Date: Dec. 10, 2011

Environmental and Social Considerations in Detailed Planning Survey

(Technical Cooperation for Development Planning)

1. Full title of the Project

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

2. Type of the study

Master Plan

3. Categorization and its reason

"Category B"

The Project was categorized as "Category B" tentatively when the official request of technical assistance was submitted from the government of Mozambique to the government of Japan.

As a result of the Detailed Planning Survey which was carried out from late October to early December in 2011, it was concluded that "Category B" might be reasonable at this stage of the Project due to the following reasons:

- This Project aims to formulate development strategies thus no definite projects are proposed yet at present. The outline of alternative projects will be studied in the course of formulation of the development strategies during the full scaled study stage.
- No serious impacts by the project implementation are predicted at present. Although slight impacts are predicted for some items, it is considered as possible to take the mitigation measures by appropriate environmental management.
- The resettlement, even if it happens, will not cause serious impacts. Firstly, the country has the landownership in Mozambique. Secondly, the government has a guideline/regulation to provide the people to be resettled by possible project with the same or better conditions for their properties.

4. Agency or institution responsible for the implementation of the project

Ministry of Planning and Development (MPD)

5. Outline of the Project

(1) Background of the Project

The Nacala Corridor, which is located in the northern part of Mozambique, has

huge potential to boost economic growth with fertile land, natural resources, employment potential, and access to other countries with good port and trunk roads. JICA has cooperated in many projects in this corridor, and there are already existing investments by private sectors in various fields. However, there are some obstacles in order to promote economic development under current situation on infrastructure and social capital. The government of Mozambique is aware of various development potentials along the Nacala Corridor. Therefore the government considers the necessity to update existing development plans of the corridor as a whole to guide investment and to reduce negative impact on local society.

The Project is to find out the obstacles existing in the Corridor, and the ways to overcome them through grasping the possible impact which may exist among development projects, further development potentials, development risks, and constrains to promote the development has been requested to the government of Japan by the government of Mozambique.

(2) Location

The Project will target Nampula Province, Niassa Province, Cabo Delgado Province, Zambezia Province (northern 7 districts) and Tete Province. The northern 7 districts of Zambezia Province are Alto Molocue, Gile, Gurue, Ile, Lugela, Milange, and Namarroi. The locations of these provinces are shown in the chart.

Tete Province is not classified as a part of the Nacala Corridor currently. However, it is decided to include Tete Province in the study area of the Project according to the suggestion from MPD. MPD explained that the development and investment in Tete Province blooming nowadays would have considerable impact on the Nacala Corridor in the short term, especially after realization of railway development, thus the review of Tete's situation is indispensable for the Project.

It is noted that the focuses and approaches in the Project to each province should be different from the view point of their geographical conditions and development

potentials. Nampula Province requires special attention considering the capacity of Nacala Port, while key factor in Niassa and Zambezia provinces is agriculture. Cabo Delgado Province is a part of the important river basins which could provide water to Nampula and Niassa provinces.

(3) Goals of the Project

(a) Goal of the Proposed Plan

To formulate development strategies to guide appropriate development and investment in the Nacala Corridor

(b) Goal which will be attained by utilizing the Proposed plan

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

(4) Outputs of the Study

1) Integrated development strategies for the Nacala Corridor
2) Database of various sectors in the Nacala Corridor, including GIS data.
3) Topographic maps for selected areas in the Nacala Corridor

(5) Scope of the Study

The Study will be carried out in the period of approximately twenty (20) months both in Mozambique and Japan. The scope of the study is listed as follows:

1) Review of existing development plans, development projects, studies, and public and private investments in the Nacala Corridor
2) Collection of available data and information concerning the Nacala Corridor including Tete Province
3) Collection of available data and information and review of existing development plans and projects concerning neighboring countries
4) Collection and preparation of GIS data for establishing GIS database
5) Preparation of topographic maps for selected areas
6) Preparation of database of socio-economic and sector situation on the Nacala Corridor
7) Analysis to identify constraints to development, factors of promoting

development, and potential for development

8) Establishment of a planning framework
9) Analysis by preparing alternative development scenarios
10) Strategic environmental assessment of development strategies for the Nacala Corridor
11) Formulation of integrated development strategies for the Nacala Corridor
12) Recommendation of measures to complement on-going and planned development projects
13) Formulation of projects in selected sectors in accordance with the integrated development strategies
14) Prioritization of existing and proposed development projects
15) Capacity development of planning and monitoring for development of the Nacala Corridor

6. Description of the project site

(1) Population and Area

The area, population, and major cities of the targeted 5 provinces are shown in the table below:

Item	Nampula Province	Niassa Province	Cabo Delgado Province	Tete Province	Zambezia Province
Area (km^2)	81,606	129,056	82,625	100,724	105,008
Population (Nos.)*	4,076,642 (4,375,722)	1,178,117 (1,318,385)	1,632,339 (1,732,068)	1,832,339 (2,068,597)	3,892,854 (4,074,841)
Population density(person/km^2)	Approx.50	Approx.9	Approx.20	Approx.18	Approx.37
Major cities	Nampula, Nacala	Lichinga Cuamba	Pemba	Tete, Moatiza	Quelimane,** Mocuba**

Note : *Population by national census in 2007. Population in parenthesis is WB assumption in 2010.
**: Outside of the Study area

There are the following major cities in the Study area with higher ranking population in the country:

Name of City	Approximate population	Rank in Mozambique
Nampula city	540,000	2nd
Nacala city	220,000	5th
Tete city	170,000	7th
Pemba city	160,000	8th

(2) Social and Economic Conditions

The Study area shares almost a half of the total area and population of the country. More than 90% of people are farmers and most of them are small scaled. The mean cultivation land per household is approximately 1.3ha and the agricultural water depends mostly on rain. The irrigation area is less than 1%. Most farmers are categorized as self-sufficient. The Nacala Corridor area is generally fertile. Especially the southern part of Niassa Province and the northern part of Zambezia Province is called as the green-belt as the most productive agriculture zone.

The farmers generally live in a house with bricks or clay-covered wall and straws roof. The size and quality of their houses is not so much different. It seems that their living standards are similar in respective village or community. Most villages are composed of 10~50 houses/families, although some villages are bigger. Every village is located keeping some distance from the next village.

A village in Niassa Province

The socio-economic indicators of Nampula and Niassa Provinces for some items are shown in the table below:

Item	Nampula Province	Niassa Province
Illiteracy rate (%) 2008	57	55
GDP/capita(US$) 2009	332	225
Poverty rate (%) 2008	54.9	31.9
HIV Morbidity rate （%）	8	na
Drinking water accessible rate by population （%） 2008	43	44
Electrified house rate （%）	13	n.a.

The illiteracy rate of woman is approximately 70%, while man is approximately 40%. The lower level of education for women is predominant.

Major Centers of Economy

The zone connecting Nampula city and Nacala city maybe the core of the Nacala economic Corridor. Nampula city is the most populated center in the northern region and has function as a relay center of logistic flow. In Nacala city, there are Nacala port and economic/industrial development zones, an international airport (under development), which are expected to attract investment including industries of large scale, especially from the foreign countries.

Tete city in Tete Province shows remarkable economic activities recently mainly followed by coal mining development. Pemba city in Cabo Delgado Province is also one of core cities and also has a port. Pemba city is sometimes called as the gate of the Pemba economic Corridor. Lichinga city in Niassa Province does not show remarkable economic activities in comparison with the others. There are no remarkable core cities in the study area of Zambezia Province.

Industry

The fishery is active in the coastal zone, but the scale is mostly self-sufficient level or small in business.

In Tete Province, the mining industry develops extensively. Although the major mining is coal, the other mineral resources such as titan, gold, phosphorus, etc. are also productive. The other provinces such as Niassa and Nampula Provinces also have good reserve potential of mineral resources. In addition, it was recently confirmed that there is a large reserve of natural gas in the off-shore ocean on the north of Carbo Delgado

Province. The coal mining industry is led by private companies such as Vale.

The logistic business such as transportation and warehouse is also active as it is necessary to transport daily essentials from abroad or Maputo. The agricultural processing factories are scattered around. In Niassa Province, the timber business becomes one of major industries.

The tourism business is not so active, although there are some attractive sites for tourists, such as Mozambique Island, the beaches in and around Pemba city, Niassa Reserve, and Quirimbas National Park. There are also many undeveloped potential areas especially as beach resorts. Lake Niassa has beautiful places with sandy beach. A limited number of local people come to the lake beaches for recreation.

Nacala Industrial Zone (Flour milling factory under construction)

(3) Land Use

The study area is topographically composed of gentle sloped hilly lands, river/lake lands, and forest-mountains. As the land use classification, undeveloped or unused lands are extended widely. The agricultural land dominates in the land used area. Urban areas are located at some limited locations along the main road network. Many villages are also located along the main road but there are also many small villages located far away from the main road.

(4) Infrastructure

Railway

Nacala Railway (mono-line, narrow gauge 1,067 mm) runs from Nacala city to Nayuci town located on the border with Malawi. The total distance is 611km. The 533km section from Nacala to Cuamba, through Nampula city, is in good condition. The

train may run by ordinary speed of approximately 70km/h. But, the section from Cuamba to Nayuci is not good in condition and it is necessary to make slow down the operation. There is also a railway line from Moatize, neiboring town of Tete city, to Beira city which is the third populated city in the country and has a port for export and import. There is a project ongoing to connect the railway from Tete to Nacala directly through Malawi for transportation of coals to export from Nacala port by Vale.

Railway (between Nampula city and Nacala city)

Road

Although road network is connected from Nacala port to Malawi, only a section between Nacala port and Nampula City, approximately 200km in distance, is well paved with 2 lanes. The 500km section between Nampula and Malawi border is not paved. But, a project to pave 350km section from Nampula to Cuamba is currently ongoing by co-financing of JICA and AfDB. There are other sections of paved road in the Study area and the length of paved road section is extending gradually every year. However, most secondary or tertiary roads are not yet paved and driving a car during the rainy season becomes difficult.

Road between Nampula city and Nacala city

Port

Nacala port is considered as the best in Mozambique due to the location in a natural deep bay. There is a port in Pemba as well, although the capacity is small in comparison with Nacala port.

Airport

There are airports with regular flight service at all the provincial capital cities (Nampula, Tete, Lichinga, and Pemba). The airports of Nampula and Tete have function as international airport as well. Nampula airport works as a kind of hub airport of the northern region. The Nacala international airport will be opened in a few years, as it is under construction by expanding the old military airport.

Dam

Dam is the representative structure of river. There is a famous Cahora Bassa dam which is located in Tete Province and in Zambezi River for hydro power generation. In Nampula Province, there are two dams in Monapo River. One is for the water supply of Nampula city and another is for irrigation of banana plantation. There is a dam in Lichinga city for water supply.

Cahora Bassa Dam and Reservoir (Tete Province)

Urban water supply

The service covering rate of urban water supply is more or less 50% in an average although the rate differs in each city. Pemba city has the highest rate of 89%. The rate of unaccounted for water is generally 30~40%.

Nacala Reservor (Water Source for Nacala city)

Rural Water Supply

The rural water supply development is extensive by various donors' assistance. Most rural water supply is done by well with hand-pump. The well is commonly used generally. But there are still more or less 60% of people who do not have access to drinking water within a short distance.

Typical type of well (with hand pump) in a village

A dry river during the dry season (Tete Province)
(People dig a hole in the river bed to get subsoil water)

Electricity

The electrification rate is as low as 10～20% in the Study area. The transmission lines are laid only along some major roads. The Cahora Bassa dam explained above

generates hydro power which covers nearly 90% of the total power generation in the country.

Sewerage

There are no sewerage treatment facilities in the Study area, including Nampula city and Nacala city. There are considerably many septic tanks in urban areas. However, there is no proper treatment system of waste water and sludge from the tanks.

Solid waste

Concerning the solid waste management, collection and disposal system seems to be not well functional. There are abandoned sold wastes piled or scattered on roads and the disposal methods are primitive. Incineration of solid waste is done only in a large hospital and landfilling is not carried out at disposal sites.

(5) Health and hygiene

The diseases with high morbidity rate are measles, cerebrospinal meningitis, food poisoning, malaria, respiratory disease, diarrhea, tubercle, Hansen's disease, HIV/AIDS, etc. The rate of malaria disease is increasing in recent years. The morbidity rate of HIV/AIDS is 13.8% on an average in the country, but the rate in the northern region is 7.2%. The water-borne diseases, such as diarrhea and vomit, occur every year in some villages. The main cause is considered to be shallow well which may be contaminated.

Ministry of Health and also Health departments of Provincial government have laboratories for water quality analysis.

(6) Natural Conditions

Topography and Geology

In general, the Study area is low land in the eastern coastal zone, hilly land in the inner zone, and mountain land in the western zone. The altitude is high in the west and gradually becomes lower towards the east up to the Indian Ocean. In high land area, the altitude is generally higher than El.1,000m. There are mountains higher than El. 2,000m on the top in the northern part of Zambezia Province. In the inner hilly zone, there are rocky, comparatively low mountains with steep slope.

In the Study area, metamorphic rocks and granites of pre-Cambrian period are widely distributed as a base rock. In the coastal plain, level and alluvial layers composes the foundation. The foundation rocks of pre-Cambrian period are hard and

generally impermeable. But, there are groundwater in the cracked zone caused by weathered layers and faults. The level and alluvial layers in the coastal plain are composed of unconsolidated clay, silt, and sand. It becomes a good aquifer.

Vegetation/Ecology

The vegetation conditions show semi-arid features. There are many and various trees, but they are not densely located. The bare lands of rocks or earths with scarce grasses are seen. In comparatively lower and flat areas, many fruit trees such as cashew nuts and mango are seen along the roads. Two national park/reserved areas are located in the north of Study area. The vegetation and ecological conditions within the park/reserve are more or less natural. The main cause of scarce trees is logging activities by local people. The natural forests are located generally in higher altitude mountain areas. The forest plantation activities are carried out in some areas. Most trees are broad-leafed species but coniferous trees are also seen.

Ministry of Coordination of Environmental Affairs (MICOA) publishes a report about ecological system in Mozambique. But, the information and data are for the whole country and no detailed information of provincial or district level is found in the book. There are various wild animals within the national parks or reserves. However the ecological condition seems to be not rich in other general areas than national parks or reserves.

Climate

Although there are some differences among regions, the Study area is mostly classified as semi-tropical climate zone and a year is divided into dry season and rainy season. Both temperature and humidity are high in rainy season, from November to April (or from December to May). It is dry and sunny during the dry season from May to October in general. Approximately 80% of annual rainfall is concentrated in the rainy season. The annual rainfall is generally in a range of 800～1,200mm in the Study area. The mountain areas in Niassa Province and the northern area of Zambezi Province have annual rainfall more than 1,200mm. The most highest monthly rainfall with 250～350mm happens in a period from January till March. The lowest rainfall with only 0～10mm happens generally in September.

The annual mean temperature is different by locations but within a range of 18～26℃. The temperature is higher in the coastal zone and gets gradually lower towards the higher altitude zone. In Lichinga city, the monthly mean highest temperature is observed in October with 21.5℃ and the lowest in September with 20.0℃. The variation is very little in Lichinga city. In Nampula city, the highest monthly mean

temperature is 27.8℃ in January and the lowest is 21.1℃ in July.

River, Lake

The main stream of most rivers runs from west to east. There are several rivers in the Study area, which have larger basin area than the Tone River, the largest river (in terms of basin area) in Japan. The representative rivers are as follows:

- The Ruvuma River: running on the border of Tanzania
- The Lurio River: running on the border of Carbo Delgado Province and Nampula Province
- The Zambezi River: the largest in the SADC (South Africa Development Community) countries

Lake Niassa which is located on the west side of Niassa Province is the international border to Malawi.

In the north-western area, there are alluvial low and wet lands called Dambos. The dambos areas are inundated in the rainy season and become wetland in the dry season.

Lurio River (downstream view, end of dry season)

Monapo River (downstream view, end of dry season)

Zambezi River (Tete city, end of dry season)

(7) Public Nuisance

There is no significant public nuisance in the Study area at present. But, the government agencies related to environmental matters show interest in public nuisance, such as air pollution, water contamination, and waste disposal, for the future. The water pollution may be a priority concern as there are no treatment facilities in the Study area. The solid waste disposal is also considered as a priority issue.

(8) Landownership and Resettlement

The landownership was nationalized in Mozambique when the country became independent in 1975 from Portugal. The land tenant right for 50 years is possible if the permission is given by the government as categorized as follows:

- Smaller than 1,000ha: Provincial government
- 1,000ha~10,000ha: Ministry of Agriculture
- More than 10,000ha:Cabinate

Land Act (1995,1997) prescribes a requirement of compensation in case of resettlement. The definite conditions, however, are not included in the act. There are the following regulations in connection with the resettlement matter:

- Land Regulation : Decree 66/98 December 8
- Compensation of land acquisition : Resolution 10/95 October 17

In general, the following procedure is taken for the resettlement.

- Social investigation
- Evaluation of properties
- Environmental impact assessment
- Study on compensation
- Preparation of relocated site (by relevant government agency)
- Payment of compensation (by implementation agency/company)

(9) International Convention

Mozambique is a country to have positive intention for environmental conservation and protection. As an example, the country ratified various international environmental conventions listed as follows:

- Convention of Biological Diversity
- United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought
- Climate Change Convention / Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Basel Convention on the Control of Trans-boundary Movements of Hazardous Waste and their Disposal
- United Nations Convention on the Law of the Sea (UNCLOS)
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- Convention for the Protection of the World Cultural and Natural Heritage

There is a registered site by Ramsar convention in Zambezia Province.

(10) World Heritage Site

Mozambique Island (Ilha de Mocambique) is solely designated world heritage site in Mozambique. It is located approximately 20km south from Nacala city. It became cultural heritage site in 1991. The name of the island is the original of the country name. The island is currently connected with mainland by a long bridge. There are an old fort and town in the island. The number of tourist is not large yet.

(11) Protection/Reserved Area

The national parks and nature reserves are under management of Ministry of Tourism. There are 5 national parks and 6 national nature reserves as listed below:

National Park

- Parque Nacional das Quirimbas（Cabo Delgado）
- Parque Nacional da Gorongosa（Sofala）
- Parque Nacional de Zinave (Inhambane)
- Parque Nacional do Arquipelago de Bazaruto (Inhambane)

- Parque Nacional(Gaza)
- Parque Nacional (Gaza)

National Nature Reserve

- Reserva Nacional do Niassa (Niassa)
- Reserva Nacional do Gile (Sofala)
- Reserva Nacional de Marromeu (Manica)
- Reserva Nacional de Chimanimane (Inhambane)
- Reserva Nacional de Pomene (Maputo)
- Reserva Espacial de Maputo (Maputo)

Among them, there are two locations in the Study area as follows:

Quirimbas National Park(Parque Nacional das Quirimbas)

The park is located on the north side of Pemba city in Carbo Dergado Province and has 7,506 km^2 in area. The park includes the ocean area with 11 islands. There are large wild animals in the park and good for eco-tourism, but visitors generally are interested in the coral beaches and islands, represented by Ibo Island.

Niassa National Reserve（Reserva Nacional do Niassa）

The park is located on the northern part of Niassa Province and adjacent to the border with Tanzania. The area is 42,000 km^2 and it is the largest natural park/reserve in the country. It is called as National Game Reserve, although the hunting is not allowed. There are natural landscape and large wild animals there. Hunting is possible in a private park located south from the reserved area.

There are Forestry and Conservation areas in Nampula Province with the total area of 7,817 km^2. Forest reserves in Nampula are listed as follows:

- Macuburi Forest Reserve
- Matibane Forest Reserve
- Lower Pinda Forest Reserve
- Ribaue Forest Reserve
- Mpalue Forest Reserve

There are no provincial reserves in Niassa Province according to the interview meeting with a provincial officer.

7. Legal Framework of Environmental and Social Considerations

(1) Laws, regulations and standards related to environmental and social issues including requirements and procedures of Environmental Impact Assessment (EIA),

stakeholder participation, and information disclosure.

1) Environmental Policy

The National Environmental Policy was enacted in 1995. The policy says that the sustainable economic development is promoted and the rational utilization of natural resources needs to be impelled for the reconstruction and development of the country, by establishing the appropriate environmental policy and laws.

2) Environmental Laws and Regulations

The Environmental Law (Decree 45/2004) was enacted in September 2004. Under this law, there are various laws, regulations, etc. related to the environmental conservation and management in Mozambique. The major or essential laws, regulations, etc. for the implementation of proposed project are listed as follows:

- National Environmental Management Program (1996)
- Framework of Environmental Act (1997)
- National Directorate for Environmental Impact Assessment (2000)
- EIA Regulations (1998, 2004, 2005)

3) Environmental Impact Assessment Regulation

It is required to obtain Environmental License before the implementation of a project.

Projects are classified as Category A, B, or C in accordance with location, type/objective, scale, etc. The EIA regulation prescribes the details. The general description of these three categories is made as follows:

Category A

Significant and irreversible impact is predicted by the project implementation. It is required to submit EIS (Environmental Impact Study). EIS is considered as same as EIA.

① Project or location in the following conditions:

- Reserved areas/location designated by the government or national convention
- Densely populated area with resettlement requirement
- Project with unallowable level of occurrence of public nuisance
- Focus development area, Disputing area, Area under mineral resources exploration, etc. Area located just next to a river or water source body
- Habitat area of endangered aquatic fauna/flora, or medicinal plants

② Large scale project listed in the following:

- Social Infrastructure project
- Forest/Logging development
- Agricultural development
- Industry (Metals, Chemistry, Food, Fabric, Timber, Paper, Rubber, Oil refinery, Energy, Industrial waste treatment, etc.)
- Project within protected area

The definite scale standards of respective project or conditions are described specifically in the regulation. For example, the agricultural development larger than 100 ha is considered as large scale.

Category B

The adverse impact is predicted but the impact level may not be significant comparing with Category A. It is necessary to submit SEA (Simplified Environmental Assessment). SEA is considered to be similar to IEE.

Category C

The adverse impact is predicted to be low or nothing. It is not necessary to submit either EIS or SEA. However the appropriate environmental management including the monitoring is required. The list of projects or activities is omitted to be shown here.

It is noted that the category is decided by MICOA based on the list and conditions in the regulation. MICOA can categorize a project as Category A, even if the project is considered as Category B or C by the regulation, if any resettlement of more than several people is predicted by the project implementation.

The agency in charge and the required period of review is explained by the Environmental Directorate in Nampula Province (PICOA) as follows:

- Category A : by MICOA（45 days after application）
- Category B : by PICOA（30 days after application）
- Category C : by PICOA（15 days after application）

The public consultation meeting is required in case of Category A. In general, the meeting is held three times; before starting the construction, during the construction, and after completion of the construction. In case of Category B, the public consultation meeting is required only in special conditions such as involuntary resettlement.

(2) Relative agencies and institutions

1) Related Organizations for Environmental Management of the Study

MICOA is the representative and responsible organization for environmental management. In addition to MICOA, there are various other agencies related to the Study as listed as follows:

- Ministry of Public Works and Housing, National Directorate of Water (DNA)
- Ministry of Public Works and Housing, Investment and Asset Fund for Water Supply（FIPAGA）
- Ministry of Public Works and Housing, Regional Water Administration(ARA)
- Ministry of Agriculture (MOA)
- Ministry of Agriculture, National Cartography and Tele-detection Center （CENACARTA）
- Ministry of Transportation and Communication（MOTC）
- National Road Administration (ANE)
- Ministry of Energy（MOE）
- Ministry of Mineral Resources（MOMR）
- Ministry of Tourism（MOT）
- Ministry of Industry and Trade（MOIT）
- Ministry of Planning and Development（MPD）
- Ministry of Planning and Development, Economic Zone Office for Accelerated Development (GAZEDA)
- Mozambique Railway and Port Administration(CFM)
- Nampula Provincial Government
- Niassa Provincial Government
- Zambejia Provincial Government
- Tete Provincial Government
- Cabo Delgado Provincial Government

According to the interview with DNA, there is an EIA section within DNA for internal review and guidance of EIA report. It is also informed that there is usually an EIA section within major governmental agencies.

2) Ministry for Coordination of Environmental Affairs (MICOA)

The organization of MICOA is composed of the followings under management of Minister, Deputy Minister, and the secretary.

- National Directorate of Environmental Management
- National Directorate of Environmental Impact
- National Directorate of Physical Planning
- National Directorate of Planning and Research
- National Directorate of Environmental Promotion
- Department of Human Resources
- Department of Administration and Finance
- Department of International Cooperation
- General Inspection Office
- Legal Office
- Centers for Sustainable Development

Among the above, the representative directorates related to the study are as follows:

- National Directorate of Environmental Management
  Responsible for management of environmental quality, natural resources, coastal area conservation, and urbanization matters

- National Directorate of Environmental Impact
  Responsible for EIA review and issue of Environmental License

- National Directorate of Environmental Promotion
  Responsible for environmental education, preparation of environmental data and documents, etc.

3) Environmental Agency of Provincial Government

There is provincial directorate of coordination of environmental affairs at respective province. The functions and activities are almost the same among provinces. The organization of Nampula Province is shown as representative case as follows:

- Department of Planning and Territorial Development
- Department of Environmental Impact Assessment
- Department of Environmental Management
- Department of Environmental Education
- Department of Environmental Inspection

The general manager of the directorate is dispatched from Maputo with

appointment by MICOA. There are currently approximately 50 staffs under the general manager.

8. Provisional Scoping (types and magnitudes of possible adverse impacts and mitigation measures)

(1) General Environmental and Social Issues

The information of environmental issues is mostly obtained through the interview with government agencies. There are various environmental and social issues in Mozambique as well as in the Study area as explained below:

- Education level is generally low and the illiteracy rate is quite high. This situation may cause inefficient results of environmental education and guidance.
- The environmental monitoring by relevant governmental agencies is not working well. Their staff, facilities, equipment, etc. are generally not sufficient for the functional monitoring. For example, MICOA does not have water quality laboratory.
- There are not a few staffs that do not have capacity and experience to properly analyze and evaluate EIA reports.
- Concerning the resettlement issues, there is information that the government takes care of compensation conditions while it does not care sufficiently about the details of living conditions in the resettlement new community.
- The contamination of some sea areas is seen and the further contamination may be probable.
- The treatment facilities and systems against the water contamination in water bodies (rivers and lakes) are remarkably behindhand from the requirement.
- Destruction and damage of forest caused by slash and burning is seen in many places.
- Due to poor system of solid waste collection and disposal, the illegal scattering and uncontrolled disposal are seen everywhere, especially in urban areas.
- Soil erosion is extended caused by logging and the other matters.
- Illegal logging causes loss of forest. No effective control is made at present.
- It is difficult to watch and regulate the illegal land uses. Although it is required to get license to tenant the land, which is owned by the country, there are many cases of illegal uses of lands.
- Destruction of natural environment is in progress. More than 80% of

population lives in rural farmland areas. Consequently they need to log for their cooking and warming. The traditional slash and burn methods for farming also accelerate the forest diminishing.

- Management of vegetation and ecology is insufficient.
- Construction and maintenance of parks and green in urban areas are not enough.
- Ministry of Tourism is in charge of national parks and reserves. Such management should be done by MICOA. It seems that tourism development has priority compared to environmental conservation.

(2) Environmental and Social Considerations for the Study of Proposed Project

It is not necessary to predict the adverse environmental and social impacts at Detailed Planning Survey stage, since no remarkable projects are considered yet to be studied in the Project. The scoping will be carried out during the full scaled study if it is considered as necessary with more concrete idea of certain projects or sectors.

The below described is considerations referential for the full scaled study. These environmental considerations are made by assuming typical/general cases of projects to be proposed for the economic development in various sectors including transportation, road, railways, water resources, agriculture, water supply, power and energy, etc.

The rating is not carried out.

<u>Social Environmental Matters</u>

① Involuntary Resettlement

It is difficult to assume the numbers of houses or people which need to be relocated or resettled by possible projects, since no definite projects are proposed nor studied yet at present. Although there is a possibility that resettlement matter will not become significant by taking necessary procedure according to the regulations of Mozambique, it is required to carefully consider this issue in case any new projects are suggested during the study of the Project.

② Regional Economy for Employment and Living

It is not sure at present if any impacts will occur or not on regional economy in connection to employment and living of local people. In general, if the regional economy becomes active, the positive impacts are predicted for the employment due to probable increase of employment opportunity and income. On the other hand,

however, it is probable that many local people are not employed due to low quality as labor force. The illiterate people may have difficulty of employment, except cases of temporary labor. It is desirable that the economic strategic plan may consider such cases of differential opportunity of employment and its impacts.

③ Land-use and Use of Regional Resources

Remarkable changes are expected on land use in the Study area due to economic development projects and activities. For example, the currently un-used lands will be converted to industrial or residential lands.

Every provincial government is under preparation of land-use plans at district basis at present. However, there are no plans for the whole province or wider area covering provinces. Various adverse impacts will be predicted in accordance with the land use development based on the strategic plan without comprehensive land use plans. It is necessary to take into consideration the probable adverse impacts in the Study. Zoning plan for appropriate utilization of lands and regional resources may be used for mitigation of such adverse impacts.

④ Division of Communities, Social Organizations for Infrastructure

The economic development, especially in a case of with large development area and/or large structures, sometimes causes division of community. Such possibility, however, cannot be predicted at present. When any projects which may cause community division are planned, the Study should firstly know the probable impacts. The mitigation measures need to be planned if any such impacts are predicted as a result of the survey. The planning is made in consideration of social organizations and infrastructures. The public consultation or stake holder meeting is effective and desirable to get community's positive participation to the project planning.

⑤ Existing Social Infrastructure and Services

New infrastructures will be constructed and new social services will be required according to the economic development. On the other hand, it may become an issue how to harmonize between the existing and new infrastructures. For example, the existing infrastructure may have issues on over-aged deterioration, shortage of capacity, insufficient function, etc. The safety and landscape matters also may become additional issues. For taking countermeasures, alternative study

needs to be carried out on the harmonization or effective uses of old and new infrastructures. The public consultation and participation of inhabitants may be promoted for this purpose.

⑥ Poverty, Aborigine, Minorities

As far as the information through interview from the government agencies is concerned, there are neither aborigines nor minority people to be protected, although there are various tribes. Concerning the poverty, many people are in lower level than the poverty level in Mozambique. Accordingly it is not reasonable to pay special attention only to a limited poor people of a particular community. Most farmers may be said as quite poor if the definition of poverty is made on a basis of income. It may be reasonable to examine the necessity of studying the poor, aborigine, and minority when the ideas of projects are proposed and the environmental impact assessment is required. The mitigation measures will be studied and taken in the strategic plan, if any adverse impacts will be predicted,

⑦ Unfair Distribution of Damage or Benefit

Majority of inhabitants live in a community with almost equal standards in economy and living conditions. When the economic development project realizes in or near their community, it may be inevitable to cause unfair distribution of damage or benefit. It is difficult to provide everybody with the same level of benefit when various infrastructures or industries are developed in a certain site. However, it is necessary to take into consideration of leveling the possible differences of beneficiaries among the relevant community. Any damage should be avoided in any case.

⑧ Archaeological/Cultural Heritage

There may be no problems of this item as the development is not able to be allowed in the designated area of archaeological/cultural heritage. The considerable issue may be the sites which are not designated yet. For example, there are some partially damaged but beautiful bridges constructed in 1940's. It is probable that there are archaeological/cultural heritage sites which are not designated yet but worth to be remained. It is required to carry out the survey to confirm if there are any archaeological/cultural heritage sites or not during the study for alternative development plans.

⑨ Political Conflict within the Region

It may be inevitable to have conflict of interest in any development projects. The differences of income and opportunity of employment caused by various development projects may be observed. Even in case of agricultural development, the differences of production become large by an irrigation project. It may be required to consider minimizing or mitigating the differences among the people in the same community or district when any economic development plans are implemented. The conflict caused by the differences of interest in the same community needs to be avoided as much as possible. The public consultation for the objective inhabitants may be effective to find ideas for minimizing probable conflict.

⑩ Vested Right of Water

The water resources are limited in volume and located unequallywhile the water demands sites are also located unequally. The locations with high water demand are occasionally far from the water supply sources. In the Study area, the water demand is not so large and consequently no serious shortage is observed at present. However, it is probable that water shortage may take shape in the future when the economic development is promoted and the living standards of people are remarkably improved. The water-use-right system is already established by the law and ARA is in charge of the water right license. But, their activity in this regard is not sufficiently functional. It is required to carry out the survey and study on water balance between the water demand and water supply for water resources development and management planning, before any serious situation comes on the water uses. In addition, it is necessary to strengthen the regulations and management system for water right.

⑪ Health and Hygiene

As a result of economic development, various construction works are executed and the health and hygiene problems become serious due to increase of labors and increase of waste and effluent during construction. On the other hand, when the industry or facilities start the operation after the completion of construction, the volume of waste and effluent is furthermore increased. It may be the first thing to establish the environmental management plan including the issue of health and hygiene management at respective industry/facility side as well as at the

government agency side in charge. The cooperation between the public and the private sector is essential.

⑫ Disaster/Accident, Infectious Disease

Concerning the disaster/accident and infectious disease during the construction, the probable risk should be seriously considered. The labor safety at construction site is not usually a matter of priority concern in developing countries. The infectious disease may break out as labors gather from various places and live together in temporary houses. Besides the requirement of appropriate safety management by implementing company or agency, it is also essential for the government to provide practical guidance with the regulation and manual on safety and sanitation, including the matter of infectious diseases.

Natural Environment

① Topography & Geography

A large scale infrastructure development may cause considerably large change of local landform. The impact needs to be evaluated by individual projects. As examples of adverse impacts, there are various cases such as instability of slope, deterioration of landscape, impacts to ecosystem, etc. The mitigation measures are also necessary to be taken into consideration in individual case. For example, the zoning of land uses may mitigate the negative impacts in connection with topography and geography.

② Soil Erosion

Soil erosion is also one of environmental issues. The typical case of soil erosion occurs when the surface soil is eroded by logging trees and removal of vegetation. It is also possible to have similar condition in case of construction site for economic development. There are some measures to mitigate the soil erosion. For example, to minimize logging trees and removal of grasses at construction site, providing drainage system, etc. might be effective. In case of agricultural cultivation, the selection of land reforming method is essential.

③ Ground water

The impact caused by groundwater uses is not a matter of concern at present since

rather small quantity is consumed. When the groundwater use become large scale in a certain area, it may cause some impacts such as reduction of possible pumping yield, lowering of water level, water contamination, and ground subsidence. It is necessary to carry out the survey of groundwater and geological formation to estimate the potential of water extraction. The excessive uses of groundwater should be avoided in a planned manner. In addition, it is necessary to prevent any hazardous substances flowing into the groundwater at the industrial development site with appropriate management.

④ Rivers and Lakes

As a part of water resources development, unbalanced water use may cause changes of water level and flow volume of rivers and lakes. Such situation also causes negative impacts to ecology and water users in the downstream area. It is fundamentally essential to establish a comprehensive water resources development and management plan for water source conservation, appropriate distribution of water, effective water resources development, etc. There are many rivers in the study area. The water resources management should be done as a whole region. It may be also necessary to take Lake Niassa into a part of the study.

Lake Niassa

⑤ Coastal Area

The eastern border of the Study area faces to the Indian Ocean. The present coastal areas mostly remain as natural seaside. If the weather is fine, the cobalt blue colored sea is very beautiful and coral and mangrove zones are still located at various places. The fish species are also rich. It is quite significant to maintain the present natural conditions without construction of artificial structures along the coast. In addition, the control to minimize the effluent or waste water flowing into the sea is essential. The economic development in the coastal zone needs to pay

special care for minimizing the contamination in the sea as well as on the beach. The development plan usually considers only a positive side, but it is surely necessary to consider the negative side as well for the sustainable development toward the future.

Seaside with Cobalt Blue Water

⑥ Inhabitation of Fauna & Flora, Ecology

As seen in the other African countries, the ecosystem outside national parks or reserved areas is rather poor. There are no large animals. There may be monkeys at most in the higher mountain areas. The location of industry is usually selected avoiding the national parks or the other protected areas in development plans thus there may be no serious impact predictable concerning the inhabitation of fauna & flora and the ecology. However, when a development is planned in an area without specific data of ecological conditions and no human activities are observed, the ecological survey needs to be carried out prior to the implementation of a project. The special cares will be required for the wetland as well as the coastal zone. If any endangered species are found, the alternative study to minimize the impact to the ecology needs to be carried out.

⑦ Climate

The scale of development project or activity is not so large as to have any impacts on the climate. When the development area becomes wide and the natural earth and vegetation is replaced by concrete or asphalt, it is possible that the air temperature might be increased slightly. However, such change happens only within a limited area and no adverse impacts may happen. Although there is a research result that the local climate may be changed if a large reservoir is constructed, such case is also considered to be within a variation of nature. In

general, the project scale and type may not cause any impacts on local climate changes.

⑧ Landscape

The landscape changes are one of essential items accompanied by development activities. For the most people in the Study area (as same as the other developing countries), the awareness to the landscape may not high. However, such low awareness or interest of people will be changed in the future. There are various sites with good or attractive natural landscape. There are many natural rivers without dam and the coastal zone. When a large scale structure is planned, it is desirable to use natural materials as much as possible. In addition, it is desirable to have regulations or guidelines for the landscape in the industrial zone.

⑨ Global warming

It is confirmed that the economic activities cause the generation of global warming gas such as carbon dioxide, methane, nitrous oxide, etc. However, the amount of such gas caused by economic development in the Nacala Corridor is actually negligibly small. It is nevertheless necessary to raise awareness and have guidance at every industry and facilities in the Nacala Corridor to minimize the generation of global warming gas.

Environmental Pollution

① Air pollution

The causes of air pollution during the construction period are generally the exhaust gas from construction equipment and vehicles, the dust caused by construction works, etc. The construction management including the mitigation measures against air pollution is required like water splaying, separation of roads for construction from those for local people, time control, etc. The monitoring and strict guidance based on the air quality standards are essential for the air pollution originated from the operation of industry.

② Water Pollution

Concerning the water pollution during the construction period, it is generally mitigated by selecting construction methods or providing treatment facilities to

control the discharge volume of mud, oil, etc. from the construction site. Concerning the waste water discharge by the operation of industry, facility, mining, etc., there are some alternative methods to mitigate the adverse impacts. The waste water treatment facility is surely required for industries or mining with a certain scale. The most effective way may be the strict regulation and monitoring of waste water. The penalty should be stipulated by the regulation.

③ Soil contamination

Soil contamination occurs when hazardous substances are dumped into the ground. There is generally no construction works which may cause soil contamination. If there are any industries to produce or use hazardous substances planned by the development plan, it is essential to prepare the appropriate treatment and disposal plan.

④ Solid Waste Disposal

The construction works produce soils/rocks and unnecessary materials generally from the excavation works and demolishing work. Then the industry and facilities also produce various wastes during operation. The waste disposal management plan will settle or minimize the adverse impacts. However, there is an issue that the present public system of waste collection and disposal is relatively poor. Sometimes it may not be easy to find the appropriate disposal site. Without the improvement of public waste disposal system, it may be difficult to take effective measure.

⑤ Noise/Vibration

Noise/vibration during the construction may be caused mostly by drilling, earth works, and transportation. The construction plan needs to consider the construction methods for mitigating the noise/vibration. For example, the information and notice of construction schedule is better to be given to the inhabitants. Construction time (working day and hours) at respective site should be flexible and adjusted in consideration of living conditions of the inhabitants. It is usual to avoid the works at night and on holidays as much as possible.

Concerning the noise/vibration during the operation period, the selection of facility site is essential. Protection devices and materials for mitigation should be also

provided. For example, the pumping station should not be located in a residential area. The selection of less noise type equipment and provision of sound proof wall might be necessary.

⑥ Ground Subsidence

The ground subsidence may not happen by the construction or structures as the foundation is mostly stable in the Study Area. However, the investigation of foundation geology and hydro-geology accompanied by the environmental impact assessment will be required if large amount of ground water has to be pumped up by a project.

⑦ Odor

The exhaust gas from construction vehicles are usually produced locally and it may be sufficiently mitigated by countermeasures such as detour route, using new vehicles, etc. However, the serious impact may occur in case of industries generating odor during the operation and sewerage treatment facilities. It is difficult to assume where and what kind of industries or facilities will be constructed at present. The intensive measures or planning will be required to avoid or mitigate odor when a permanent or semi-permanent facilities which may generate odor are planned.

⑧ Bottom Sediment Quality

It may cause environmental deterioration of bottom sediment quality when large volume of waste water and mud flowing into a river or a lake. During the construction period, there are some countermeasures such as selection of construction method, selection of discharge point, treatment of waste water, etc. In case of the issues during the operation of industry or mining, it becomes essential to provide effective treatment facilities to reduce the contaminated water and mud. It is also required to give guidance for monitoring, and to control the bottom water quality by strict regulations.

⑩ Traffic Accidents and Other Accidents

During the construction, it is usual that the risk of accident will be increased. However, it is possible to mitigate such situation by some measures of traffic and

the other safety control. There are some possible measures such as control of vehicle passing time/hours, provision of information of daily works to inhabitants, detour route, construction of bypass road, deployment of traffic control staff, etc. During the operation of industries or facilities, the safety management at individual site is essential. It is necessary for a relevant governmental agency to provide them with the guidance for safety during the operation.

9. Alternatives to the project activities including 'without project' option.

Not applicable at the stage of Detailed Planning Survey since any definite projects are planned to be studied.

10. Result of the consultation with recipient government on environmental and social consideration including roles and responsibilities.

MPD agreed with JICA on November 18, 2011 to abide by "JICA Guidelines for Environmental and Social Considerations (April, 2010)" in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

11. Terms of Reference for Environmental and Social Considerations

In order to satisfy the compliance policy of JICA, conducting a Strategic Environmental Assessment of development strategies is considered to be suitable to confirm the environmental and social impacts in the regional planning process.

12. Other relevant information

None.