 1,000):	802,650
Economic Damage per year (US$ X 1,000):	25,892

Source: UNISDR (http://www.preventionweb.net/english/countries/statistics), 2014

7.2 Institutional Framework for the Environment

7.2.1 Administrative Structures of the Ministry for Coordination of Environmental Affairs (MICOA)[1]

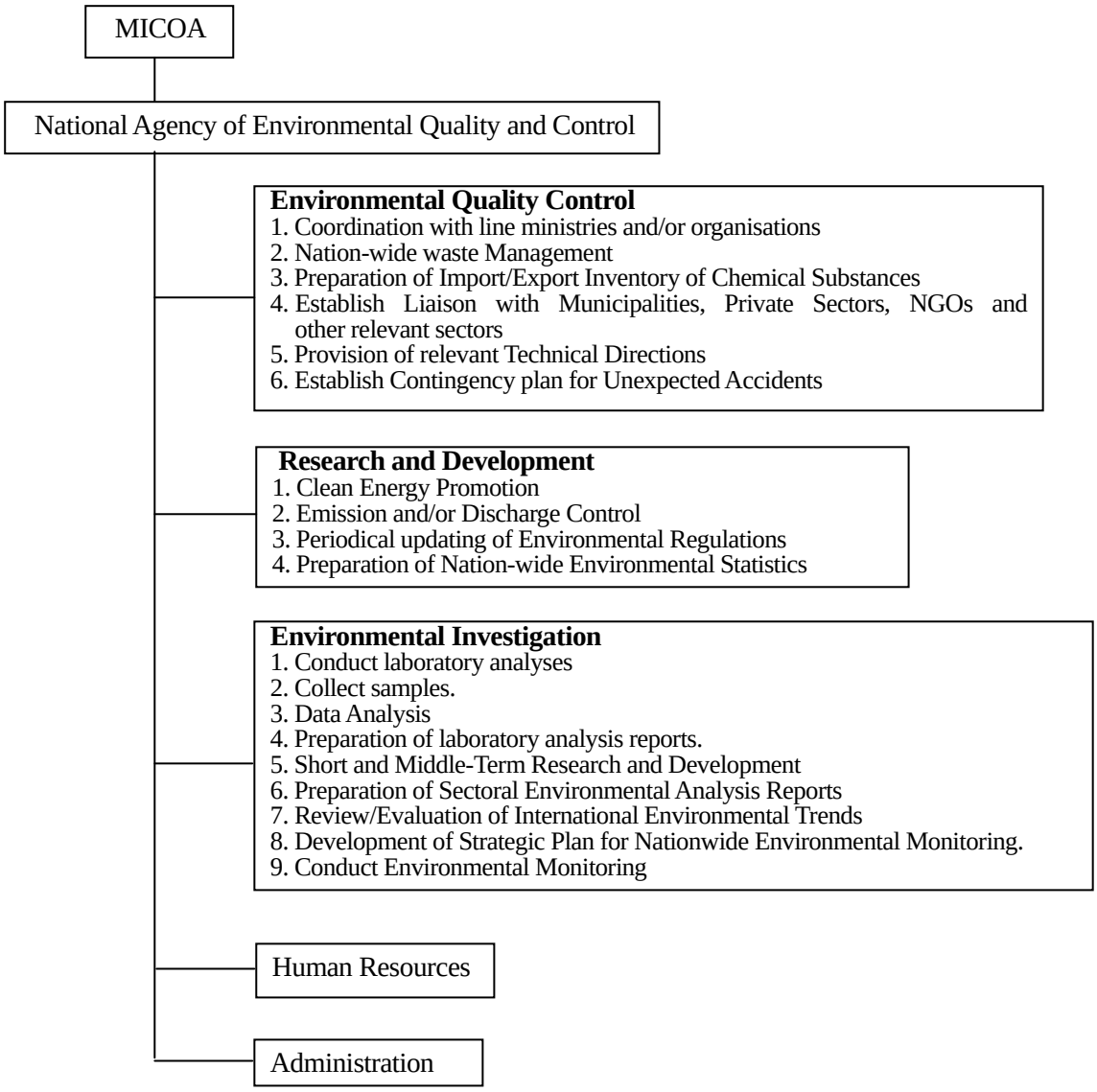
In the early 1990s, many policies and laws concerning environmental protection and natural resource management were recognised as outdated. Since the creation of the National Environmental Commission (NEC) in 1990, environmental issues began to attract higher attention. In order to ensure sustainability in the country's economic growth, Ministério para a Coordenação da Acção Ambiental (MICOA, the "Ministry for Coordination of Environmental Affairs" in English) was established from the NEC in 1994. Since its establishment, MICOA has developed legal frameworks for environmental management. The figure below shows the organisation structure of MICOA. In 2012, a new institution, named the "National Agency of Environmental Quality and Control" was established within MICOA (see Figure 7.2.2). Mainly, this institute is in charge of nation-wide environmental quality control based on field study, and currently, is trying to enhance relevant human resources and equipment in order to conduct full-fledged activities.



Source: MICOA

Figure 7.2.1 Organisation Structure of MICOA

[1] In January 2015, central government ministries of Mozambique were reorganised and MICOA has become Ministry of Land, Environment and Rural Development (Ministério da Terra, Ambiente e Desenvolvimento Rural).



Source: Republic of Mozambique, Resolution#5/2012

Figure 7.2.2 Organisation Chart of National Agency of Environmental Quality and Control

7.2.2 National Commission for Sustainable Development

In addition to MICOA, the National Commission for Sustainable Development is one of the key environmental administrations. This Commission, linked to the Council of Ministers, was created in October 2000 by a provision in the Framework Environmental Act. This Commission seeks to ensure effective coordination and the integration of sectoral policies and plans related to environmental management at the highest level.

7.2.3 Administrative Structure of Provincial Directorates

In order to enhance its mandate more effectively, and in line with the Government's decentralization policy, MICOA has established an increasing institutional presence at lower government levels since 1995 and Provincial Directorates for the Coordination of Environmental Affairs (DPCAs) have been set up in all ten provinces. Usually, 40 to 50 permanent staff are working at each provincial directorate, and approximately half of them are engaged in substantial

environmental administration such as the examination of the environmental licence applications. The role of the provincial directorate is, principally, to facilitate the implementation of environmental legislation at the local level, including EIA regulations and guidelines. Most of the provincial governments have a Department of Environmental Management, and some even have a separate EIA Department (Nampula and Cabo Delgado Provinces).

7.2.4 Other Ministries Concerning the Natural Environment and Resources[2]

Responsibilities for environmental management are thinly spread across various government sectors. The Ministry of Agriculture (MINAG) is principally responsible for the natural resources management in the agriculture, livestock, forestry and wildlife sectors. The National Directorate of Land and Forestry (DNTF) is in charge of managing the forestry and wildlife resources outside of the national parks and reserves, while the responsibilities for national parks and reserves (except for forest reserves) and hunting areas have been shifted to the Ministry of Tourism (MITUR, currently known as Ministry of Culture and Tourism). The National Remote Sensing and Cartography Centre (CENACARTA), under MINAG, manages satellite data and is developing a geographic information system (GIS) database. Other key ministries are the Ministry of Fisheries, the Ministry of Industry and Commerce (MIC) and the Ministry of Planning and Development (MPD), which are engaged in the regional development planning as well as large-scale development projects across the country.

[2] Description of this paragraph is based on the governmental structure before the reorganisation of the central ministries in January 2015. After this reorganisation, the following alteration was applied: Ministry of Agriculture became Ministry of Agriculture and Food Security, Ministry of Tourism became Ministry of Culture and Tourism, Ministry of Fisheries became Ministry of the Sea, Inland Waters and Fisheries, and Ministry of Planning and Development became Ministry of Economy and Finance. Ministry of Trade and Industry remains as it was called.

7.3 Legal and Policy Frameworks related to the Environment

7.3.1 Legal Frameworks and Policies on the Environment

(1) Constitutional Requirements for Environmental Protection in Mozambique

The Constitution of the Republic of Mozambique address matters on the environment and quality of life in its articles 90, 98, 102 and 117. Article 90, which is part of Chapter V (economic, social and cultural rights and duties) of Title III (fundamental rights, duties and liberties), assure humans the right to live in a balanced environment, and commits "the State and local authorities, in collaboration with other appropriate partners, to adopt policies for the protection of the environment and care for the rational utilisation of all natural resources".

(2) The Framework Environmental Act (Act 20 of 1997)

The Framework Environmental Act provides a legal framework for the use and management of the environment, and aims to assure the sustainable development of the county. Chapter 4 of this Act refers to the 'Prevention of Environmental Damage.' Under this clause, all development projects and/or activities that could potentially cause significant environmental negative impacts shall apply for an environmental licence. The issuance of an environmental licence is determined based on the appropriateness of the EIA report after examination by MICOA. Essentially, all sectoral legislations which deal with environmental management are obliged to be reviewed and revised in order to conform to this Act (Article 32).

Participation of the local communities is assured by this Act in the process of developing policies and laws for natural resource management, management of protected areas, and policing environmental norms and regulations. This Act also addresses the implementation of the strategic environmental assessment (SEA) for all national and/or regional master plan studies. However, no specific law and/or regulation specifying the SEA procedure has been issued yet.[3]

(3) EIA Act (Decree 45 of 2004)

The EIA Act defines the framework to manage the environmental effects deriving from developments. All sectoral legislations in Mozambique are required to be revised so that they will conform to the Act. Although EIA regulations follow the internationally accepted processes on paper (screening, scoping, consultation, assessment of impact, review, and monitoring and evaluation), various problems occur in practice, such as inconsistencies in contents and format across ministries and departments involved in environmental management, since roles, responsibilities and methods of cooperation have not been properly defined. The followings are the major institutional problems concerning the EIA practices:

- A potential conflict of interest, as EIAs are mostly prepared by a consulting firm that was hired by the company which is to conduct the development project
- Limited human resources and institutional capacity, especially at the provincial level, where many of the responsibilities for environmental management have been transferred
- Insufficient communication and information sharing between related institutions

[3] Based on personal communication with MICOA in 2012

- Constraints in terms of planning, operation and human resources for linking environmental monitoring activities at the provincial level to the national level
- Shortage of technical expertise for evaluating environmental impacts

The problem is that the rate of development is so fast that it produces an increasing number of EIAs and licences to be granted and the capacity of MICOA (currently known as Ministry of Land, Environment and Rural Development) is not adequate to catch up. It is also reported that the requirements for public participation are not sufficient. In addition, although it is MICOA's obligation to inspect and control project activities on a regular basis, with its current resources its implementation is limited.

(4) Land Law

The Land Act, its Regulations (Decree No. 66 of 1998) and Technical Annex (Ministerial Diploma No. 29-A of 2000) defines the legal framework for land ownership and control, as well as those of natural resources. The Act provides an additional legal basis for allocating areas for protection and conservation (Article 5) and the creation of totally and partially protected zones (Article 6). Furthermore, the rights of local communities over land and natural resources are emphasised.

(5) Forest and Wildlife Act

In 1997, Policy and Strategies for Management of Wildlife and Forestry were adopted. Specific exploitation of the forest resources is regulated in the Policy of Forests and Wildlife Development Strategies, Forestry and Wildlife Law 10/99 and its Regulation was approved by Decree 12/2002, and its revised version was approved recently. The new law requires private operators for more commitment in their activities with preparation of management plans. Moreover, the new law also defines fines and penalties for illegal logging.

(6) Summary

Legislation and policy making in the field of the environment is of reasonable quality. The Government of Mozambique appears to be aware of the importance of the environment, as well as of natural resources. However, its implementation and follow-up monitoring are weak and uncoordinated.

Currently, the Government of Mozambique is trying to include appropriate environmental and social considerations for development policies and plans at an earlier stage by establishing a Strategic Environmental Assessment (SEA) System.

The coordination, the coherency and consistency between different policies and strategies will become increasingly important when Mozambique begins to embark on massive development initiatives including coal and natural gas extraction. To address this concern, it will be important to establish a proper system and organisation for SEA.

Also, it is reported that the link between policy statements and budget allocations is weak. Although environmental considerations began to be well integrated within development projects as much as possible, the actual budget allocation to the environment was a small fraction of GDP.

7.3.2 The Environment in National Development Policies/ Plans and Sector Policies

Since adopting the constitution, the Government of Mozambique has produced and adopted a wide

range of legal instruments that provide protection for the natural resources as follows:

(1) The Agrarian Policy

The Agricultural Policy and Implementation Strategy (PAEI), approved in 1995, is the umbrella policy for subsectors, which aims to "develop agricultural activity with a view to achieving food security through the diversified production of goods for consumption, provisioning domestic industry and export, based on the sustainable use of natural resources and the guarantee of social equity (mission statement)." Sustainable use of natural resources is taken as one of the means to achieve the objective above, and the Policy argues matters on the decentralization of land use and community-based management of natural resources to achieve sustainable development.

(2) The Land Policy

The National Land Policy was approved in 1995, which became the base for the Land Law in 1997. The objective of this policy was to entrench the rights of the population over the land and other natural resources, while promoting investment and sustainable and equitable use of these resources. The Policy underlines that investments have to be done in a manner that local populations can directly benefit from, and the role of the communities in land and natural resources management are regarded as important means to achieve this.

(3) The Environmental Policy

The National Environmental Policy was approved in 1995 in order to provide an umbrella legal framework for preparation of other national plans and legislations in the environmental sector. The objectives of this policy are: to ensure the sustainability of the functioning and productivity of environmental and natural resources, as well as to ensure consideration of the environment in socioeconomic planning.

(4) The Environment in the Poverty Reduction Action Plan (PARP), 2011 - 2014

The Poverty Reduction Action Plan (PARP) 2011-2014 established the medium-term strategies of the Government, in order to implement the five-year government programme "Programa Quinquenal do Governo para 2010-2014". While the five year government programme aims to reduce poverty, improve social development and foster the key sectors, the PARP is a bit narrower, and focuses on enhancing the productivity of agriculture and fishery, increase employment, and improve human and social development while maintaining a focus on governance, macroeconomic affairs and fiscal management. Improving fishery and land administration, as well as access to markets, are given priorities.

7.3.3 Environmental Sector Plans

(1) National Environmental Management Programme (NEMP), 1995

In its initial period, MICOA formulated the NEMP in 1996 in order to promote and implement sound environmental policy, which is composed of an 'Environmental Policy,' 'Framework Environmental Act,' and 'Environmental Strategies.' Under this programme, MICOA is working on: firstly, the development of inter-sectoral policies in sustainable development, secondly, the development and promotion of integrated planning of resource use, thirdly, the promotion of sector legislation and standards for environmental protection as well as natural resource use, and finally,

creation of conditions for the law enforcement and the environmental monitoring.

(2) National Environmental Sector Strategic Plan (2005 – 2015)

NEMP was developed in 1995, and has been revised or updated by MICOA periodically. The latest revision was done in 2004 (strategic plan for 2005-2015). There, several nation-wide policies were developed on the following issues: the management and protection of natural resources, urban environment, atmospheric pollution, and public health. In addition, key principles and guidelines to implement the above plans are described. Although provincial level environmental management strategies must be developed based on these nation-wide strategies, no province-wide strategies have been developed so far.

7.3.4 Pollution Control System

(1) Overall Current Situation

The environmental management is hampered by insufficient institutional capacity for enforcing the legislations and the monitoring. As well, the availability of statistical information on environmental indicators is also limited. The 2005 MDG progress report assesses as weak all the elements of environmental monitoring (see the table below).

Table 7.3.1 Environmental Monitoring and Evaluation Capacity

Elements of monitoring environment	Assessment		
Data gathering capacities	Strong	Fair	Weak
Quality of recent survey information	Strong	Fair	Weak
Statistical tracking capacities	Strong	Fair	Weak
Statistical analysis capacities	Strong	Fair	Weak
Capacity to incorporate statistical analysis into policy, planning and resource allocation mechanisms	Strong	Fair	Weak
Monitoring and evaluation mechanisms	Strong	Fair	Weak

Source: Republic of Mozambique and UNDP, 2005, p. 41.

As of June 2013, no major progress regarding the nation-wide environmental monitoring and control system has been achieved. However, a new department called the Quality Control Unit was established within MICOA in 2012 and several preparatory works have been started.[4]

(2) Environmental Audit and Inspection for the Pollution Source

Environmental auditing and inspection control are required for all development activities implemented since the enactment of the Environmental Act, whether or not an environmental licence is required. Monitoring mechanisms are generally developed by the EIA Review Department and the Environmental Inspection Department of MICOA[5], and the sectoral ministries are responsible for monitoring of activities in the implementation phase. However, lack of human resources is a critical bottleneck for implementation.

(3) Environmental Standards

Regulations on standards for environmental quality as well as effluent emissions were published in

[4] Based on personal communication with MICOA in 2013
[5] Description here concerning MICOA is based on the governmental structure before the reorganisation of the central ministries in January 2015.

the Government Bulletin on 2 June 2004 (Decree No 18/2004) in order to control the levels of pollutants, which are to be applied to all new public and private activities. Penalties between 20 million and MT 200 million will be imposed on non-compliance with any standards or failure of reporting.

7.3.5 Nature Conservation System

(1) General Profile

Several sites in Mozambique have rich biodiversity, such as Gorongosa Mountain, the Archipelago of Quirimbas, and the Chimanimani Massif. It is estimated that the country has 685 species of birds, 195 mammals, 228 reptiles, 59 amphibians, and nearly 5,700 species of plants, many of which are endemic.

Mozambique has six categories of protected areas, covering 147,345 km^2, which is 18 per cent of the country's total surface area (see the Table below).

Table 7.3.2 Category of Environmental Reserves in Mozambique

	Category	Number	Area (km^2)	Share of area in the country (%)
1	National Park	6	37,476	4.68
2	National Reserve	6	47,700	5.95
3	Game Controlled Area	2	2,700	0.34
4	Hunting Area	12	50,017	6.24
5	Forest reserves	26	9,452	1.18
6	Zones of use and of historic and cultural value	0	0	0
Total			147,345	18.38

Source: Ministry of Agriculture, 2013, Current Status of Biosafety in Mozambique

The management of protected areas is under the jurisdiction of two government institutions: the Ministry of Tourism for all National Parks, Reserves and Hunting Areas, and the Ministry of Agriculture for Forest Reserves. Protected Areas can also be entitled under the Historical and Cultural Heritage Law (Ministry of Education) and under the Fisheries Law (Marine Reserves) [6].

(2) Environmental Reserves around the Nacala Corridor Region

Across the Nacala Corridor Region, covering the northern five provinces that are targeted within PEDEC-Nacala, there are three environmental reserves (see Table 7.3.3 and Figure 7.3.1). Currently, the registration of a new national park, named "Mágoè National Park", located in Tete Province, is being examined.

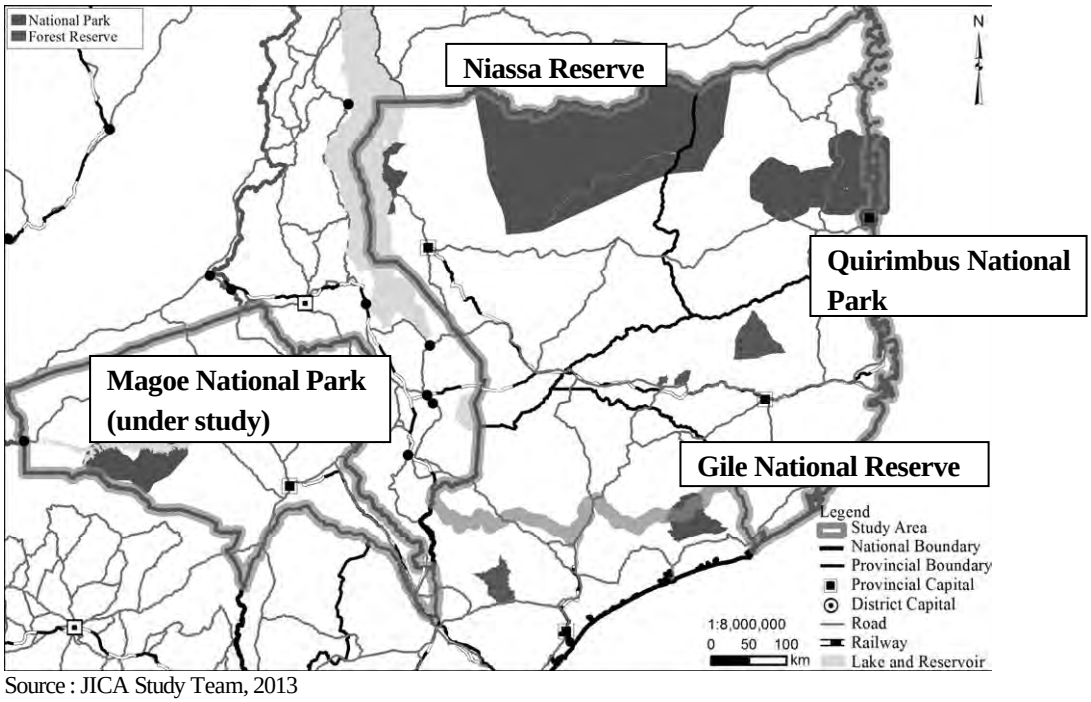
Table 7.3.3 Summary of Environmental Reserves around Northern Mozambique

Name	Location & Area (km^2)	Main Features
Niassa Reserve (NR)	Niassa and Cabo Delgado Provinces. A = 42,000 km^2	This is one of the world's major natural reserves and the biggest in Mozambique. NR was proclaimed by Decree # 2884 of 1960, and created in 1964. At present, NR is the conservation area with the widest range of wild species in the country, with the population of elephants estimated at 13,000. NR is part of the Eastern Miombo woodlands, which also cover parts of Tanzania and Malawi, and is one of the largest Miombo woodland preserves in the world, with coverage of half of the area. The remaining area is mostly open savannah with some wetlands and isolated patches of forest. Approximately 95% of the preserve's biomass is vegetation, including 21 types of plants and 191 species of trees and shrubs. NR possesses an African wild dog population of over 350, a sable antelope population of over 12,000, an

[6] Description here concerning the roles of former Ministry of Tourism, Ministry of Agriculture and Ministry of Education is based on the governmental structure before the reorganisation of the central ministries in January 2015.

		elephant population of 13,000, over 400 bird species, and large populations of Cape buffalo, impala, wildebeest, zebra and leopards. The area has three endemic species: the Niassa wildebeest, Boehm's zebra, and Johnston's Impala. Recently, a new species of lizard was found in the NR.
Quirimbas National Park (QNP)	Cabo Delgado Province A= 7,506 km^2	This national park covers six provincial central districts and 11 islands in the Archipelago of Quirimbas. It was created in 2002, and has a great potential for ecotourism activities. The region was isolated for decades during the Mozambique civil war. On land, there are populations of elephants, lions, leopards, crocodiles and even wild dog. Habitats include mountains, forests, woodland, savannah, mangroves, beaches, coral reefs and sea grass beds. QNP contains a rich variety of marine life such as sea turtles, dugongs and variety of fish. Three hundred and seventy-five species of fish have been identified, including threatened pipefish and seahorses.
Gilé National Reserve (GNR)	Zambézia Province A = 2,860 km^2	GNR was declared at first as a Partial Game Reserve of Gile in 1932. Major areas of the reserve consist of miombo forest, dambos, reforested savannah and riverine vegetation. The granitic Kopjes exist either inside or around GNR. There are 95 mammal species listed, including elephants, lions, leopards, wild dogs, spotted hyenas (crocutacrocuta), pala-palas, kudos, and impalas. There are also 114 bird species listed.
Mágoè National Park*1	Tete Province A = 3,559 km^2	A baseline flora/fauna study is completed already, and currently, the registration of this national park is being conducted in the cabinet, and it will take about one year for its ruling (MITUR, personal communication, 2013).

Source: MICOA(2009) "4th National Report on Implementation of the Convention on Biological Diversity in Mozambique."
*1: MITUR, Personal Communication, 2013



Source : JICA Study Team, 2013

Figure 7.3.1 Location of National Parks and Reserves across the Northern Part of Mozambique

(3) Forest Reserves

Across the Nacala Corridor Region, there are five forest reserves (all five in Nampula Province as in the table below).

Table 7.3.4 Forest Reserves in the Nacala Corridor Region

	Name	Area (ha)
Nampula		
1	Mecuburi	240,457.56
2	Baixi Pinda	20,263.8
3	Matibane	11,109.85
4	Ribáuè	12,955.93
5	Mupalue	27,575.33

Source: Ministry of Agriculture, 2012

7.3.6 Environmental Impact Assessment System

(1) EIA Procedure

The EIA process is defined in the Regulations on the EIA Process, Decree No 45 of 2004, which replace those of No 76 of 1998. They are applied to all public and private activities which may have possible environmental impacts. Further, particular regulations can be prepared for projects concerning prospecting, exploration and production of petroleum, natural gas and mineral resources. A list of activities which may require EIA or Simplified Environmental Report (SER) as well as list of sensitive environments are also provided.

Based on Article 15 of the Environmental Law, licensing and registration of activities, which may potentially have significant impact on the environment, have to be done in accordance with the EIA regulations. Moreover, an Environmental Licence must be issued based on the approved EIA of the concerned project. Importantly, the Environmental Licence is a pre-requisite for any other legal licence or permit.

The activity must start within two years from the date when the Environmental Licence was issued. The licence for an activity will be valid for five years and is renewable for another five years. Applications shall be sent to MICOA (currently known as Ministry of Land, Environment and Rural Development), and category A and B projects require a fee of MT 10,000 and MT 5,000 respectively. The licence will be updated depending on the submission of an updated Environmental Management Plan for Category A and B projects, or a report on environmental performance concerning the items defined in the authorization document for Category C activities. The renewal application must be submitted at least 180 days before the licence expiration.

(2) Environmental Management Plans

Following the approval of the EIA by MICOA (currently known as Ministry of Land, Environment and Rural Development) with an Environmental Licence for the activity, the investor shall prepare an Environmental Management Plan (EMP), which gives guidelines on how to mitigate the predicted negative impacts, and the investor is responsible for the implementation. Also, it is claimed that more strict regulation is needed to define a company's responsibilities in implementing EMP, including penalties for noncompliance.

(3) Inspection and Audit

According to Article 24 of the EIA Regulations, it is MICOA's (currently known as Ministry of Land, Environment and Rural Development) responsibility to make regular inspections. If a complexity is seen or it is justified, MICOA can request an environmental audit. Additionally, Category B projects shall provide an EMP to the auditors, which includes at least the items listed in the box below:

a) Impact monitoring schedule clearly indicating the mitigation measures and the accountability and frequency of respective actions of intervention;
b) Environmental education programme; and
c) Accident contingency plan.

However, lack of monitoring capacity of MICOA in terms both of human and material resources is leading to insufficient enforcement of EMP. This causes failure of imposing penalties for possible

incompliance of the plan.

7.3.7 Strategic Environmental Assessment System

The Framework Environmental Act (Act 20 of 1997), which provides a legal framework for the use and correct management of the environment and its components in Mozambique, addresses the necessity to implement the SEA for all national and/or regional master plan studies. However, no specific law and/or regulation specifying the SEA procedure have been issued yet.[7]

In the last decade, there are the following three case studies on SEA in Mozambique:

- SEA on Selection of Transport Methods for Heavy Sands in Gaza Province, MICOA/DANIDA, 2004 (Gaza Province)
- SEA for National Agricultural Development Programme II, MINAG/IUCN, 2005 (Mozambique)
- SEA for Sustainable Coastal Development Policy in Mozambique, MICOA, 2013 (41 coastal districts)

7.3.8 Carbon Market and Global Warming (CDM and REDD)

(1) Clean Development Mechanism (CDM)

Mozambique ratified the UNFCCC (United Nations Framework Convention on Climate Change) in 1994. However, so far no CDM project has been registered in Mozambique, and it is necessary to build capacity of both the ministries and the private sector.

(2) REDD (Reduced Emissions from Deforestation and Degradation)

REDD+, which is to develop financing mechanisms to compensate for developing countries' CO_2 emissions by measures to protect forests, is now encouraging a race for land in the country. A national consultative process was held to prepare REDD+ strategies and to determine the pilot areas. Recently, a Decree is under preparation which will establish the Technical Unit for the REDD+ Technical Group.

7.3.9 Sustainable Development Programme/ Projects

The Poverty Reduction Action Plan (PARP) for 2011-2014 proposes the following government programmes on sustainable development to be implemented. It can be said that intense focus is put on matters of use or management of natural resources at this stage of development, where economic development and resource exploitation occurs, rapidly exceeding the current capacity to manage the natural resources, and latest eco-friendly technologies are not broadly available either.

[7] Based on personal communication with MICOA in 2014

Table 7.3.5 Proposed Programmes in PARP on Sustainable Development

PARP Objective	Designation of the Government Programme	Objective of the Government Programme
Increase output and productivity in agriculture and fisheries	Management of natural resources for local development	Promote productive and sustainable management of natural resources and the environment
	Forestry	Define and implement a policy for sustainable exploitation of forest resources
	Climate change	Promote environmental quality and policies and strategies for mitigating and adapting to climate change
	Environmental education, communication and dissemination	Promote environmental education and raise the community awareness of the importance of preserving the environment
	Environmental management	Adopt and implement strategies and measures to combat erosion, deforestation, wildfires and pollution, and disseminate good environmental management practices
	Renewable energy and new energy sources	Create the capacity to use new and renewable energy sources in the country, encourage the development of technologies for producing and installing solar, wind and water-powered energy systems

Source: IMF (2011) Poverty Reduction Action Plan (PARP) 2011-2014

7.4 On-going Initiatives and Programmes/Projects

7.4.1 Poverty and Environment Initiative (PEI)

(1) Outline of the Poverty and Environment Initiative (PEI)

The Government of Mozambique is implementing the Poverty Environment Initiative (PEI) under a joint programme developed by the United Nations Development Program (UNDP) and the United Nations Environment Program (UNEP). The first phase of the PEI (2005-2007) focused on capacity building and training on environmental policy and management in order to incorporate the environment into the national development plans, with a vision to achieve poverty alleviation and sustainable development. The second phase of the PEI succeeded the efforts in the first phase, and its focus was on poverty reduction and environmental mainstreaming into policies, planning and budgeting processes at the national, sectoral and district levels so that the implementation of the Action Plan for the Reduction of Absolute Poverty II (PARPA II) and Environmental Strategies for Sustainable Development can be supported.

(2) Major Achievements and/or Progress of PEI

According to UNDP-UNEP "PEI Annual Progress Report 2010," the following are the major achievements of PEI in Mozambique:

i. PEI supported the reflection group of the National Action Plan for the Reduction of Absolute Poverty (PARPA II) whose task was to define the sector needs to address the environmental issues within PARPA and the Strategic Development Plans at provincial level. The group was successful in bringing together all actors with an interest in mainstreaming environmental sustainability in PARPA II, which helped the evaluation of PARPA II and oriented the next PARP to have environmental sustainability recognised as a main pillar.

ii. Improved understanding of the environmental mainstreaming status and needs based on a PEI-led study on the mainstreaming of environmental issues into the sectoral economic and social plans. This study identifies a number of recommendations on how agriculture, energy, health, mining, public works, tourism and fisheries sectors can improve environmental mainstreaming. The study was disseminated and these sectors were informed about how to better mainstream the environment into their annual plans.

iii. PEI has been a catalytic activity, embedded in many government processes. It has been able to influence national and district plans and budgets towards a better integration of the environment and poverty reduction through building the capacity of planning officers.

iv. Workshops for governments, civil society and journalists, combined with studies on poverty-environment linkages, have led to an improved understanding of the linkages and improved national capacities for mainstreaming. Training of teachers has also been undertaken to raise awareness of poverty-environment linkages in the national curriculum.

v. PEI has supported the MPD in the preparation and implementation of a unified planning and monitoring instrument (Mainstreaming Matrix) for mainstreaming cross-cutting issues in sector plans at the national and provincial levels.

vi. A greater level of coordination and dialogue have been achieved between the relevant institutions involved in environmental mainstreaming, such as between MICOA and the sectors.

vii. Strengthened sector capacity for environmental mainstreaming. The Environmental Units are seen as key units to ensure environmental mainstreaming in sector plans. In 2010, PEI supported the exchange of information among the sector environmental units, including giving targeted technical support.

viii. Environment mainstreaming capacities strengthened at district level. Approximately 100 district planners from Cabo Delgado, Gaza and Zambézia have received capacity building and improved their skills for environmental mainstreaming in district development plans.

Source: UNDP-UNEP (2011) PEI Annual Progress Report 2010

7.4.2 Payments for Environmental Services (PES)

(1) Introduction

Payments for Environmental Services (PES) are part of a new and more direct conservation scheme. PEI pilot projects are on-going in several countries of East Africa: Kenya, Tanzania, Ethiopia, Rwanda and Uganda.

In 2007, the initiative to support the development of national strategies for sustainable financing for conservation areas was stated in Mozambique. Then, in 2009, the Conservation Policy of Mozambique was adopted which incorporates principles to encourage sustainable financing of conservation areas, including PES.

PES mechanisms vary, and in Mozambique, new approaches to map "natural capital" and valuing ecosystem services have been applied.

(2) Bio-Prospecting

Bio-prospecting is the process of discovering potentially beneficial biological substances from a country's traditional medicines. This scheme has attracted the interests of developed countries in finding these substances as well as developing them and patenting them. Yet, this scheme is sometimes termed as "bio-piracy," with disapproval of certain exploitive methods occasionally used by large companies.

A range of laws have been ratified for bio-prospecting: the Convention on Biological Diversity and the Carthage Protocol on Bio-security, as well as relevant national policies (Traditional Medicine 2001) and regulations (Decree Nº 19/2007 of 8 August and the Industrial Property Code). MICOA (currently known as Ministry of Land, Environment and Rural Development) is the responsible authority for the access and benefit sharing (ABS) related to the exploitation of genetic resources, which is currently participating in the ABS Capacity Development Initiative for Africa to support development and implementation of ABS policies. Currently, there are some domestic companies marketing natural products for cosmetics and other uses.

The Ministry of Science and Technology (currently known as Ministry of Science, Technology and High Technical and Professional Education) and the Ministry of Health have major responsibilities in formulating bio-prospecting programmes in Mozambique. MITUR (currently known as Ministry of Culture and Tourism) plays a role in authorizing the access to conservation areas, drafting

regulations on collection of species in conservation areas, and developing commercial bio-protecting partnerships with business and research organisations. A key bottleneck in implementation is the lack of a biodiversity inventory, limited efforts to market the country's rich biodiversity, and inadequate protection for the community rights to the traditional knowledge.

Chapter 8 Existing Conditions of Social Capacity

8.1 Education Sector

8.1.1 Present Conditions of Education Sector

(1) Present Conditions of Mozambique

1) Organisations in Education Sector in Mozambique[1]

The Ministry of Education (MINED) is responsible for formulation of education policies, implementation of primary education, secondary education, non-formal and adult education, technical and vocational education (TVE) and tertiary education. There are provincial directorates of education and culture and the district services for education, youth and technology. These entities are responsible for local management of the education system from the opening of primary schools to the placement and management of teachers. On the other hand, the Ministry of Labour (MITRAB) provides non-formal vocational training through the National Institute for Employment and Vocational Training (INEFP).

2) Education System in Mozambique

The education system in Mozambique consists of primary, secondary, and higher education. Mozambique follows a 7-5-3~9 education system (7 years of primary education, 5 or more years of secondary and higher education). Compulsory education is not defined in the law in Mozambique. Since 2005, school fee for primary schools has been eliminated as one of the measures to attain MDGs and EFA.

3) Education Related Indicators

The education sector in Mozambique is highlighted by its low human development index with its rank at 185th out of 187 countries in the world in 2012[2]. The human development index (HDI) is composed of life expectancy, education and GDP index. Regarding the education sector, the low literacy rate of Mozambique, which was 47% in 2010 compared with 76% in sub-Saharan Africa, especially affected the HDI.

[1] The description in this paragraph is based on the governmental structure before the reorganisation of the central ministries in January 2015. After this reorganization, the responsibilities of MINED are to be undertaken by the Ministry of Education and Human Development and the Ministry of Science, Technology and High Technical and Professional Education.
[2] UNDP (2013) Human Development Report 2013

Table 8.1.1 Education Related HDI Indicators of Mozambique in 2010

Indicators	Net Enrolment Rate (NER)	Literacy Rate	Ratio of females to males in primary schools
Mozambique	76.3%	47.4%	95.4%
Sub-Saharan Africa	76.4%	71.9%	85.0%
Developing Countries	88.8%	87.2%	96.0%
Developed Countries	97.0%	-	100.0%

Source: MDG, 2012, Annual Report

Almost all of the indicators in the table below show that both primary and secondary education have expanded. Gross enrolment rate (GER)[3] in the primary education (EP) is 116.5%, which means that there are some late-entering students. Although secondary education has been improving as indicated by the increase of net enrolment rate from 10.5% in 2008 to 14.8% in 2011, its level is still low compared to primary education, for which the net enrolment rate was 74.1% in 2011. Gross enrolment rates show that there are a lot of late-entering students. As mentioned in the previous section, primary school formally starts at age 6 but many children are late-entering students. The number of secondary school students has increased substantially in recent years with an average annual rate of increase of 10%. Yet, the net enrolment rate of secondary school is just 14.8%. This implies that only some of the primary school graduates continue on to secondary school.

Table 8.1.2 Number of Students, Teachers and Enrolment Rates

Item	2008	2009	2010	2011	Average Annual Growth Rate (%/year)
Primary Education					
Number of EP students	4,893,456	5,062,014	5,266,352	5,266,661	2.5
EP NER (%)	72.5	74.5	76.3	74.1	-
EP GER (%)	119.7	120.2	121.2	116.5	-
Number of classrooms in primary education	97,187	100,951	104,866	-	3.9
Number of teachers	58,120	62,680	67,707	-	7.9
Secondary Education					
Number of ES students	709,854	812,505	913,201	952,909	10.3
ES NER (%)	10.5	13.1	13.3	14.8	-
ES GER (%)	38.5	42.5	45.2	46.2	-

Source: MINED, 2010, Alguns Indicadores sobre Educação; Ensino Primário e Ensino Secundário Geral

(2) Present Conditions of the Nacala Corridor Region

1) Literacy Rates and Basic Educational Efficiency

Table below presents the major educational indicators of the five provinces related to the Nacala Corridor Region. The literacy rate of the five provinces was as low as 31%, less than half of that of the other provinces at 66%. While there were no significant differences between the five provinces and other provinces in primary school GER and classroom student ratio, there was a gap in teacher student ratio, 81.3% in the five provinces related to the Nacala Corridor Region and 65.2% in other provinces.

[3] Gross enrolment rate (GER) is the proportion of actually enrolled students regardless of their age against the total number of children who are of their corresponding school ages. Net enrolment rate (NER) is the number of students who are enrolled in their appropriate grade according to their age divided by the total number of children who are of their corresponding school ages.

Table 8.1.3 Literacy Rates and Basic Educational Efficiency

Indicator	Literacy Rate (%) in 2008	Primary School GER (%)		Classroom Student Ratio (%)		Teacher Student Ratio (%)	
		2007	2010	2007	2010	2006	2010
Mozambique	47.2	89.1	93.9	50.1	49.7	72.5	60.4
Five Provinces related to Nacala Corridor Region	31.4	85.8	95.4	51.7	52.2	81.3	67.3
Other Provinces	65.6	91.9	92.7	48.8	47.6	65.2	54.6

Source: JICA Study Team based on MICS, 2008, and MINED, Alguns Indicadores sobre educação ensino primário e Ensino Secundário Geral

8.1.2 Existing Strategic Plans for Education

MINED prepared the Strategic Plan for Education targeted at 2012-16 which covers pre-primary education, primary education, secondary education, technical and vocational education, higher education and administrative and institutional development. Though the plan sets the highest priority to provide primary education to all the children, it also puts priority on the post-primary education, which contributes to the economic, social and political development of the country.

Table 8.1.4 Development Status in 2016

Sector Programme	General Purpose	Outcome Indicator		Baseline 2011	Goal Year 2016
Pre-Primary Education and Primary Education	To ensure complete primary education	Gross completion rate	Total	49%	54%
			Female	45%	51%
Literacy and Adult Education	To increase opportunities for youth and adults	Illiteracy rate	Total	48.1%	30%
			Female	62.7%	45.0%
Secondary Education	To expand secondary education	Gross enrolment rate	Total	46%	50%
			Female	43%	47%
Technical and Vocational Education	To improve vocational and technical education	% of graduates absorbed by labour market according to their training programmes		27%	60%
Higher Education	To promote participation and access to higher education	Number of people with higher education by 1,000 habitants		3	5
Administrative and Institutional Development	To strengthen professional management of education system at various levels	Index of satisfaction of population with quality of educational services		n.a.	Satisfactory

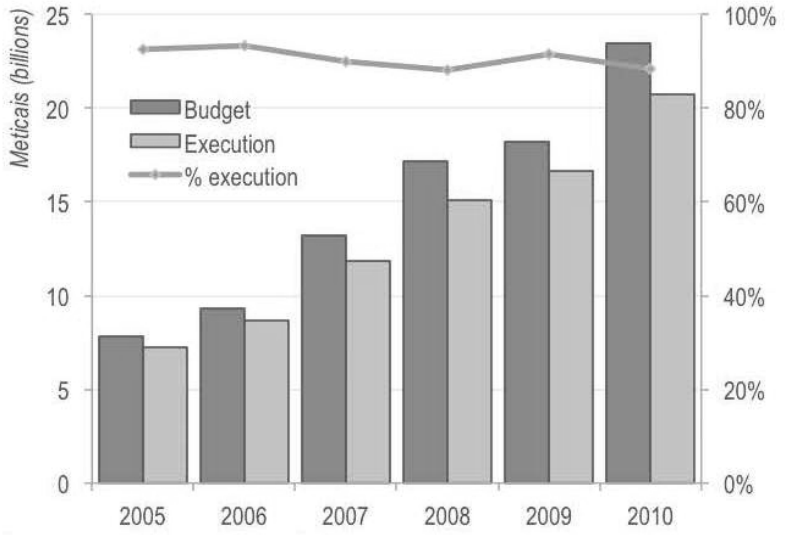
Source: JICA Study Team based on MINED, Strategic Plan for Education 2012-2016

8.1.3 Government Efforts and Budgeting to Education Sector

The government of Mozambique gives great importance to the education sector, especially primary education from the perspective of budget and efforts. The sector budget has increased to comprise around 20% of the State budget. As a result, some indicators related to access to school have improved, particularly with respect to the system's expansion and the increased levels of equity in participation.

These government's efforts, however, could not cover all areas. There has been a delay in educational development, peculiarly in the less accessible areas.

The figure below shows the evolution of the education sector's budget and its actual execution from 2005 to 2010.



Source: MINED, 2013, Education Strategic Plan 2012-2016

Figure 8.1.1 Budget and its Actual Execution of Education Sector

8.2 Health Sector

8.2.1 Present Conditions of Health Sector

(1) Present Conditions of Mozambique

1) Organisations Engaged in Health Service in Mozambique

The Ministry of Health (MISAU) is responsible for the formulation of health policies and implementation of projects. The health care activities in Mozambique are managed at three levels: central, provincial and district. The central level is an orienting organ engaged in political definitions, norms, laws, etc. The Ministry of Health prepares strategic plans for the sector and outlines principal strategies that provide orientation for district and provincial planning.

2) Health System in Mozambique

The Mozambican health system includes public centres and for profit private sector organisations. Of these, the public sector relies on the National Health Services (SNS) as the main service provider on the national scale. SNS is organised in four levels. There are 4 levels in the health system as below.

Table 8.2.1 Health System in Mozambique

Level of Health System	Description
Primary Level	The primary level (I) corresponds to the health sectors with the function of executing strategies on primary health care (PHC). The primary level constitutes the first contact of the population with the health centres. The health centres are responsible for the health of the population as well as the environment; they have to assure sanitary coverage of the population in a geographic zone defined by the health area.
Secondary Level	The secondary level (II) is composed of district hospitals, rural hospitals and general hospitals and their function is to provide health care as a first-level reference to the patients who could not get to other health centres.
Third Level	The third level (III) is composed of the provincial hospitals, and patients are referred there if they could not get all the help that they needed from district hospitals or the health centres that are located near the provincial hospital.
Fourth Level	The fourth level (IV) is composed of the central hospitals, and the patients are referred there if they could not get all the help that they needed from provincial, district or rural hospitals, as well as for patients who could not get all the help that they needed from health centres and are transferred to the general hospital. In this level, there are also specialised hospitals that provide different care. These hospitals can only be created if it is proved to be the best way of providing certain special care excluding psychiatric hospitals.

In line with the above mentioned health system, features of each type of health facilities are described in Table 8.2.2.

Table 8.2.2 Features of Health Facilities in the Health System

Hierarchical Classification	Targeted Administrative Level	Targeted Population and Function	No. of Medical Staff	No. of Beds
Central Hospital	Regional	• They operate as a regional Hospital	• Number of staff is decided by National Directorate of Health and MISAU	400-900
Specialised Hospital	Provincial/ district	• They specialise in one specific area (i.e. dentist hospital)	• Not specified	Not specified
Provincial Hospital	Provincial	• One covers 800,000 to 3,500,000 population	• Number of staff is decided by National Directorate of Health and MISAU	200-450
General Hospital	For urban areas (municipalities/ districts)	• One covers 150,000 to 900,000 population • They support health centres around rural areas	• Doctors: 3-5 • Technicians in medical, aesthetics, surgery, instrument, dentistry, laboratory, radiology, physiotherapy: 10-17 • Staff in laboratory and radiology: 3-9 • Nurse: 20-33 • Administration, clerks, attendants: 34-38 Total: 61-102	60-200
Rural Hospital	For rural areas (districts)	• Their function is identical to General Hospitals but they are located in rural areas	• Doctors: 3-5 • Technicians in medical, aesthetics, surgery, instrument, dentistry, laboratory, radiology, physiotherapy: 10-17 • Staff in laboratory and radiology: 3-9 • Nurse: 20-33 • Administration, clerks, attendants: 34-38 Total: 61-102	60-200
District Hospital	District	• They are located at district centre or administrative post with population around 50,000 to 250,000	• Doctors: 1-2 • Technicians in medical, dentistry, laboratory, pharmacy and radiology: 5 • Staff in medical, dentistry, laboratory, pharmacy and radiology: 6-8 • Nurse: 11-15 • Administration, clerks, attendants: 10-13 Total: 32-42	25-60
Urban Health Centre A	For urban areas (municipalities/ districts)	• One covers 40,000 to 100,000 population	• Doctors: 1 • Technicians in preventive medical and sanitation, dentistry, laboratory and pharmacy: 4 • Staff in medical, dentistry, laboratory and pharmacy: 5-10 • Nurse: 9-10 • Administration, clerks, attendants: 8-12 Total: 26-30	2-3 for patients waiting to be transferred
Urban Health Centre B	For urban areas (municipalities/ districts)	• One covers 18,000 to 48,000 population	• Technician in medical: 1 • Staff in medical, prevention and facility environment, dentistry, laboratory and pharmacy: 5 • Nurse: 8-10 • Clerk and attendants: 4 Total: 16-18	2 for patients waiting to be transferred
Urban Health Centre C	For urban areas (municipalities/ districts)	• One covers 10,000 to 25,000 population	• Technician in medical: 1 • Nurse: 2 • Attendants: 1 Total: 4	2 for patients waiting to be transferred
Rural Health Centre I	For rural areas (districts)	• One covers 16,000 to 35,000 population	• Technician in medical: 1 • Staff in medical, prevention and facility environment, dentistry, laboratory pharmacy and radiography: 6 • Nurse: 4-6 • Administration and attendants: 4-5 Total: 13-16	2 maternity beds for birth 6-8 maternity beds 10-18 normal beds
Rural Health Centre II	For rural areas (districts)	• One covers One for 7,500 to 20,000 people	• Staff in medical and nutrition: 2 • Nurse: 1 • Attendants: 1 Total: 4	
Health Post	For rural areas (districts)	-	-	-

Source: Interview with Nampula Provincial Department of Health, 2014

3) Health-related Indicators

The health sector is still stagnated. The table below shows MDG indicators related to health. The rate of immunization of children is still only 77% although this rate has been increasing. In comparison to the Sub-Saharan Africa region, the infant mortality rate and contraceptive prevalence rate are much worse. Of special note, the maternal mortality ratio is quite high as shown in the Table 8.2.3 (500 women died per 100,000 live births). This ratio is far higher than that of developed countries. Other social indicators are among the worst in Sub-Saharan Africa. The current situation of disease in Mozambique is dominated by communicable, infectious diseases such as malaria, diarrhoea, tuberculosis, respiratory infections and HIV/AIDS. Mozambique is vulnerable to frequent outbreaks of cholera, dysentery and meningococcal meningitis. These outbreaks are more likely to occur in precarious environments, particularly urban areas, and are caused by over population in towns and cities by people who migrated in search of security. Other important factors are the repeated occurrence of calamities and lack of food security in some areas. Mozambique is one of the countries with the highest HIV incidence rate among Sub-Saharan African countries as in the table below. Additionally, there are many tuberculosis cases per 100,000 people among Sub-Saharan African countries.

Table 8.2.3 Health Situation in Mozambique and the World in 2010

Indicators	Mozambique 2008	Sub-Saharan Africa	Developing Countries	Developed Countries
Children at 1 year old immunised against measles	58%*	75%	84%	94%
Infant mortality rate/ 1,000 live births	93*	121.0	63.0	7.0
Contraceptive prevalence rate	16.2%*	25.0%	62.0%	72.0%
Births attended by skilled health personnel	55%*	45.0%	65.0%	_
Maternal mortality ratio/ 100,000 live births	500*	500	24	16
HIV incidence rates	11.5%	5.0%	7.0%	4.0%
Tuberculosis cases per 100,000 population	624	276	151	27

Source: UNDP, 2012, MDGs Report
Note: *The data of Mozambique is for 2008, which is from MPD, 2010, Report on the Millennium Development Goals.

The situation in Mozambique is worse than other countries in all the indicators expect births attended by skilled health personnel. Despite the unfavourable health situation in Mozambique compared with other countries, its MDG indicators have shown an improvement in the recent years as shown below.

Table 8.2.4 Present Health Situation

MDG Indicator	1990	1995	2000	2005	2008	2012*	2015 MDG Target
Children at 1 year old immunised against measles	59%	61%	58%	63%	58%	82%	95%
Infant mortality rate/1,000 live births	158	147	124	100	93	63	67
Under-five mortality rate/1000 live births	235	219	178	145	138	90	108
Contraceptive prevalence rate	-	5.1%	17%	11.8%	16.2%	-	34%
Births attended by skilled health personnel	-	44.2%	47.7%	48%	55%	92.3%	66%
Maternal mortality ratio/ 100,000 live births	-	1000	408	520	500	490	250

Source: MPD, 2010, Report on the Millennium Development Goals (for year 1990 to 2008)
World Bank, 2014,World Development Report 2014, and UNDP, 2014, Human Development Report 2014 (year 2012)
Note: *For the 2012, data for 1) Children at 1 year old immunised against measles, 2) Infant mortality rate/1,000 live births, 3) Under-five mortality rate/1000 live births, 4) Births attended by skilled health personnel are taken from UNDP, 2014, and data for Maternal mortality ratio/ 100,000 live births is from World Bank, 2014, which is the data as of 2010.

(2) Present Conditions of the Five Provinces related to the Nacala Corridor Region

1) Health Facilities

According to the table below, there were 805 health facilities in the five provinces related to the Nacala Corridor Region by 2012 including one central hospital in Nampula, four provincial hospitals, one each

in Niassa, Cabo Delgado, Tete and Zambézia, one general hospital in Nampula, eleven rural hospitals, ten district hospitals and 778 health centres and health posts. This indicates that a large portion of health facilities are health centres and health posts. Generally, only a few health workers work at health posts and health centres.

Table 8.2.5 Number of National Health Service Facilities by Province

Indicator	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Health Centre and Health Post	Total	Hospital Beds ** (per 10,000)
Mozambique	**3**	**7**	**4**	**22**	**15**	**1381**	**1432**	**7.78**
5 Provinces of Nacala Corridor Region	**1**	**4**	**1**	**11**	**10**	**778**	**805**	**38.9**
Niassa	*0*	*1*	*0*	*1*	*1*	*148*	*151*	*11.9*
Cabo Delgado	*0*	*1*	*0*	*3*	*0*	*110*	*114*	*8.9*
Nampula	*1*	*0*	*1*	*4*	*3*	*200*	*209*	*7.4*
Zambézia	*0*	*1*	*0*	*0*	*6*	*217*	*224*	*4.7*
Tete	*0*	*1*	*0*	*3*	*0*	*103*	*107*	*6.0*
Other Provinces	**2**	**3**	**3**	**11**	**5**	**603**	**627**	**12.4**
Manica	*0*	*1*	*0*	*0*	*3*	*97*	*101*	*6.8*
Sofala	*1*	*0*	*0*	*4*	*0*	*147*	*152*	*10.0*
Inhambane	*0*	*1*	*0*	*2*	*1*	*119*	*123*	*10.9*
Gaza	*0*	*1*	*0*	*4*	*0*	*122*	*127*	*16.3*
Maputo Province	*0*	*0*	*1*	*1*	*1*	*82*	*85*	*7.9*
*Maputo City **	*1*	_	*2*	_	-	*36*	*39*	*22.2*

Source: Information for health facilities is based on the quantitative data from MISAU, received in 2012.
Note: *Data for Maputo City on numbers of health facilities is based on MISAU, 2008, National Plan for Health Human Resource Development (data of 2003).
**All data on hospital beds is based on INE, 2012 Statistical Yearbook 2012 (data of 2012).

Tables below show the number of health facilities at the district level, which is a disaggregated data of the above provincial level table. In general, it can be said that currently smaller districts in rural areas are generally covered by a Rural Health Centre or Health Post in terms of population coverage. However, in municipalities and bigger districts most of which are along the main, sub and feeder Corridors of the Nacala Corridor, higher level health facilities are needed considering the current population as well as future population growth.

Table 8.2.6 Number of National Health Service Facilities by District (Niassa Province)

District	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Urban HC* A	Urban HC B	Urban HC C	Rural HC I	Rural HC II	Health Post	Total
Lichinga City	-	1	-	-	-	1	-	-	-	-	NA	2
Cuamba	-	-	-	1	-	1	3	-	1	12	NA	18
Lago	-	-	-	-	-	-	-	-	1	12	NA	13
Lichinga District**	-	-	-	-	-	-	-	-	1	15	NA	16
Majune	-	-	-	-	-	-	-	-	1	6	NA	7
Mandimba	-	-	-	-	-	-	-	-	1	8	NA	9
Marrupa	-	-	-	-	1	-	-	-	1	6	NA	8
Maua	-	-	-	-	-	-	-	-	1	7	NA	8
Mavago	-	-	-	-	-	-	-	-	1	3	NA	4
Mecanhelas	-	-	-	-	-	-	-	-	1	11	NA	12
Mecula	-	-	-	-	-	-	-	-	1	8	NA	9
Metarica	-	-	-	-	-	-	-	-	1	6	NA	7
Muembe	-	-	-	-	-	-	-	-	1	4	NA	5
Ngauma	-	-	-	-	-	-	-	-	1	6	NA	7
Nipepe	-	-	-	-	-	-	-	-	1	5	NA	6
Sanga	-	-	-	-	-	-	-	-	1	11	NA	12
Total	**0**	**1**	**0**	**1**	**1**	**2**	**3**	**0**	**15**	**120**	**NA**	**143**

Source: Quantitative data from MISAU, received in 2012 (the source is same for the below tables for other provinces)
Note: * HC: Health Centre
** Currently known as Chimbonila District.

Table 8.2.7 Number of National Health Service Facilities by District (Cabo Delgado Province)

District	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Urban HC A	Urban HC B	Urban HC C	Rural HC I	Rural HC II	Health Post	Total
Pemba City	-	1	-	-	-	-	1	8	-	-	NA	10
Ancuabe	-	-	-	-	-	-	-	-	2	4	NA	6
Balama	-	-	-	-	-	-	-	-	1	6	NA	7
Chiure	-	-	-	-	-	-	-	-	3	8	NA	11
Ibo	-	-	-	-	-	-	-	-	1	2	NA	3
Macomia	-	-	-	-	-	-	-	-	1	6	NA	7
Mecufi	-	-	-	-	-	-	-	-	1	2	NA	3
Meluco	-	-	-	-	-	-	-	-	1	4	NA	5
Mocimboa da Praia	-	-	-	1	-	-	-	2	-	4	NA	7
Montepuez	-	-	-	1	-	-	1	1	1	7	NA	11
Mueda	-	-	-	1	-	-	-	-	-	7	NA	8
Muidumbe	-	-	-	-	-	-	-	-	1	5	NA	6
Namuno	-	-	-	-	-	-	-	-	1	6	NA	7
Nangade	-	-	-	-	-	-	-	-	1	4	NA	5
Palma	-	-	-	-	-	-	-	-	1	5	NA	6
Metuge	-	-	-	-	-	-	-	-	1	4	NA	5
Quissanga	-	-	-	-	-	-	-	-	2	5	NA	7
Total	**0**	**1**	**0**	**3**	**0**	**0**	**2**	**11**	**18**	**79**	**NA**	**114**

Table 8.2.8 Number of National Health Service Facilities by District (Nampula Province)

District	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Urban HC A	Urban HC B	Urban HC C	Rural HC I	Rural HC II	Health Post	Total
Angoche	-	-	-	1	-	-	-	1	1	8	6	17
Erati	-	-	-	1	1	-	-	-	1	6	1	10
Ilha	-	-	-	-	-	-	-	-	2	3	-	5
Lalaua	-	-	-	-	-	-	-	-	1	4	-	5
Malema	-	-	-	-	-	-	-	-	2	3	3	8
Meconta	-	-	-	-	-	-	-	-	2	4	1	7
Mecuburi	-	-	-	-	-	-	-	-	1	10	2	13
Memba	-	-	-	-	-	-	-	-	4	6	2	12
Mogincual	-	-	-	-	-	-	-	-	1	8	-	9
Mogovolas	-	-	-	-	-	-	-	-	1	5	1	7
Moma	-	-	-	-	1	-	-	-	2	9	3	15
Monapo	-	-	-	1	-	-	-	-	3	6	4	14
Mossuril	-	-	-	-	-	-	-	-	3	5	2	10
Mucate	-	-	-	-	-	-	-	-	1	6	2	9
Murrupula	-	-	-	-	-	-	-	-	2	3	1	6
Nacala -A-Velha	-	-	-	-	-	-	-	-	2	3	1	6
Nacala Porto City*	-	-	-	-	1	1	1	5	-	3	2	13
Nacaroa	-	-	-	-	-	-	-	-	2	3	1	6
Nampula City	1	-	1	-	-	1	5	4	-	-	1	13
Nampula-Rapale**	-	-	-	-	-	-	-	-	3	4	8	15
Ribáué	-	-	-	1	-	-	-	-	1	4	3	9
Total	**1**	**0**	**1**	**4**	**3**	**2**	**6**	**10**	**35**	**103**	**44**	**209**

Note: *Currently known as Nacala City.
**Currently known as Rapale District.

Table 8.2.9 Number of National Health Service Facilities by District (7 districts of Zambezia Province)

District	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Urban HC A	Urban HC B	Urban HC C	Rural HC I	Rural HC II	Health Post	Total
Alto Molócuè	-	-	-	-	1	-	2	-	1	9	3	16
Gilé	-	-	-	-	1	-	-	-	-	8	1	10
Gurué	-	-	-	-	1	-	1	-	-	10	1	13
Ile	-	-	-	-	-	-	-	-	1	14	2	17
Lugela	-	-	-	-	-	-	-	-	2	7	3	12
Milange	-	-	-	-	1	-	1	-	-	10	4	16
Namarroi	-	-	-	-	-	-	-	-	1	7	-	8
Total	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**5**	**65**	**14**	**92**

Table 8.2.10 Number of National Health Service Facilities by District (Tete Province)

District	Central Hospital	Provincial Hospital	General Hospital	Rural Hospital	District Hospital	Urban HC A	Urban HC B	Urban HC C	Rural HC I	Rural HC II	Health Post	Total
Tete City	-	1	-	-	-	2	1	1	-	3	1	9
Angonia	-	-	-	1	-	-	-	-	-	7	2	10
Cahora Bassa	-	-	-	1	-	-	-	4	1	3	-	9
Changara	-	-	-	-	-	-	-	-	1	12	-	13
Chifunde	-	-	-	-	-	-	-	-	1	6	-	7
Chiuta	-	-	-	-	-	-	-	-	2	2	-	4
Maganga	-	-	-	-	-	-	-	-	2	6	-	8
Magoe	-	-	-	-	-	-	-	-	2	5	-	7
Maravia	-	-	-	-	-	-	-	-	-	5	-	5
Moatize	-	-	-	-	-	-	-	-	2	10	-	12
Mutarara	-	-	-	1	-	-	-	-	-	10	-	11
Tsangano	-	-	-	-	-	-	-	-	1	5	-	6
Zumbo	-	-	-	-	-	-	-	-	2	4	-	6
Total	**0**	**1**	**0**	**3**	**0**	**2**	**1**	**5**	**14**	**78**	**3**	**107**

2) Population per Health Worker

Health workers include public health, nursing, obstetrics, technicians for instruments, anaesthesiologists, and surgery and management staff. Population per medical personnel in the five provinces related to the Nacala Corridor Region is strikingly high; 81,000 persons per doctor, 4,900 persons per nurse and 1,800 persons per health worker. According to WHO recommendations, the ideal standard is 1 doctor for 1,000 patients. Each nurse covers 4,900 people in the five provinces related to the Nacala Corridor Region. This ratio is higher than in other provinces.

Table below shows the shortage of health workers in Mozambique, especially in the five provinces related to the Nacala Corridor Region.

Table 8.2.11 Population per Health Worker by Province, 2007

Province	Population per Health Worker	Population per Doctor	Population per Nurse
Mozambique	**1,600**	**57,400**	**4,500**
5 Provinces of Nacala Corridor Region	**1,800**	**81,000**	**4,900**
Niassa	*1,200*	*78,000*	*4,000*
Cabo Delgado	*1,800*	*70,000*	*5,200*
Nampula	*1,900*	*76,000*	*4,800*
Zambézia	*2,300*	*110,000*	*6,000*
Tete	*1,600*	*70,000*	*4,600*
Other Provinces	**1,400**	**34,000**	**4,200**
Manica	*1,550*	*50,000*	*4,800*
Sofala	*1,250*	*30,000*	*3,600*
Inhambane	*1,550*	*65,000*	*5,500*
Gaza	*1,450*	*28,000*	*4,800*
Maputo province	*1,400*	*30,000*	*5,000*
Maputo city	*1,350*	*2,000*	*1,500*

Source: JICA Study Team based on interviews and National Plan for Health Human Resources Development

The table below is to support the information on population per health worker, with the classifications of health service staff as higher, medium, basic, elementary and general support.

Table 8.2.12 Population per Health Worker by Province, 2012

	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	Inhambane	Gaza	Maputo Province	Maputo City
Higher	21,034	16,192	12,339	23,894	19,548	14,960	4,693	12,406	11,895	8,511	3,495
Medium	3,265	2,514	2,824	3,299	3,612	3,280	1,722	2,692	2,683	2,971	1,714
Basic	2,014	2,132	2,242	3,244	2,366	2,394	1,329	2,044	1,909	2,387	1,149
Elementary	2,611	1,657	1,537	2,284	2,960	1,698	796	1,508	1,811	1,493	720
General support	4,704	2,247	1,944	2,718	4,711	2,813	1,041	2,272	2,400	1,760	783

Source: INE, 2012, Statistical Yearbook 2012

3) Maternal Health

The conditions of antenatal care are also less favourable in the five provinces related to the Nacala Corridor Region as indicated by the ratio of the sources of antenatal care service; at 0.9% by a doctor, 33.2% by a nurse, 52.6% by a midwife and the remaining 9.0% by none, while the corresponding percentages in other provinces are 3.9%, 76.6%, 15.8% and 2.8% respectively.

4) Child Health

The infant mortality rate in the five provinces related to the Nacala Corridor Region was 117.7 per 1,000 live births in 2008, while that of other provinces was 81.9. The under-5 mortality rate in the five provinces was 164.3, whereas the rate was 133.6 in other provinces. The situations regarding vaccination and child malnutrition in the five provinces were much worse than in other provinces. 21.1% of the children in the five provinces related to the Nacala Corridor Region suffer from malnutrition, which is about 10% higher than the other provinces.

5) Disease Trend

In the five provinces related to the Nacala Corridor Region and Mozambique as a whole, common causes of death and illness are HIV/AIDS, malaria, tuberculosis, respiratory tract infections and diarrhoeal disease. This section explains the trends of HIV/AIDS, malaria and tuberculosis.

HIV/AIDS

The incidence of HIV has been worsening in the five provinces related to the Nacala Corridor Region. The number of HIV positive people increased from 1,013,000 in 2001 to 1,530,000 in 2009, which relates to 10.3% of the population of 15 to 49 years old in 2001 to 12.2% in 2009. The situation in the five provinces, however, was better than in the other provinces with the proportion of HIV positive people to the total population in the five provinces at 7.5% in 2009, while that in the other provinces was 16.9%. The rate was highest in Zambézia at 12.6% followed by Cabo Delgado (9.4%), Tete (7.0%), Nampula (4.6%) and Niassa (3.7%).

Malaria

Malaria is still one of the main diseases in Mozambique. The prevalence of malaria was still high (47%) in 2009 though the rate has decreased from 52% in 2003. Proper preventive actions such as spraying inside of homes and the use of mosquito nets are still inadequate.

Tuberculosis

Tuberculosis is still a major disease in Mozambique. The incidence rate of tuberculosis was 504 cases per 100,000 people in 2009. The proportion of cured cases increased slightly from 81% in 2003 to 82% in 2009.

8.2.2 Existing Policies and Plans for Health Sector

A plan for health sector improvement is articulated in the Strategic Plan for the Health Sector, 2014-2019 (PESS). The principles of the National Health Plan are as follows:

- Primary health care (PHC)
- Equity
- Quality
- Partnership
- Community involvement
- Research and technological innovation
- Integrity, transparency and accountability

The strategic objectives of PESS 2014-2019 are defined as follows:

- To increase the access and use of health services
- To improve the quality of the services provided
- To reduce geographic inequalities, and inequalities among population groups, in the access and use of health services
- To improve the efficiency in service provision and use of resources
- To strengthen mutual respect based partnerships for health
- To increase the transparency and accountability in the way that public goods are used
- To strengthen the Mozambican health system

8.3 Human Resources Development for Economic Sectors

8.3.1 Present Conditions of Technical Education and Training[4]

(1) Formal Technical Training and Vocational Education (Formal TVE)

The technical and vocational education and training (TVET) system in Mozambique can be classified into three types: (i) formal technical and vocational education, (ii) non-formal vocational training and (iii) informal training. Formal technical and vocational education (TVE) is provided by public or private schools according to the educational system of the Ministry of Education (MINED). The largest provider of TVE is the National Directorate for Primary Education (DINET) of MINED.

There are two levels of TVE, namely, post-primary TVE and higher education.

Post-primary TVE is mainly provided by DINET of MINED. Post-primary TVE is comprised of basic and intermediate levels. Basic level schools admit students who have completed the 2nd cycle of primary education (grade 7), while intermediate level schools admit students that have completed the 1st cycle of secondary education (grade 10) or basic level TVE schools. Durations of the courses of both levels are three years.

Apart from public schools and private schools, there are so-called community schools, which are developed by organisations such as churches and NGOs, but the government (DINET) dispatches teachers to the schools.

The total number of students of all TVE schools attending more than 145 public and private institutes increased from 32,000 in 2004 to 45,000 in 2011. Out of the 45,000 students, 36,000 were students of public institutes.

TVE schools under DINET provide training in agriculture, industry and commercial subjects. There are around 60 courses in the areas of industrial maintenance, agriculture, mining, hotel and hospitality, administration and management, etc.

There are 52 basic level schools in total in Mozambique, including professional schools, and 44 intermediate level schools, including those providing both basic and intermediate level education. Many intermediate level schools (16 out of 44) are concentrated in Maputo city, although each province has at least one intermediate level school. On the other hand, basic level schools are distributed equally among the provinces.

(2) Higher Education

Higher education is under the jurisdiction of the National Directorate of Higher Education (DICES) of the Ministry of Education. There are 42 higher education institutions in total in Mozambique; of these, 18 are public and 24 are private. Among the 18 public schools, 4 are universities, 4 are superior polytechnics, and the remaining 10 are superior institutes, colleges and academies. The main campuses of the universities are located in Maputo (Eduardo Mondlane University), Nampula (Lúrio University), and Beira (Zambeze University). Each of them has branch campuses in surrounding provinces. Pedagogical University has branch campuses in almost all provinces. Two superior polytechnics are located in Tete

[4] The description in this section on the roles of the ministries (MINED and MITRAB) is based on the governmental structure before the reorganisation of the central ministries in January 2015.

Province; one is located at Songo, offering courses in electronics and hydraulics, and the other at Tete, offering courses in mining, mineral processing and informatics.

The number of students in higher education increased greatly between 2004 and 2010. The number of students in public institutions increased from 15,113 to 72,636, and those in private institutions increased from 7,143 to 28,726.

(3) Non-Formal Vocational Training Education

The National Institute for Employment and Vocational Training (INEFP) of the Ministry of Labour (MITRAB) is the largest provider of non-formal vocational training.

The INEFP have 13 Vocational Training Centres (CFP) in Mozambique. Almost all CFPs are located in the capital cities of the provinces. There are four mobile units providing training in rural areas. INEFP of each province is making an effort to provide training opportunities in rural areas and towns far from the capital city in different ways. Vocational training provided by INEFP focuses more on practical skills development in comparison with the TVE provided by DINET. Durations of training are three or six months for short courses, and twelve months for medium courses. Trainees are awarded professional certificates upon completion of the courses.

PIREP (Programa Integrado de Reforma da Educação Profissional), a reform programme for TVET, has designed the National Vocational Qualifications Framework (QNQP), and the qualification for level 3–5 (equivalent to 11th and 13th grade graduate) has already been developed according to the QNZP. The INEFP is waiting for the qualifications of level 1 and 2 (equivalent to 7th and 10th grade graduate) since most INEFP courses (almost 80%) are incorporated in these two levels. INEFP is mainly conducting short courses (three months) for those who have completed grade 5–7 of primary education. INEFP is working closely and collaboratively with private companies in conducting training courses. The companies, mostly large foreign companies, send their employees to Vocational Training Centres and INEFP conducts training according to the needs and requests of the companies. The number of trainees has greatly increased, from 8,798 in 2006 to 101,726 in 2009, an increase of about 12 times.

Some large-scale foreign companies and large-scale projects such as Rio Tinto and Empresa Construtora Norberto Odebrecht from Brazil are also conducting non-formal vocational training for their employees.

(4) Government Policies, Strategies and Plans related to Human Resources Development

The government policies specifically focusing on human resources development include the following:

- Strategic Plan for Education and Culture 2006–2010 (ESSP II)
- Education Sector Strategic Plan 2012–2016
- Strategic Plan for Higher Education 2000–2010 (PEES I and PEES II)
- The Strategy for Technical and Vocational Education in Mozambique 2002–2011
- Employment and Vocational Training Strategy 2006–2015

The Education Sector Strategic Plan 2012–2016 stipulates the general objective and strategic objectives as follows:

a. General objective: Improve access, relevance, efficiency, effectiveness and quality of technical and vocational education (TVE), to develop the country
b. Strategic objectives:
    - Increase access and retention in the TVE, paying particular attention to geographical and

gender disparities

- Ensure the quality of TVE and its relevance to the requirements of the labour market (formal and informal)
- Improve management and coordination systems

The Government of Mozambique designed the Professional Education Reform Programme (REP), a long-term TVET reform programme for the period 2006–2020. The objective of the REP is to improve the quality and responsiveness of the TVET system to labour market needs by providing training delivered in a sustainable, integrated, effective, and suitable manner.

The REP consists of the following three phases: pilot phase 2006–2011, expansion phase 2012–2016 and consolidation phase 2017–2021. PIREP is the pilot phase programme of REP (TVET Reform). It was planned to be implemented from 2006 to 2011, but was extended to 2014. PIREP has the following four components:

- Development of an institutional framework
- Standards-based qualifications and training system
- Quality improvements in TVET Institutions
- Skills development fund (FUNDEC)

Four economic areas were identified for the pilot projects: 1) industrial maintenance, 2) hospitality and tourism, 3) agriculture and agro-business, and 4) administration and management services.

Training institutions selected for the pilot project located in the Nacala Corridor Region, are listed below.

Table 8.3.1 List of Selected Training Institutions for the Pilot Project (only in the Nacala Corridor Region)

Institution	Province	Economic Sector for Provision of Training	Proprietor
Escola Agrária de Lichinga	Niassa	Agro Industry	MINED
Escola Industrial e Comercial de Pemba	Cabo Delgado	Tourism Services Administration and Management	MINED
Escola/instituto Industrial e Comercia13 de Fevereiro	Nampula	Administration and Management Industrial Maintenance	MINED
Vocational Training Centre (INEFP)	Nampula	Industrial Maintenance	MITRAB
Escola Profissional Dom Bosco	Tete	Industrial Maintenance	Rede Salesiana

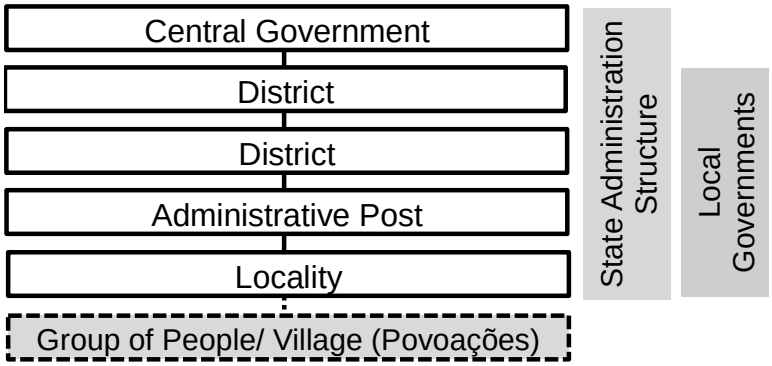
Source: Project Appraisal Document, World Bank

8.4 Institutions and Organisations

8.4.1 Present Conditions of Institutions and Organisations

(1) Government Administration Structure

There are five tiers of the state administration structure in Mozambique: central government, province, district, administrative post, and locality.



Source: JICA Study Team based on the Ministry of State Administration

Figure 8.4.1 Government Administration Structure in Mozambique

There is another local government unit called a "municipality." A municipality is regarded as an upgraded unit from one of the administrative posts with larger autonomies. Organisational structures are not controlled by the same regulations as for other local governments. While the larger level of autonomy would enable municipalities to provide services matched to local needs, it might create difficulties in coordination among local governments vertically and horizontally.

The head position of each state administration tier is appointed by the central government including a provincial governor as a representative of the central government as shown in the table below. An exception is the case of a municipality. Regarding this structure, the central government might have strong influence and control over the state administration structure.

Table 8.4.1 Key Position of Each Local Government

Unit	Position	Nominated by	Subordinate to	Appointed (or dismissed) by
Province	Provincial Governor	President of Mozambique	President of Mozambique	President of Mozambique
	Provincial Permanent Secretary	Minister of State Administration	Provincial Governor	Prime Minister
	Director of each directorate	Minister of each sector ministry	Provincial Governor	Minister of each sector ministry
	Head of each department	Provincial Director	Provincial Director	Provincial Governor
District	District Administrator	Minister of State Administration	Provincial Governor	Minister of State Administration*1
	Director of each district department	District Administrator	District Administrator	Provincial Governor
Administrative Post	Chief of Administrative Post	Provincial Governor	District Administrator	Minister of State Administration*1
Locality	Chief of Locality	District Administrator	Chief of Administrative Post	Provincial Governor

Municipality	President of municipality	Local people (election)	Local people (election)	Local people (election)
	Municipal Director of each directorate	Municipal Council *2	President of Municipality	President of Municipality

Source: JICA Study Team based on the Ministry of State Administration
Note :
*1 The District Administrators and Chief of Administrative Posts are appointed by the Minister of State Administration (currently known as the Ministry of State Administration and Public Service) under delegation of power from the President of Mozambique
*2 A municipal council composed of a minimum of five and a maximum of 11 councilmen (Vereador) who are responsible to specific area(s) of administrations. All of them are politicians. A Municipal Council helps the President of the Municipality with administration.

The Portuguese colonial rule created a highly centralised state administration system. After the long civil war (1977–1992), the government of Mozambique has made an effort to modernise and democratise the state administration structure. Decentralisation was one of these efforts. The main tier of decentralised state administration structures is the district and municipalities.

(2) Coordination Mechanisms for Development

There are mainly two ways of development coordination. One is through the preparation of development plans under the National Planning System. The types of development plans at the central, provincial and district levels as shown below are prepared through coordination.

Table 8.4.2 Development Plans at Central, Provincial and District Levels

Target Period	Central Government	Province	District
Long-term (more than 5 years)	Agenda 2025 *(Agenda 2025)*		
	National Development Strategy *(Estratégia Nacional de Desenvolvimento: ENDE)*[*1]	Provincial Strategic Plan *(Plan Estratégio da Procíncia: PEP)*	
	Millenium Development Goals *(Objectivos de Desenvolvimento do Milénio)*[*2]		
5 years (for each administration)	Government Five Year Programme *(Programa Quinquenal do Governo: PQG)*		
	Poverty Reduction Strategy Paper *(Plano de Acção para Redução da Pobreza: PARP)*		
	Sector Strategies[*3]		
Medium-term (every 3 years)	Mid-term Expenditure Framework *(Cenario Fiscal de Medio Prazo: CFMP)*[*4]	Mid-term Expenditure Framework *(Cenario Fiscal de Medio Prazo: CFMP)*[*4]	Mid-term Expenditure Framework *(Cenario Fiscal de Medio Prazo: CFMP)*[*4]
Short-term (every year)	Economic and Social Plan *(Plano Económico e Social: PES)*	Economic and Social Plan and Budget *(Plano Económico e Social-Orçamento de Provincial)*[*5]	Economic and Social Plan and Budget *(Plano Económico e Social-Orçamento de Provincial)*[*5]

Source: JICA Study Team based on Ministry of State Administration
Note:
*1 National Development Strategy (2015-2035) was prepared in July 2014.
*2 Millennium Development Goals (MDG) is not a development plan prepared by the government of Mozambique. However the government is following the directions of MDG for the preparation of the development plans of the country.
*3 Each sector ministry prepares sector strategies.
*4 CFMP covers 3 years. It is revised every year for the next 3-year term.
*5 At the province and district levels, usually an 'Economic and Social Plan' and 'Budget' are prepared together in one document.

The other way uses organisational coordination mechanisms such as meetings of stakeholders. The Provincial Forum of Economic Council, for example, is held once a year and all economic and social development issues are discussed with stakeholders including all district administrators and all the

presidents of municipalities in the province. Through this meeting, vertical coordination is attempted. For horizontal coordination, provincial governors have meetings every 15 days and discuss various matters. There are regional meetings called the Regional Forums of Governors that are held in each region.

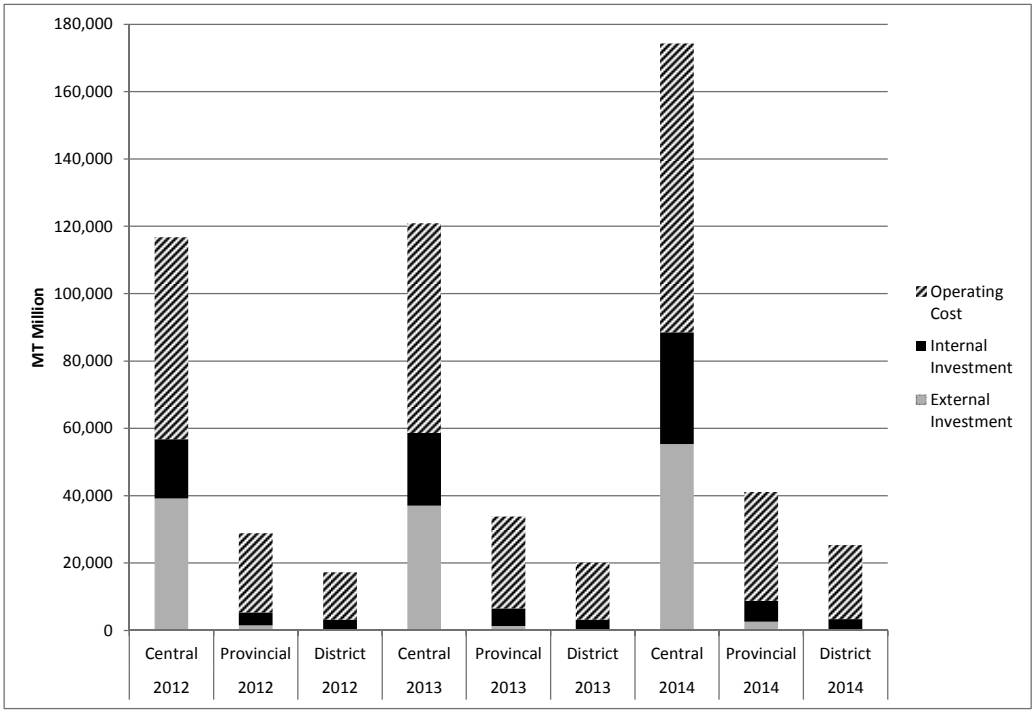
There exist some coordination mechanisms at national level and provincial level such as follows:

- The Technical Planning Council is joined by all directors of planning of all ministries. The director of the National Directorate of Planning of MPD (currently known as the Ministry of Economy and Finance) is the chair. The council is held once a month and discusses various issues in relation to planning.
- The Investment Council is held once a quarterly period. This is a council of all ministers where large investments are discussed.
- The Coordinating Agency for Integrated Development of Nampula (Unidade de Coordenação do Desenvolvimento Integrado de Nampula: UCODIN) manages all issues related to economic and social developments described in the Provincial Development Strategy (PEP) of Nampula Province. There is no such organisation in other four provinces of the Nacala Corridor Region.
- Development Observatory is a mechanism to hear people's voice in the political decision process. At the central level, National Directorate of Planning of MPD chairs the observatory, whereas it is chaired by the provincial governor at the province level. It takes place in response to requests from the people.

8.4.2 Government Budget

The state budget at the central level for 2014 is MT 174 billion whereas the state budget at the provincial level for 2014 is MT 41 billion. The state budget at the central level is approximately four times higher than that of the provincial level.

Although the dependence on external investment (donations, foreign aid, and external credit) has decreased compared to the past when more than 50% of the state budget was external investment, it still amounted to about 30% of the state budget at the central level throughout 2012-2014. The state budget of Mozambique is still relatively highly dependent on external resources, and external investment occupies more than 60% of total investment, meaning that the amount of internal-source budget allocated for new investment is limited. In addition, the proportion of investment in the state budget at the provincial and district levels is quite low, which means that not much budget is secured for new investment.



Source: Ministry of Finance, State Budget for the Year 2012-2014

Figure 8.4.2 Operating Cost, Internal and External Investment of the State Budget at the Central, Provincial, and District Levels

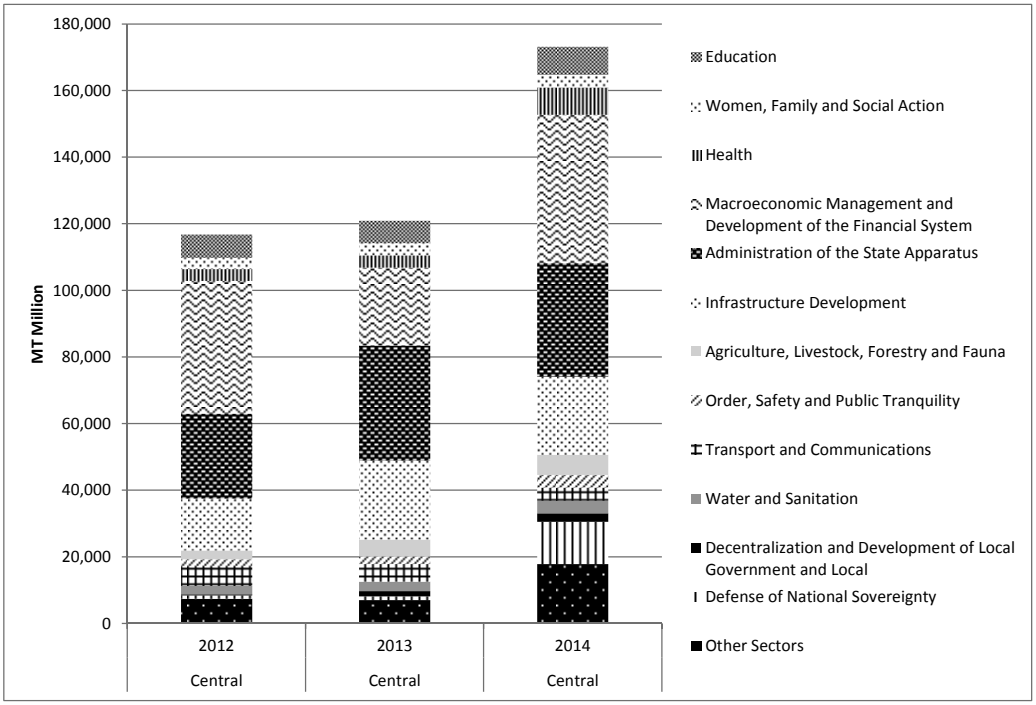
Table 8.4.3 Operating Cost, Internal and External Investment of the State Budget at the Central, Provincial, and District Levels

(Unit: MT Million)

	2012			2013			2014		
	Central	**Provincial**	**District**	**Central**	**Provincial**	**District**	**Central**	**Provincial**	**District**
Operating Cost	59,941 (51.3%)	23,530 (81.4%)	14,046 (81.1%)	62,261 (51.5%)	27,233 (80.5%)	16,936 (83.9%)	85,762 (49.2%)	32,319 (78.5%)	22,040 (86.6%)
Internal Investment	17,635 (15.1%)	3,824 (13.2%)	2,803 (16.2%)	21,551 (17.8%)	5,248 (15.5%)	3,082 (15.3%)	33,146 (19.0%)	6,202 (15.1%)	3,142 (12.3%)
External Investment	39,221 (33.6%)	1,561 (5.4%)	475 (2.7%)	37,126 (30.7%)	1,345 (4.0%)	173 (0.8%)	55,391 (31.8%)	2,620 (6.4%)	268 (1.1%)
Total	**116,797**	**28,915**	**17,324**	**120,938**	**33,826**	**20,191**	**174,299**	**41,141**	**25,450**

Source: Ministry of Finance, State Budget for the Year 2012-2014

The allocations for the "Macroeconomic Management and Development of the Financial System" and "Administration of the State Apparatus" represent about 45% of the state budget at the central level. The allocation for Infrastructure accounted for more than 13% throughout 2012-2014. Education and Agriculture are also relatively high throughout the same period. The allocations for Health and Defence grew significantly in 2014. Health has a 225% increase from 2013. Defence has a 1158% increase from 2013 due to the external investment for Multilateral assurance of troops and promoting bilateral and multilateral cooperation.



Source: Ministry of Finance, State Budget for the Year 2012-2014

Figure 8.4.3 Amount of State Budget at the Central Level by Sector

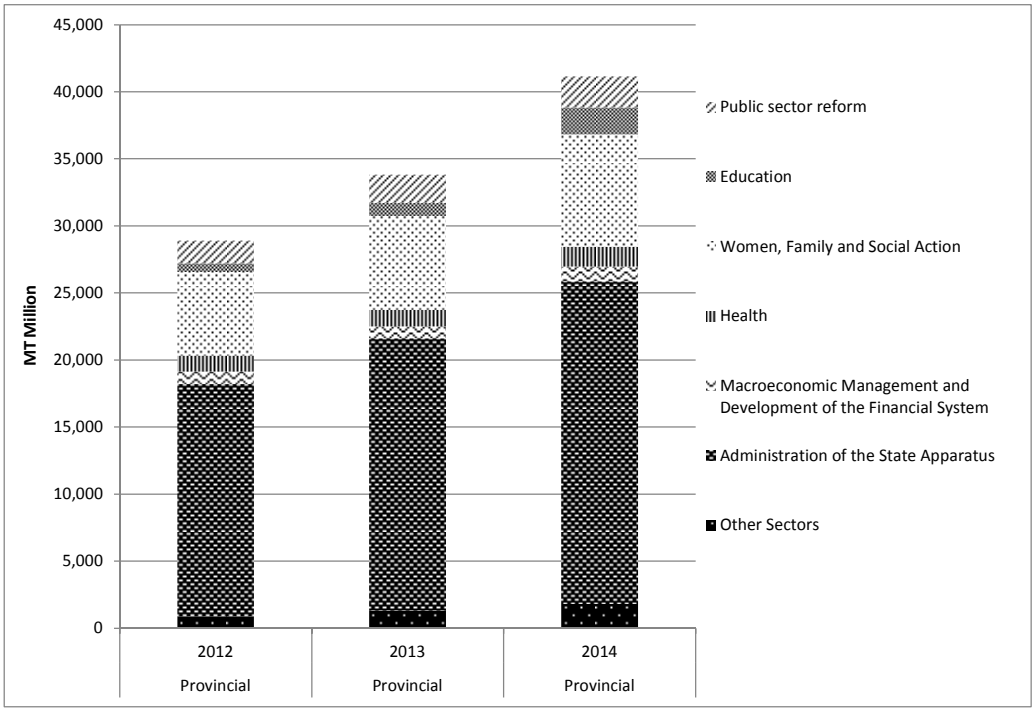
Table 8.4.4 Amount of State Budget at the Central Level and its Proportion by Sector

(Unit: MT Million)

Sector	2012	2013	2014
Macroeconomic Management and Development of the Financial System	39,836 (34.1%)	23,397 (19.3%)	44,538 (25.7%)
Administration of the State Apparatus	25,541 (21.9%)	34,553 (28.6%)	34,173 (19.7%)
Infrastructure Development	15,531 (13.3%)	23,727 (19.6%)	23,378 (13.5%)
Education	6,983 (6.0%)	6,748 (5.6%)	8,355 (4.8%)
Health	3,571 (3.1%)	3,670 (3.0%)	8,244 (4.8%)
Agriculture, Livestock, Forestry and Fauna	2,716 (2.3%)	5,004 (4.1%)	6,021 (3.5%)
Transport and Communications	6,001 (5.1%)	5,266 (4.4%)	3,943 (2.3%)
Order, Safety and Public Tranquillity	2,006 (1.7%)	2,325 (1.0%)	3,840 (2.2%)
Women, Family and Social Action	3,366 (2.9%)	3,652 (3.0%)	3,822 (2.2%)
Water and Sanitation	2,463 (2.1%)	2,878 (2.4%)	3,759 (2.2%)
Decentralization and Development of Local Government and Local	348 (0.3%)	1,586 (1.3%)	2,559 (1.5%)
Defence of National Sovereignty	1,036 (0.9%)	1,092 (0.9%)	12,646 (7.3%)
Other Sectors	7,398 (6.3%)	7,038 (5.8%)	17,881 (10.3%)
Total	**116,796**	**120,936**	**173,159**

Source: Ministry of Finance, State Budget for the Year 2012-2014

The allocation for "Macroeconomic Management and Development of the Financial System" occupied 60% of the state budget at the provincial level throughout 2012-2014. The next is "Women, Family and Social Action" which accounted for 20% of the state budget. In 2014, the allocation for Education increased two times higher than 2013 because of the inflow of external investment for primary and secondary education. Still, its amount is one fourth of that of the central level.



Source: Ministry of Finance, State Budget for the Year 2012-2014

Figure 8.4.4 Amount of State Budget at the Provincial Level by Sector

Table 8.4.5 Amount of State Budget at the Provincial Level and its Proportion by Sector

(Unit: MT Million)

Sector	2012	2013	2014
Administration of the State Apparatus	17,360 (60.0%)	20,300 (60.0%)	24,058 (58.5%)
Women, Family and Social Action	6,222 (21.5%)	6,990 (20.7%)	8,382 (20.4%)
Public sector reform	1,714 (5.9%)	2,096 (6.2%)	2,302 (5.6%)
Education	635 (2.2%)	985 (2.9%)	2,002 (4.9%)
Health	1,218 (4.2%)	1,264 (3.7%)	1,487 (3.6%)
Macroeconomic Management and Development of the Financial System	903 (3.1%)	883 (2.6%)	1,110 (2.7%)
Other Sectors	864 (3.0%)	1,310 (3.9%)	1,803 (4.4%)
Total	**28,916**	**33,828**	**41,144**

Source: Ministry of Finance, State Budget for the Year 2012-2014

8.4.3 Challenges

The following are the challenges for the institution and organisation sector:

- The current administration and MPD (currently known as the Ministry of Economy and Finance) have already recognised the necessity of strengthening sector-wide coordination mechanisms. To cope with the situation, the administration and MPD changed the structure of the poverty reduction action plan (PARP) from a sector-oriented approach to purpose-oriented ones. Additionally, MPD has finished working on the preparation of the first National Development Strategy (ENDE) as an important tool for attracting private investors by showing impacts and benefits of integrated projects. In addition to coordination through a planning process such as this, an organisational mechanism should be created that would provide both vertical and horizontal coordination among organisations of different tiers and of different sectors.
- Nampula Province established UCODIN as a coordination body for the economic and social development activities including planning processes. This is presumably a solution to improve coordination among development actors in different tiers and in different sectors at the provincial

level. At the moment, only Nampula Province has such an organisation. The possibility of creating this kind of organisation in other provinces is worth consideration.

- The coordination function with neighbouring countries such as Malawi and Zambia needs to be strengthened as the Nacala Corridor development is embarking upon a new stage of realization. The existing initiatives such as Zambia-Malawi-Mozambique Growth Triangle (ZMM-GT) initiative should be made full use of, overcoming the differences in the development stage and policy priorities among the three countries.

8.5 Social Situation

8.5.1 Introduction

Recently, private investments as well as public investments through foreign official development assistance are seen as engines toward economic development in the Nacala Corridor Region. The PEDEC Strategies would also bring substantial changes in the society in the region when the plans are actually brought to implementation; realizing better transportation and logistics throughout the large target area, development of urban cities as well as urban industries, incoming of agricultural investments and change in the practices of farmers.

Though these investments should be regarded as an opportunity for the region, at the same time they would also cause various impacts to the region and the society, which can sometimes be negative. Therefore, this study will prepare strategies to tackle these issues, so that Nacala Corridor development can be realised while avoiding or minimizing adverse impacts on the society and the people.

This chapter will first describe the above mentioned changes deriving from private as well as official assistance projects in the Nacala Corridor Region, some of which have already been seen while others are expected to occur in the near future. Secondly, current situations of social structure of the area, economic activities and livelihood of the people in the Nacala Corridor Region as well as emerging problems regarding land and resettlement disputes in this region are summarized. Finally, legal frameworks prepared by the government to cope with these issues will be described. In the subsequent chapter (section 18.5), issues deriving from the above mentioned projects' effects will be discussed.

8.5.2 Expected Effects of Nacala Corridor Regional Development

Expected effects of Nacala Corridor regional development, which will affect relatively directly toward the local societies as well as people's livelihood, are listed below.

Table 8.5.1 Expected Effects of Nacala Corridor Regional Development promoted by PEDEC-Nacala

Development Activities in Nacala Corridor Region	Effects
1) Road and railway improvement	• Accessibility to major urban centres, sea ports and market places will be improved • Costs of transport will be reduced • Market for agricultural crops will be expanded • Industries in major urban centres will be expanded due to better transport and logistics conditions • Acquiring jobs in urban areas will become easier for rural residents
2) Improvement of electricity and water infrastructure in major urban areas	• Private investments will increase in major urban centres • Commerce and logistics sectors will grow • Manufacturing industries will develop • Jobs will increase, especially in major urban centres
3) Incoming agricultural investment	• Investors will acquire DUAT for the areas farmers originally occupied • Resettlement of residents will occur • Employment in agricultural private firms will increase (farmers will be employed on the farms of private firms) • The number of contract farmers (out growers) will increase
4) Shift to intensive	• The number of farmers conducting settled intensive agriculture will

agriculture	increase. • Need for lands to operate settled agriculture will increase • Investment for agricultural inputs (fertiliser, seeds, equipment, machinery) will be necessary • Production of cash crops will increase and food crop production may decrease
5) Regional development as a whole	• The majority of infrastructure projects, as well as those of commercial agricultural projects will be located along the major corridors, sub-corridors and feeder lines, while other areas will remain relatively untouched.

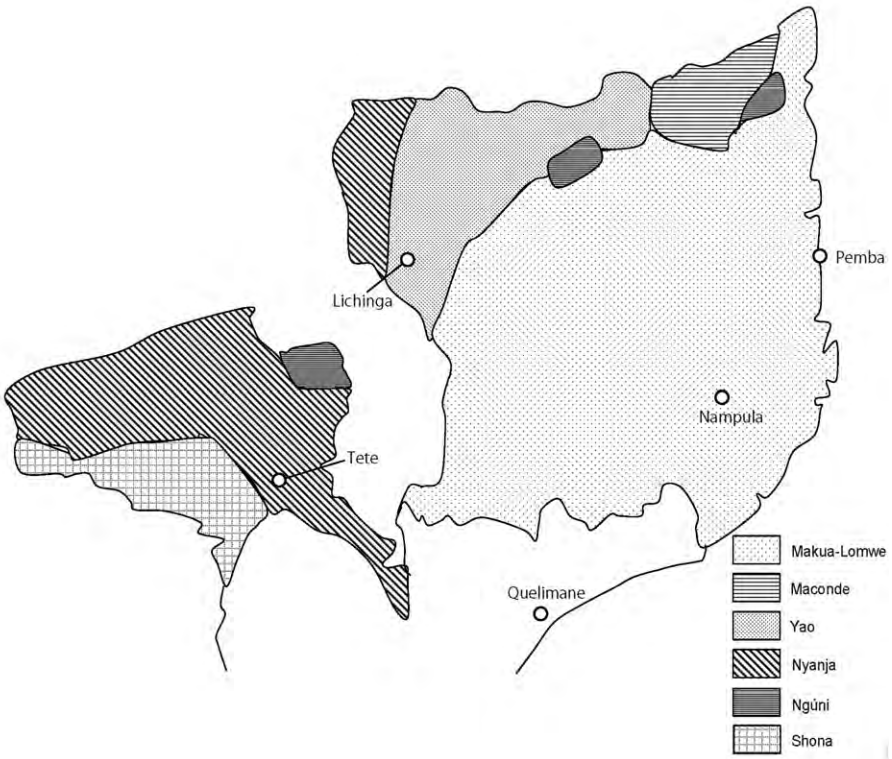
Source: JICA Study Team

Issues which will be caused by the above projects' effects are summarized in Chapter 18.

8.5.3 Present Conditions of Social Structure

(1) Ethnicity

Population of the Nacala Corridor Region is mainly composed of Makua-Lomwe, Makonde, Yao, and Nyanja. Makua-Lomwe is the largest ethnicity in the country consisting of 40% of the total population, and it is the majority of the Nacala Corridor Region as well. The map of ethnic distribution is shown in the Figure 8.5.1. Historically, people have moved around the region by group or individually, and it can be said that each ethnic group is not very strongly attached to any location of the country. Although opposition between Makua and Maconde was politically created in the time of the Civil War, currently there is no visible conflict among them.



Source: JICA Study Team based on Pelissier Rene, 1994, Historia de Mocambique: formação e oposição 1854-1918, Editorial Estampa

Figure 8.5.1 Ethnic Distribution in the Nacala Corridor Region

(2) Religion

According to the Census in 2007, Christians counted for 56.1% of the whole population, Muslims for 17.9%, other beliefs (mostly animism) for 7.3%, and other 18.7% had no religious beliefs. In the Nacala Corridor Region, the proportion of Muslims is larger than that of Southern Mozambique due to population incoming from the neighbouring countries in the North. Religious conflicts are not recognizable in the area; even cases of inter-religious marriage were heard in the course of interviews in Lichinga, and churches and mosques sometimes exist close to each other in a neighbourhood.

(3) Rural Settlement

Rural settlements are built along the roads (primary, secondary and tertiary roads), and most of the people walk to their cultivation lands which are sometimes 10km from their houses. In many cases, a settlement consists of 10 to 30 households, and the houses are located far from each other.

(4) Social Structure and Traditional Communities/ Leaders

Matrilineal system is dominant in Makua-Lomwe, and household's lands are also inherited through this matrilineal line. The minimum social unit of living is called erukulu, which is a matrilineal expanded stem-family, and includes grandmother generation, her child generation, and her grandchild generation. Male brother of the grandmother is the head of this unit called "atata," and has decision power on production activities and distribution etc. in the household.

Traditional communities, which should be distinguished from administrative systems though they exist in parallel with each other, consist of three layers, and each has a traditional leader who has a decision power. Regulo is the top of the three layers and controls the area called Regulado; Cabo controls natural villages in Regulado called Bairro; and Mwene regulates settlements in Bairro called Aldeai.

Traditional leaders have authorities in land management in the communities. Traditionally, the leaders are authorized by the community members for land use coordination in the community. Moreover, in the Land Law in 1997, the traditional leader is formally assigned to be community authorities, and roles of the leaders as well as community members were officially regulated. Traditional land use rights are allocated to groups, communities, clans, households or individuals, and the right holders are authorized to decide the purpose of land use with responsibility for the maintenance of the land plot.

Traditional leaders also have a significant role in conflict settling. Public administration basically depends on the traditional leaders for settling of conflicts within the community, such as land conflicts, marital conflicts and matters on social welfare etc. Issues are first brought to Mwene, and if it is found difficult for Mwene to solve them, then they are brought to Cabo or Regulo. Only the problems which could not be solved within the community will be delivered to administrative procedure.

(5) Mutual Assistance Institutions[5]

Though small and medium scale farmers operate family farming, in the busy farming season,

[5] FAO, 2003, Working with Local Institutions to Support Sustainable Livelihoods

mutual support system called "ganho-ganho" is practiced. Ganho-ganho is paid per work system, and it has existed since the colonial era to engage people in plantations. Currently, it is operated among community members. Payment depends on the area which one worked, and the amount is defined in an informal contract between the land owner and the worker. Ganho-ganho is also one of the main sources of income for the poorest in the rural area.

8.5.4 Present Conditions of Economic Activities, Agricultural Activities, People's Livelihood and Land Use

(1) Occupation and Wage

The table below shows the distribution of household members in each kind of labour activity, which is the result of sampled survey conducted by JICA Research Institute in November 2010 to study the household features and agricultural production practices of Nacala Corridor Region. The table shows that the vast majority is engaged in agricultural activities especially in their own land, while only a few people are engaged in non-agricultural labour.

Table 8.5.2 Distribution of Household Members Active in Each Kind of Labour Activity by Location

	Total	Along Corridor	100m North	200km North	100km South	200km South
Agriculture (own farming)	1,535	395	194	222	485	239
Agricultural Labour	73	33	22	7	9	2
Non-agricultural Labour	18	8	1	2	5	3
Self-employment	133	66	21	20	22	4
Total	1,759	502	238	250	521	248

Source: JICA Research Institute, 2010, Household Survey: Northern Development Corridor

Note: This survey targeted households located in administrative posts with more than 5% of agricultural land use over their total land, totalling 40, and divided these areas into five categories as below: 1) Along the corridor (11 administrative posts): Mitande, Ribaue, Iapala, Lurio, Namina, Rapale, Mutuali, Cidade de Cuamba, Mandimba, Malema and Cidade de Nampula; 2) Up to 100 km north of the Nacala Corridor (6 administrative posts): Nipepe, Chihulo, Meti, Metarica, Milhana and Mecuburi; 3) Up to 100 km south of the Nacala Corridor (11 administrative posts): Calipo, Etatara, Nihessiue, Also Ligonha, Lioma, Mepuagiua, Alto Molocue, Insaca, Cidade de Gurue, Namaita and Nauela; 4) From 100 km to 200 km north of the Nacala Corridor (6 administrative posts): Muembe, Namuno, N'cumpe, Machoca, Hucula, Balama; 5) From 100 km to 200 km south of the Nacala Corridor (6 administrative posts): Mulumbo, Munhamade, Lugela, Ile, Namarroi, Milange. Therefore, the target area of this study does not exactly match that of PEDEC-Nacala.

Major non-agricultural rural occupations include transport driver, construction worker, hotel/hostel worker, restaurant staff and domestic servant. Though their cash income is relatively higher than that of agricultural employees, their median wage ranges around 200 to 875 MT per month as of 2002/2003[6].

(2) Agriculture and People's Livelihood

The majority of farmers in the target area are operating small-scale farms on non-irrigated land of less than 10ha, which make up approximately 97% of the cultivated lands of the five provinces related to the Nacala Corridor Region. The average household farming size by province is: 1.82ha in Niassa, 1.45ha in Cabo Delgado, 1.25ha in Nampula, 1.29ha in Zambézia (including districts outside PEDEC target area), and 1.66ha in Tete (Agriculture Census in 2009-2010, INE). It can be assumed that farmers with lands of 1-2 ha mostly depend on subsistence farming, meaning that, at present, the majority of farmers do not

[6] Joseph Hanlon & Teresa Smart, 2008, Do Bicycles Equal Development in Mozambique? Boydell & Brewer Ltd., p.196

have surplus to be changed into cash. In addition, farmers or farmers associations cannot expect buyers to come to rural villages and therefore small-scale farmers do not have markets to sell their agricultural products even if they have any surplus. According to the survey conducted by JICA Institute mentioned above, most of farmers who have surplus sell crops at local market, then next major answer was selling at their farm gate. Travel distance of farmers to the markets varies greatly.

Shifting cultivation prevails in the Nacala Corridor Region which requires vast fallow lands, leaving the agricultural productivity low. The small number of labour force in a family is the limitation for expanding the land, due to the nuclear family system which is dominant in the Nacala Corridor Region.

(3) Land Use

The Land Law of Mozambique (Law No. 19/97) regulates that land use rights (DUAT: Direito de Uso e Aproveitamento de Terra, right of land use and benefit) can be declared if the local resident occupied the land in accordance with customary norms or he has used the land at least for 10 years. If the above items are proved, farmers will be entitled with DUATs.

However, most farmers practice agriculture without having registered DUAT, since it is not compulsory to register DUATs acquired through good faith occupation by national individuals. Farmers also do not recognize the necessity and benefit of DUAT registration or the land law itself. In addition, the application fee for DUAT is too expensive for small-scale farmers to register lands. As a result, few small-scale farmers apply for DUAT registration. Therefore, investors could come in to find these occupied but un-registered lands as available, and this has caused a conflict between local farmers and outside investors. In the last several years, even without issuance of DUAT, the occupants' land use has not been disturbed. However, if an outsider comes and tries to acquire DUAT for the land, the original occupants without DUAT cannot negotiate as title holders but they can only negotiate as members of the community, since the land without DUAT can be regarded as belonging to the whole community[7].

In some areas of the Nacala Corridor Region where population density is relatively high and is expected to be higher in the future as well, land will be insufficient for all the farmers' cultivation. In reality, land disputes between community members have actually happened as well in some densely populated areas, when for example a new comer tries to expand his land and cultivate someone's fallow land. Additionally, land conflicts between investors and communities are also seen, which will be described more in the below section.

8.5.5 Present Conditions of Land Disputes

Many cases of land disputes between investors and communities are reported, and these problems are regarded as negative social impacts. The JICA Study Team conducted interview surveys with investors, community representatives and related government officers who were engaged in four investment projects in Nampula and Zambézia Provinces. The questions of the interview surveys in theses provinces were designed in such a way as to clarify the problems encountered from the three different perspectives of the community, the investor and the local government. The results are summarized as below.

[7] Based on JICA Study Team's interview with an ex-officer of DNTF in 2013.

Table 8.5.3 Problems Identified in Communities

Category	Problems Raised
1. Disagreement in the contents of built consensus	• Investors pulled out crops which the residents cultivated without any permission and started planting their crops. (Community). • In the acquired land there are illegal occupants, and they would not move even if they get paid. (Investor) • Since local residents will not relocate, the project is being delayed. (Investor)
2. Default of compensation	• Compensation for land acquisition has not been paid. (Province) • Some of the compensation items which had been negotiated in the process of consensus building have not been realised yet. (Community) • Compensation money for crops has not been paid. (Community) • None of the compensation promised in the process of consensus building was provided (Community)
3. Anxiety for coming changes in the living environment	• Residents are feeling anxious about what will become of their residential area (Community). • Faced with relocations of other people, residents are worried that their lands will also be taken in the future. (Community)

Source: JICA Study Team

8.5.6 Existing Legal Frameworks

(1) Existing Legal Frameworks on Land Rights

In this section, the procedure for investors to acquire DUAT is explained according to the description of the Land Law. In addition, the process of community consultation will be summarized, which is an essential process to avoid conflicts regarding land rights.

All the land of Mozambique belongs to the state according to the Land Law of Mozambique. Therefore, in order to use a certain piece of land, a land use right is required. The Law regulates that land use rights can be declared in the following cases:

- Occupancy by individual persons and by local communities, in accordance with customary norms and practices which do not contradict the Constitution;
- Occupancy by individual national persons who have been using the land in good faith for at least ten years;
- Authorisation of an application submitted by an individual or corporate person in the manner established by this Law.

If the above items are proved, DUAT will be registered upon application fee and annual fee payment.

In order for investors from outside to acquire DUAT for conducting economic activities, application for DUAT must be submitted to the Provincial Geography and Cadastral Service (SPGC). Once application has been submitted, SPGC sends a copy of the application to the district administration, and participatory consultation processes are held by the local cadastral service, district administration and local community (Article 27, Land Law Regulations). Consultation with local communities shall comprise two phases: the first phase consists of a public meeting with a view to announce to the local communities the application for acquisition of DUAT and the tentatively identified boundaries of the concerned parcel, and the second phase is for the pronouncement by local communities regarding the availability of the concerned land area (Ministerial Diploma No. 158/2011, MINAG). The areas will be finally identified after the discussion in the public consultation process. If both sides reach an agreement as a result, the investor and community leader visit the administrative office to conclude contracts.

After the process of public consultation, the application will be sent to the central level (DNTF) for final verification, and finally authorized by competent entities (Provincial Governor, Ministry of Agriculture or Council of Ministers) according to the size of the concerned land.

(2) Existing Legal Frameworks on Resettlement

1) Process of Resettlement

Resettlement is defined as "the displacement or transfer of the affected population from one point of the national territory to another, accompanied by the re-establishment or creation of conditions equal to or above their previous standard of living" in Regulation of Resettlement (Chapter 1, Article 1), and the process begins with preparation of a Resettlement Plan once the DUAT has been provided to the investors. Preparation of a Resettlement Plan consists of the following phases.

- Collection and analysis of physical and socioeconomic data
- Preparation of the Resettlement Plan
- Preparation of the Action Plan for the implementation of the resettlement project

The resettlement plan shall be approved by the District Government, preceded by an opinion of conformity issued by the sector supervising the Territorial Planning area, after having heard the Agriculture, Local Administration, Public Works and Housing sectors[8] (Article 9). After approval of the plan, resettlement will be implemented based on the Action Plan mentioned above.

Public Participation is guaranteed during the entire preparation and implementation process of the resettlement plans (Article 13), and at least four public consultations shall be organized during the period (Article 23). Details will be described in the section below.

The District Government is responsible for monitoring the implementation of the plan, together with the supervision by the Technical Resettlement Monitoring and Supervision Committee.

2) Process of Consensus Building

The process of public participation is defined in the regulation. Public participation comprises a) requests for clarification, b) formulation of suggestions and recommendations; and c) interventions in public meetings. Public consultation is composed of Public Consultations to analyse the local dimensions of the environmental planning and national-level strategies, and Public Hearings for the affected parties to express their opinions regarding proposals. Preparation of a record of the process of consensus building is mandated, and it shall be approved by the affected parties (Article 13, Regulation of Resettlement). Preparation of the minutes is an obligation of the "competent bodies", which could be interpreted as any or a combination of the three parties, the investor, the community or the government, according to Article 13 of Regulation of Resettlement.

[8] In this sentence, "Territorial Planning area" stands for Directorate of Territorial Planning (DINAPOT) of MICOA; "Agriculture (sector)" for MINAG, "Local Administration (sector)" for MAE, and "Public Works and Housing sector" for MOPH. Though there is no specific description in the Regulation of Resettlement whether these listed sectors are at the central level or provincial level, the National Director of DINAPOT explained that the Technical Committee to which the above members belong and which is in charge of issuing opinions to resettlement plans consists of the national level ministries. The names of the ministries listed above are based on the governmental structure before the reorganisation of the central ministries in January 2015. After this reorganization, MICOA is currently known as the Ministry of Land, Environment and Rural Development, MINAG as the Ministry of Agriculture and Food Security, MAE as the Ministry of State Administration and Public Service, and MOPH as the Ministry of Public Works, Housing and Water Resources.