Summary of the Environmental and Social Impact Assessment

Project Title : PAIR – ROAD INFRASTRUCTURE DEVELOPMENT PROJECT (RN9, BEFANDRIANA AND POMAY BRIDGES)
Country : Madagascar
Project Number : P-MG-DB0-015

1 Introduction

Madagascar’s road network is not very dense. Though extensive, it remains in a precarious state and is highly vulnerable to natural disasters, especially cyclones. Since the national road network is ramified but not interconnected, any disruption within the network automatically cuts off access to whole regions of the country.

This is the context within which the RN9 rehabilitation project has been designed in Madagascar. Its specific objectives are to:

(i) open up access and improve travel conditions to the south-west region of Madagascar by providing an all-season road and appropriate conditions for the safe transportation of goods and merchandise;

(ii) develop the tourism and agricultural potential of the south-west region; and

(iii) improve the living conditions in project impact area (PIA) communities by facilitating access to basic socio-economic services and infrastructure.

Access to the south-western part of the country will be ensured by:

- developing the road stretch between Toliara exit (PK2) and Analamisampy (PK107), representing a distance of 105 km; and
- building a bridge over River Befandriana, further north.

This document is a summary of the project’s environmental and social impact assessment that have been conducted in accordance with the procedures and policies of the African Development Bank (ADB) and the applicable national regulations of Madagascar. It has also taken into account the demands and expectations of project communities that were recorded during public consultative meetings.
2 Project Description and Rationale

2.1 Project Description

The Road Infrastructure Development Project (PAIR) seeks to open up access to south-western Madagascar and essentially comprises:

i) double-layer paving of a road segment from Toliara (PK2) to Analamisampy (PK107), representing a distance of 105 km on RN9 (Toliara/Bevoay);

ii) construction of the 160 metre-long Befandriana bridge on RN9;

iii) reconstruction of Pomay bridge on RN 35;

iv) ancillary works related to rehabilitation of farm-to-market roads and the construction of classrooms for project area communities;

v) actions promoting good governance and an institutional study on the Road Maintenance Fund (RMF).

RN9 is located in south-west Madagascar. It is the shortest roadway linking Toliara, the administrative headquarters of the Atsimo Andrefana Region or South West Region, to Morondava in the North, the administrative headquarters of Menabe Region, and to Morombe District.

It skirts 8 (eight) communes, namely: Toliary I, Belalanda, Ankilimalinika, Tsianisiha, Manombo, Milenaka, Ankililoaka, and Analamisampy. The bridge is located in Befandriana Commune.
The project will be executed over a period of four years at an estimated cost of UA 60.47 million co-financed by the ADF (UA 45.6 million), OFID (UA 11.83 million) and the Republic of Madagascar (UA 4.03 million).

2.2 Project Rationale

The project area is situated in the south-west region of the country. This region has a poverty rate that exceeds the national average (75% compared to a national rate of 69% in 2005) and is particularly exposed to natural disasters, especially cyclones formed in the Mozambique Channel that generate strong winds and heavy rainfall which cause catastrophic floods. Despite its agricultural and tourism potential, this region can remain inaccessible for long periods of eight months of the year.
The project is also building on the achievements of agricultural and fishery projects financed by ADB \(^1\) within the project impact area over the last ten years. Furthermore, the road infrastructure targeted by the project, whose feasibility and final design studies were financed by the ADB, is an extension of the roads leading from south-east Madagascar, which are currently being constructed with EU and World Bank financing.

### 3 Political, Legal and Administrative Framework

#### 3.1 ADB Policy and Procedures Framework

During the project planning and execution, ADB will ensure application of the following policies and procedures:

I. Environmental and Social Assessment Procedures for Public Sector Operations;

II. Involuntary Resettlement Policy;

III. Gender policy;

IV. Policy on Disclosure of Information;

V. Policy on Engagement with Civil Society.

#### 3.2 Malagasy Government Policy and Procedures Framework

From the institutional standpoint in Madagascar, overall organisation of the execution of road development/reconstruction and bridge construction projects is the responsibility of the Ministry of Public Works and Meteorology (MTPM), which is the contracting agency. This ministry is tasked with all operations relating to vacation of the project right-of-way, on behalf of the State of Madagascar.

The Madagascar Road Authority (ARM) acts as the delegated project supervisor on behalf of the MTPM. Apart from its technical prerogatives, the ARM seeks to ensure greater mainstreaming of the environmental dimension into road infrastructure projects. To that end, it is managing the implementation of the Environment and Social Management Plan (ESMP) on a regular basis. It works closely with the Directorate of Social and Environmental Impacts (DISE) attached to the Secretariat General of the MTPM, particularly in carrying out the environmental monitoring and control of the project. DISE, which is the environmental unit of the Ministry, is the consultative platform used by environmental authorities to address issues relating to the harmonisation of environmental and sectoral practices in the public works sector.

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\(^1\) The Mangoky Rice-Growing Area Rehabilitation Project which has just ended, the ongoing Manombo Irrigation-Farming Area Rehabilitation Project and the Tolara Fishing Community Support Project. For this last project, the development of RN9 into a paved all-season road will provide access to the 16 fishing villages situated along this road.
Apart from the abovementioned entities, the southwestern region, Toliara II districts and the mayors of communes affected by the project (Toliary I, Belalanda, Ankilimalinika, Tsianisihia, Manombo, Milenaka, Ankililoaka, Analamisanpy) will participate in the implementation and control of ESMP execution through a continuous, consultative process, specifically relating to all measures requiring a consultant and covering the three phases of the project, as described in paragraph 7 of the ESMP.

The Environmental Monitoring Committee (CSE), an inter-ministerial entity set up by the National Environment Office (ONE), will monitor implementation of the mitigative measures outlined in the ESMP and, where appropriate, make recommendations based on its monitoring of the indicators identified in the ESMP table.

4 Description of the Project Environment

The study area is situated in the south-western region of Madagascar, known as Atsimo Andrefana. RN9 is a route that serves the territory particularly from the south to the north, running through the districts of Toliara II and Morombe and eight communes successively.

In terms of its topography, the study area lies along the western lower reaches of the Mikokoba and Analavelona massifs. It thus cuts across a vast plateau that gently declines westwards from an altitude of 200 metres to much lower altitudes as it reaches the sea. Hence, the watercourses flowing from the mountains to the sea follow a direction that is perpendicular to the road.

The project area has a tropical climate with a long dry season that runs from April to November, followed by a short rainy season from December to March that however comes with heavy torrential rains. The near-drought situation gets increasingly severe from north to south. During the southern winter, from May to August, the temperature ranges from 14°C to 22°C, which is low enough to allow the annual double-cropping of rice.

4.1 Main Natural Components of the Project Environment

4.1.1 Agro-Ecological Areas

Two different geographical zones are distinguished along the RN9 itinerary: one immediately alongside and on either side of the roadway consists of vast stretches of fertile plains suitable for irrigation farming (rice) and rain-fed farming (cassava, beans, lima beans, maize, onions, etc.), and the other also lies on either side of the roadway, though much farther from it, and consists of agro-pastoral plateaus that are often devastated by bush fires.

4.1.2 Forests and Protected Areas

a. Mikea Forest

The Mikea forest, with its surface area of 371,339 ha, constitutes the last vestiges of the dry woodlands of south-west Madagascar. It has been subjected to wanton deforestation over the last few decades, despite its ecological and cultural value. The development of maize cultivation through slash-and-burn farming has led to a steady annual deforestation since the early 1970s. Hence, the Mikea forest has been steadily receding west of RN9 and is currently located more than fifteen kilometres away from the roadway.
b.  **Ranobe Forest**

The Ranobe forest is situated along the south-west coast, a few kilometres north of the regional capital, Toliara. It extends from RN9 to the Mikoboka plateau and is bounded at the south by River Fiherenana and at the North by River Manombo.

It is a dense dry forest containing rare and endemic Dalbergia and Didiera plant species. The protected area covers approximately 77,851 ha, and lies essentially on the Mikoboka Plateau. The habitat is composed almost wholly of thorny scrub growing on calcareous soils. This forest is home to certain lemur species.

Despite the conservation efforts made by project village associations, in partnership with WWF, this forest remains affected by often destructive subsistence practices.

c.  **Residual Forests**

There are some small residual forests along the entire road stretch and in certain places. They consist of a mixture of mango trees, gallery forests in the form of groves in drained low-lying flood plains as well as larger formations of rosewood, jujube and other species.

d.  **Savannah Woodland**

Savannah woodland covers over 80% of the plateaus that lies on both sides of the roadway. It is composed essentially of grass fields with occasional shrubs or patches of forest and is used by the local community for range-type animal husbandry.

4.1.3  **Water Resources**

a.  **Groundwater**

The region’s groundwater is concentrated mainly in the Toliara sedimentary basin. There are three superposed water tables: one in the Fiherenana alluvial plain (40 to 60m3/h); another one in the littoral located south of Toliara and fed from the Belomotra eocene limestone area; and the one developed in detrital terrains.

The Antanimieva-Befandriana region also has one of the largest water tables in the south west. It is fed from the sandstone karst plateaux of the East and has an estimated flow rate of 3 to 5 m$^3$/s.

b.  **Surface Water and Main Watercourses**

Situated downstream of a relatively developed basin, the area through which the RN9 runs is regularly traversed by big and small watercourses that flow perpendicular to the road alignment. Three relatively large watercourses flow through the study area, namely (from North to South):

- River Fiherena: It flows into the sea a few kilometres North of Toliara, is 138 km long and has a watershed of approximately 800 km$^2$. Its water supply depends on an average variable rainfall of 300 to 600 mm/year and substantial evapotranspiration that often reduces its water volume. It however has fairly
strong and violent floods, occurring after a few hours of sudden heavy rainfall upstream on the river basin.

- River Manombo: It also flows into the Mozambique Channel and although it is apparently smaller than River Fiherena, it generates wider floodplains at the end of its course between Ankilimalinika and Ankilioaka.

- River Befandriana: It is apparently the largest river in the study area. It has a considerable watershed and downstream, North of Befandriana village, it develops extensive floodplains used as rice-growing areas. Like the above-mentioned rivers, it produces considerable floods during the rainy season.

4.1.4 Coastal Region

RN9 skirts the coast over a distance of at least 25 km from Belanda to Andrevo, passing through the famous tourist site of Ifaty.

This coastline is characterised by the presence of coral reefs in the sea all along the road alignment and clumps of mangrove trees along the continental side of the road. The mangroves located near the various towns and villages are undergoing severe degradation. Sand dunes are also found along certain portions of the road alignment in this coastal region.

4.2 Main Socio-Economic Components of the Project Environment

4.2.1 Main Social Characteristics of the Population

a. Population:

The Masikoro are considered to be herders and the first occupants of the region, which still has extensive grassland plateaus used as pastureland and for range-type animal husbandry. It currently has at least 50,000 head of zebu. The Mikea, who are indigenes, live in the forest region to the West and maintain their cultural specificity. The region also seems to be a significant migration hotbed that has yielded a melting pot of races living together in mutual tolerance.

b. Living Conditions

In the plains and for security reasons, the population is generally grouped within the various towns and villages. The RN9 runs through at least fifty villages from Toliara to Befandriana.

Most homes are built of local materials (mud, wood and straw) and roofed with sheet metal or straw. The level of education within the community is very limited and the poverty incidence rate is almost 80% in rural areas.

c. Health

Access to basic social services is virtually non-existent in most towns and villages. Health is still managed through traditional methods. Malaria, respiratory infections and sexually-transmitted diseases are the most prevalent ailments in the project area.
4.2.2 Main Economic Activities

a. Agriculture

Agriculture is the main activity in the region, especially in the alluvial plains. Various crops, like rice, tomato, onion and cotton, are grown there.

b. Stockbreeding

Grazing is the primary source of income for several households. Range-type animal husbandry is practised in the high-lying grassland plateaux. At last count, they had 500,000 heads of zebu.

c. Tourism

Sea-side tourism has developed along the RN9 road alignment in the district of Toliara and particularly in Ifaty, and further North in Morombe. In 2003, approximately fifty hotel establishments were recorded in Toliara I and II.

Elsewhere and despite the enormous potential, tourism remains very little developed and is limited to a few tourist visits to areas of special ecological interest.

5 Alternative Solutions for the Project

The only alternative solution considered for the project is the “no project” scenario.

Development works on RN9 and construction of the Befandriana and Pomay bridges are the main components of this project. On account of the fragile situation prevailing in the country since the political crisis of 2009, the project has increasingly become a priority. The all-season operation of the road should help to stave off any further deterioration in the living conditions of the disadvantaged communities in the south-west area in general.

Given the socio-economic conditions of the communities concerned, the “no project” solution cannot be considered. It is categorically rejected by all national and local stakeholders who see in this project the hope of injecting new life into a landlocked region that is steadily sinking into poverty due to the rapid degradation of its natural capital.

6 Potential Impacts and Mitigative and Reclamation Measures

The RN9 development project will generate potential negative and positive effects on the natural and human environment during its three main phases of preparation, works and operation.
6.1 Identification of Potential Impact

6.1.1 Worksite Preparation Phase

The potential project impacts during this phase will be exclusively negative; the first of them being irreversible and the other two controllable if appropriate measures are taken. These are:

i. Community displacement, demolition of homes and loss of livelihoods and jobs, following vacation of the project right-of-way,² will be the most significant impacts generated during the worksite preparation phase. Indeed, following clearance of the project right-of-way over the 105 km to be constructed, 1675 persons will be displaced and 933 homes and business premises (often mere stalls) will be demolished.

ii. Destruction of water and community infrastructure (wells, elevated water tanks, public taps; offices, schools) within the project right-of-way.

iii. The risk of land conflicts between displaced persons and the rest of the population is a non-negligible negative impact which can, however, be controlled if the appropriate technical and social measures are taken.

6.1.2 Construction Phase

This phase will generate the greatest number of negative impacts, the first two of which are deemed to be significant. These are:

i. Traffic obstruction and aggravation of road safety problems.

ii. Risk of deterioration in public health due to the proliferation of sexually-transmitted diseases (STDs) following the massive influx of workers and labourers to the project sites and the increase in the number of passengers.

iii. The other negative impacts to be noted during this phase and which are of variable significance relate to the risk of natural resource degradation and deterioration of human health owing to all types of pollution (noise pollution, dust, waste, wastewater, waste oils), the aggravation of erosion and deterioration of the vegetation cover on borrow sites, destruction of the forest resources and biodiversity and obstruction of the natural flow of surface water.

6.1.3 Road Operation Phase

Three major impacts are noted for this phase, two of them being negative and the last one being positive. These are:

i. increased road traffic and a higher risk of accidents;

² The road is not a new creation. It already exists with a well-defined right-of-way that is currently occupied mainly by local peoples and their activities.
ii. risk of increased pressure on natural resources, especially the forests situated along the project road; and

iii. opening up of the region, promotion of its development and consequent improvement of the quality of life of its population, which is the main positive impact of the project and, indeed, the rationale for its execution.

6.2 Mitigation and Land Rehabilitation Measures

6.2.1 Worksite Preparation Phase

i. In a bid to mitigate the relocation of certain persons and their activities and the demolition of their homes and stalls within the project right-of-way, a compensation/ voluntary resettlement programme has been designed. After identification of the affected population and in accordance with Malagasy resettlement procedures and ADB policy, a compensation plan for affected households and persons was jointly agreed upon with the persons concerned and the local authorities. The compensation adopted entails indemnity for the material property destroyed and loss of income for the number of days taken to relocate the people. All communities affected by the project have opted to be compensated in cash. Hence, there is no provision for the identification and development of resettlement sites. Once they have been compensated, the communities will resettle themselves on sites which they themselves will choose and purchase. Additional assistance, in the form of resettlement support, will be provided to particularly disadvantaged persons. The compensation costs, to be defrayed by the State of Madagascar, amount to USD 1,907,855.

ii. Furthermore, during this phase, special attention will be paid to all water supply and community infrastructure situated within the right-of-way breadth of 4 to 7 metres, measured from the road (wells, public taps, elevated water tanks, offices and schools). Hence, the roadway will be clearly delimited and developed in such a way that such infrastructure will be spared; or better still, protective walls will be built around such infrastructure. Provision will also be made for special measures to stave off the risk of accident, such as the installation of road signs and the construction of speed bumps where such infrastructure is located. The data on this entire infrastructure has also been accurately recorded for inclusion in the works BDs so that the contractor will, in the works planning studies, consider the possibility of adjusting the road alignment in areas where such infrastructure is located.

iii. During this phase, local authorities will also undertake to provide guidance to affected persons when they relocate to new sites, in order to avoid any land disputes with communities already settled on such sites. Special attention should be paid to communities affected by the project during relocation and displacement. The local authorities will organize the relocation and guide the people. This will prevent any boundary violations and conflicts between the persons concerned and those already settled in the area. Hence, relocation will be carried out in phases, in accordance with a well-defined schedule.
6.2.2 Construction Phase

During the construction phase, special measures will be taken to avert the three major risks likely to occur during this period, namely the aggravation of road safety problems; STD transmission; all forms of pollution and environmental and natural resource degradation.

i. Risk of accidents during the construction phase could be reduced by ensuring that the contractor uses construction machines that are in good condition and have a valid roadworthiness certificate, clearly maps out traffic routes, installs appropriate road signs and regularly updates road users on the construction schedule.

ii. The massive influx of workers and labourers to the construction sites and the steady increase of passengers visiting the various towns will inevitably increase the risk of STD transmission. Education, information and communication activities targeting the workers and local communities as well as systematic screening and a sufficient supply of condoms are some of the measures that will mitigate STD risk.

iii. To combat any environmental and natural resource degradation, appropriate measures will be imposed on the contractor within the terms of reference. As regards depollution, domestic wastewater from workers' camps will be collected and disposed of in cesspools, solid waste will be collected and dumped in appropriate sites, filters and waste oils from trucks and construction machinery will be collected and stored in sealed containers and, to reduce dust emissions, the trucks transporting loose material will be covered with tarpaulins when there are strong winds and the project road will be watered periodically. As concerns borrow pits and quarries, the sites will be systematically selected far from sensitive and forested areas and will be operated in a manner that provides for and ensures the application of erosion-control measures. Furthermore, the project site will be rehabilitated after the completion of construction works. Lastly, forestry resources can only be protected by enacting legal provisions that are binding on the contractor company and encouraging it to assume greater responsibility for such resources. During the project, a contractual obligation will be imposed on the contractor to ensure that its workers scrupulously protect all natural resources located near the project sites.

6.2.3 Road Operation Phase

During the road construction phase, there will be an increase in two major risks: firstly, an increase in road traffic and road accidents; and secondly, increased pressure on natural resources and particularly the forests located along the road alignment, since they will be more accessible.

i. The risk of accidents can be significantly reduced by prohibiting any new resettlement areas within and in the immediate vicinity of the project right-of-way and installing appropriate road signs, especially where the road runs through towns and villages and in areas deemed to be dangerous.
ii. As concerns the risk of increased pressure on the environment and natural resources, provision is made for enhanced management and control of sensitive sites and natural forests along the road and the promotion of short-term reforestation activities, especially near human settlement areas.

iii. The two positive impacts of this phase – namely access to the region and promotion of its development as well as improvement of the living conditions of local communities – must be enhanced by designing and implementing a campaign to showcase the south-west region and its main assets in order to attract regional, national and international investors, and also by promoting and boosting activities that generate more income for local communities.

6.3 Environmental and Social Management Plan (ESMP)

6.3.1 ESMP Components
<table>
<thead>
<tr>
<th>Impact</th>
<th>Type</th>
<th>Significance</th>
<th>Measures</th>
<th>Party responsible</th>
<th>Cost</th>
<th>Surveillance Actions</th>
<th>Monitoring Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Worksite Preparation Phase</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1. Community displacement, destruction of homes and loss</td>
<td>N</td>
<td>Major</td>
<td>• Compensate the communities to be displaced at the current value of the property destroyed;</td>
<td>MTPM</td>
<td>USD 1,909,804</td>
<td>• Ensure the conformity of IRP implementation</td>
<td>• Number of household heads compensated at project commencement</td>
</tr>
<tr>
<td>of livelihoods and jobs</td>
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<tr>
<td>2. Destruction of water and community infrastructure</td>
<td>N</td>
<td>Major</td>
<td>• Limit the breadth of the right-of-way to 4 metres from the roadway, in order to preserve all water and community infrastructure which is all located 4 to 7 metres from the road surface;</td>
<td>Contractor companies</td>
<td>USD 12,000</td>
<td>• Control to ensure that the road alignment does not affect various infrastructure;</td>
<td>• Number of water structures protected</td>
</tr>
<tr>
<td>within the right-of-way breadth of 4 to 7 metres, measured</td>
<td></td>
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<td>• Wall the water infrastructure with access points that face away from the road;</td>
<td></td>
<td></td>
<td>• Control to ensure that the water infrastructure is effectively walled.</td>
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<td>from the road and risk of accidents for water users</td>
<td></td>
<td></td>
<td>• Take appropriate measures for community infrastructure in order to avoid all risk of accidents: walls, road signs, speed bumps, etc.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Risk of land disputes</td>
<td>N</td>
<td>Average</td>
<td>• Participation of local authorities in guiding the resettlement of displaced persons</td>
<td>Mayors of the communes concerned / CCRL / ARM</td>
<td>-</td>
<td>• Monitor the extent of local authority involvement in the guidance of displaced communities</td>
<td>• Number of conflicts reported during the resettlement period</td>
</tr>
<tr>
<td>4. Job creation for the direct and indirect needs of the</td>
<td>P</td>
<td>Average</td>
<td>• Encourage the contractor to recruit, in priority, the local population, particularly those affected by the project and especially for unskilled labour</td>
<td>Contractor companies/ARM</td>
<td>-</td>
<td>• Monitor the contractor’s commitment to recruit locally</td>
<td>• Number of local workers recruited by the contractor</td>
</tr>
<tr>
<td>construction site</td>
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</tbody>
</table>
5. Traffic obstruction and aggravation of road safety problems and accident risk

<table>
<thead>
<tr>
<th>N</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contractor companies</strong> and <strong>Control Mission/ARM</strong> Responsibility of contractor company in accordance with its obligations set out in the terms of reference</td>
<td></td>
</tr>
<tr>
<td><strong>Number of accidents on or around the construction site reported on a quarterly basis</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use construction engines that have roadworthiness certificates;</strong></td>
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<tr>
<td><strong>Delimit the paths used by construction engines;</strong></td>
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<tr>
<td><strong>Install appropriate road signs;</strong></td>
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<tr>
<td><strong>Update the local community and road users on the project schedule.</strong></td>
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<tr>
<td><strong>Contractor companies and Control Mission/ARM</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Number of accidents on or around the construction site reported on a quarterly basis</strong></td>
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</table>

6. Noise pollution

<table>
<thead>
<tr>
<th>N</th>
<th>Minor</th>
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<tbody>
<tr>
<td><strong>Contractor companies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Establish a work schedule that reduces noise pollution;</strong></td>
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<td><strong>Train workers;</strong></td>
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<td><strong>Ensure regular maintenance of vehicles</strong></td>
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<tr>
<td><strong>Impose a speed limit where the road runs through towns, villages and sensitive areas</strong></td>
<td></td>
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<tr>
<td><strong>Under responsibility of contractor company in accordance with its obligations set out in the terms of reference</strong></td>
<td></td>
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<tr>
<td><strong>Number of noise pollution complaints filed every quarter</strong></td>
<td></td>
</tr>
</tbody>
</table>

7. Pollution risk: dust, waste oils, waste water, waste

<table>
<thead>
<tr>
<th>N</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contractor companies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Collect domestic waste water from workers’ camps and channel it to cesspools;</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Collect and dump domestic waste from workers’ camps in appropriate sites;</strong></td>
<td></td>
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<tr>
<td><strong>Collect and store filters and waste oils in sealed containers;</strong></td>
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<tr>
<td><strong>Cover trucks transporting loose material when there are strong winds and regularly water the project roads especially during the dry season.</strong></td>
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<tr>
<td><strong>Responsibility of contractor company in accordance with its obligations set out in the terms of reference</strong></td>
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<tr>
<td><strong>Ensure the smooth implementation of measures related to dust control and the management of waste water, solid waste and waste oils.</strong></td>
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<tr>
<td><strong>Number of instances of non-compliance with pollution control measures reported per quarter</strong></td>
<td></td>
</tr>
<tr>
<td>8. Deterioration of community health owing to the spread of STDs</td>
<td>N</td>
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<tr>
<td>---</td>
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</tr>
<tr>
<td><strong>Contractor</strong></td>
<td><strong>Responsibility of contractor company in accordance with its obligations set out in the terms of reference</strong></td>
</tr>
<tr>
<td><strong>DISE/MTPM: Programme for the population</strong></td>
<td><strong>USD 25,000: Education and information programme for the local population</strong></td>
</tr>
<tr>
<td>- Design and implement an education, information and communication programme on STDs for contractors’ staff;</td>
<td>- Verify the existence and implementation of an STD control programme for company workers and the local population</td>
</tr>
<tr>
<td>- Regularly organize STD consultation and screening tests for workers and send any infected persons to the National STD Control Programme;</td>
<td></td>
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<tr>
<td>- Provide company workers with a regular and adequate supply of condoms;</td>
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<tr>
<td>- Design and implement an education, information and communication programme on STDs for the local population.</td>
<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th>9. Aggravation of erosion and degradation of the vegetation cover on borrow sites</th>
<th>N</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contractor</strong></td>
<td><strong>Responsibility of the contractor company in accordance with its obligations set out in the terms of reference</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ARM</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Select borrow sites outside sensitive areas;</td>
<td>- Verify the distance between borrow sites and sensitive areas;</td>
<td></td>
</tr>
<tr>
<td>- Execute the project in a manner that provides for and implements all erosion control measures;</td>
<td>- Control operating conditions and techniques and the application of erosion-control techniques;</td>
<td></td>
</tr>
<tr>
<td>- Restore and rehabilitate all borrow sites after completion of works;</td>
<td>- Ensure the completion of rehabilitation works on all borrow sites</td>
<td></td>
</tr>
<tr>
<td>- Prepare a specific environmental management plan for each site and have it approved prior to its operation.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Destruction of natural resources in local forests</th>
<th>N</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARM</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Impose a contractual obligation on the contractor to ensure that during construction, its workers scrupulously protect all natural resources located near the project sites.</td>
<td>- Verify the existence of a clause governing the protection of natural resources in a contract between the company and the Government and its</td>
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- Number of information sessions organised per quarter for company workers and the local population
- Number of borrow sites that are effectively rehabilitated at the end of the project
- Number of violations reported each quarter
<p>| | | | | | |</p>
<table>
<thead>
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</thead>
</table>
| 11. Obstruction of the natural flow of surface water | N | Average to major | • Conduct hydraulics studies to determine the volume of water flowing across the road at normal and at flood periods;  
• Calibrate the water drainage structures to be installed on portions of the causeway to ensure the regular flow of surface water. | ARM | Included in the project cost | • Ensure that the water drainage structures under portions of the causeway are perfectly integrated into the technical design of the project  
• Area flooded upstream of the road as a result of dysfunction in water flow |
|   |   |   |   |   |   |
|   |   |   |   |   |   |
| 12. Increased road traffic and a higher risk of accidents, | N | Major | • Prohibit community resettlement along the right-of-way and the immediate vicinity of the road;  
• Install appropriate road signs especially where the road cuts across towns and villages as well as areas deemed dangerous. | Mayors of the communes concerned/CCRL Contractor/ARM | USD 25,000 | • Regularly verify compliance with the ban on resettlement on the road sides  
• Verify conformity of the road signs in terms of road safety standards  
• Number of accidents reported annually on the road |
|   |   |   |   |   |   |
| 13. The risk of increased pressure on natural resources along the project road; | N | Major | • Prepare and execute communication and awareness-raising campaigns on natural resource protection  
• Enhance the management and control of reserves and natural forests along the road  
• Promote short-term reforestation over a total surface area of 20 hectares | DGF / Ministry of the Environment | USD 35,000 | To be defined later  
USD 25,000 for reforestation of 20 ha  
• Ensure that management and control means are indeed reinforced during road operation  
• Evolution of the vegetation cover along the road |
|   |   |   |   |   |   |
| 14. Opening-up of access to the region and promotion of its development | P | Major | • Design and implement a campaign to showcase the region and its assets | Authorities of the South West Region | USD 75,000 | • Ensure that the campaign showcasing the region and its assets is prepared and implemented  
• Number of development initiatives set up  
• Number of income-generating activities developed |
|   |   |   |   |   |   |
| 15. Improvement of the quality of life for local communities | P | Major | • Promote and boost income-generating activities | MTPM /ONG | To be determined by the authorities |   |
6.3.2 ESMP Implementing Authority

A responsibility assignment matrix sets out the various responsibilities in ESMP implementation:

- The Madagascar Roads Authority (ARM) shall ensure that the obligation to comply with the prescriptions of this ESIA is incorporated in the BDs to be provided to bidders and in the respective contracts of the works company and the Control Mission;

- The works contractor and its sub-contractors shall be required to implement the environmental mitigative measures to the same extent as the technical works specifications, in compliance with works site best practices and the environmental monitoring programme. They will be expected to have an environmentalist on site to ensure the implementation and regular monitoring of the environmental management plan. This expert shall report on his/her activities through progress and environmental monitoring reports.

- The Ministry of Public Works and Meteorology (MTPM), in collaboration with the Madagascar Roads Authority, shall supervise the Control Mission especially regarding monitoring of compliance with the procedures and regulations in force. The Madagascar Roads Authority shall entrust the implementation of environmental measures to the works contractor, ascertain implementation of such measures by the company and ensure that the Control Mission effectively conducts control.

- The Control Mission, as its name indicates, shall control compliance with the statutory and legal provisions governing environmental protection. It is tasked with ensuring the timely production of the required contract documents, the effective implementation of mitigative measures, the acceptability of the results of the environmental monitoring programme and the efficiency of mitigative measures. Where necessary, it shall take measures to apply the penalties provided for in the contract. The control mission shall report on its activities to the management organ, namely the project contracting authority, ARM and MTPM.

- During the road operation phase, the MTPM and ARM shall, in partnership with the DGF and local authorities, ensure the implementation of mitigative and rehabilitation measures.

6.3.3 ESMP Implementation Budget

The budgeting of ESMP implementation is as follows:

- The cost of compensation of the displaced community for a total of USD 1,909,804 is fully borne by the State.

- The technical measures for mitigating project impact relate to compliance with standard rules and best practices and have been completely factored into the prices determined for routine worksite operations and are completely defrayed by the contractor company and sub-contractors. Accordingly, measures targeting the operation and subsequent rehabilitation of sites such as borrow
pits, quarries, aggregate crushing stations, asphalt preparation facilities, as well as measures to control all forms of pollution, waste, waste water and noise, are included in the worksite installation, operation and withdrawal costs.

- The supervision and monitoring of ESMP implementation are implicitly included under routine worksite control and supervision operations. Monitoring of the project's impact mitigation and attendant social measures is one of the functions of the Control Mission, as is the monitoring of the volume of work planned in the total budget for road works.

- The environmental and social measures for mitigating the project's major impacts, for the benefit of the communities, local authorities, associations and other entities have also been identified and classified in order of magnitude. They relate to communication and awareness-raising activities to ensure safety, and preserve the road and its immediate environs, combat the spread of STDs, promote the development of the region and ensure some reforestation activities along the project road. A total budget of USD 250,000 has been earmarked to that end under the project.

<table>
<thead>
<tr>
<th>Name</th>
<th>Cost (in USD)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation of the displaced community</td>
<td>1,909,804</td>
<td>Compensation for damaged material property belonging to 1675 persons</td>
</tr>
<tr>
<td>Fencing of water infrastructure</td>
<td>12 000</td>
<td>Construction of fences around water and community structures located within the right-of-way breadth of 4 to 7 metres measured from the road</td>
</tr>
<tr>
<td>Communication and awareness-raising campaign</td>
<td>25 000</td>
<td>STD and teenage pregnancies</td>
</tr>
<tr>
<td></td>
<td>35 000</td>
<td>Environment and preservation of natural resources and biodiversity</td>
</tr>
<tr>
<td></td>
<td>25 000</td>
<td>Road safety</td>
</tr>
<tr>
<td>Promotion of the region</td>
<td>75 000</td>
<td>Design and implementation of a campaign to showcase the region, its assets and income-generating activities</td>
</tr>
<tr>
<td>Reforestation campaign</td>
<td>25 000</td>
<td>Reforestation of 20 hectares around the major towns and villages</td>
</tr>
<tr>
<td>Cost of monitoring mission</td>
<td>50 000</td>
<td>Operational cost of the environmental monitoring committee all through the project</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2 156 000</strong></td>
<td></td>
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</table>

7 Environmental Risk Management

The RN9 Development Project itself will not generate any major environmental risks. All the impacts identified, regardless of their magnitude, can be addressed with corrective and mitigative measures.

However, according to observed meteorological trends, it seems that the extreme phenomena observed in the region and, in this case, the cyclones generated in the Mozambique Channel risk becoming increasingly frequent and violent, with the attendant scaling up of their impact on the region's infrastructure, including the new road to be constructed.

The recent Cyclone Haruna that struck the region at the end of last February is a case in point. Wind velocity exceeded 200 km/hour and the resulting damage was unprecedented in at least 35 years.
Special attention should henceforth be paid to the monitoring of this phenomenon which most probably stems from climate change and its effect on the infrastructure, especially as it could be accompanied by a substantial rise in sea levels. Hence, the RN9 segment that runs along the coast would be exposed to this type of phenomenon which could cause increasingly severe marine erosion. Consequently, meticulous and regular observation of this road segment must be organized upon completion of the works.

8 Monitoring Program

The project oversight body, namely the Madagascar Road Authority, is responsible for ensuring cooperation and partnership with all project stakeholders and those involved in its monitoring. Such monitoring will be conducted periodically entailing the drafting of the following environmental monitoring reports:

- First environmental report, submitted at the end of the installation phase but prior to the commencement of the construction works;
- Quarterly environmental reports submitted all through the project;
- Environmental report upon completion of the works but prior to the provisional acceptance of works. This report documents the Control Mission’s acceptance of the state of finalization of restoration works on related sites, in accordance with their respective ESPP.
- Final environmental report which serves as an environmental audit after final acceptance of works. It confirms the environmental clearance of restoration works on the sites affected by the works, as one of the conditions for final acceptance of works. This clearance shall be issued by ONE to the project supervisor, namely the ARM.

It is the responsibility of each project partner to contribute to environmental monitoring. The MTPM, as contracting agent, oversees the monitoring of the natural and human environment components affected by the project. The environmental authorities, acting through ONE and the Environmental and Social Impact Directorate within MTPM, independently ascertain the application and conformity of these environmental measures. Furthermore, local communal authorities are entitled to observe and verify the application of these environmental measures, especially when they relate to the citizens in their communes.

The population can participate through a complaint register kept at the communal headquarters, which will be analysed by the authorities and submitted the works company, the monitoring authority and the project contracting authority for consideration.

A specific environmental monitoring committee for the project (CSE) will be set up to coordinate project monitoring activities. It will be composed of representatives of the relevant services, local technical services and the local authorities. The CSE will be coordinated by the National Environmental Bureau (ONE). The cost of the control mission has been estimated at USD 50,000.

9 Public Consultations and Information Dissemination

The consultation of the communities and NGOs, in conjunction with the local authorities, has constantly guided the surveys and field studies for all project managers. Various meetings
were held in July and August 2012 with the stakeholders, to inform them of the components of the project and listen to their views, so as to identify with them the environmental and social specificities of their environment and embark on joint and concerted preparation of the relevant protective measures.

The population’s concerns related mainly to issues raised by the restoration of the road right-of-way, optimization of the breadth of the road alignment, to ensure that it affects the least number of persons and homes, the terms of compensation, the principles to be highlighted and applied in order to guarantee total transparency and fairness during the compensation phase.

Aspects relating to the biophysical environment did not feature among the particular concerns of the community because the project road maintains its current alignment and no other new natural site will be affected by the project.

10 Additional Initiatives

Related structures and additional initiatives have also been planned under the project for a total of USD 1.5 million. They essentially comprise:

- Construction of six classrooms in CEG Mangily;
- Rehabilitation of 16 km of rural tracks for access from Manombo village to RN9;
- Launching of an in-depth institutional study on the functioning of the Road Maintenance Fund (RMF);
- Support to ensure that Madagascar joins the Cost Initiative.

11 Conclusion

Considering that the environmental impact assessments previously conducted for the RN9 development project have been updated, the summary in this document has made the appropriate improvements in accordance with the policies and requirements of the Madagascar authorities and the ADB relating to environmental protection and involuntary displacement of communities.

The proposed updated ESMP provides all the achievable measures to be implemented by stakeholders and which will together guarantee the environmental and social feasibility of the project in a manner that respects the natural and social balances in the region.

In addition to the ESMP of the entire project, the various sub-contractors will be required to prepare specific Environmental Management Plans per site, in order to obtain all the necessary corresponding authorizations for the environmental and social aspects.

12 References and Contacts

The documents consulted in order to prepare this summary are:

- ESIA – Manombo-Ambiky- SCET 2010, covering Section 2 of the project financed by the ADB
- ESIA – Toliara – Manombo- AIC -2007, covering Section 1,
- ESIA Supplement - NGO Capricorne- August and October 2012 and January 2013

The contacts at the Madagascar Road Authority (ARM), relating to the RN9 development project are:

- Mr. Jean Pascal Ramanamisata, Director General of ARM near stadium, Rue Ranaivo Paul, Alarobia, 3228, Antananarivo 101, Tel: (261) 20 23,295 23, Email: pascal.r-misata@arm.mg
- Ms. Lala Tiana Ratovoarivelo, Head of the Environmental and Social Actions Unit of ARM, Email: lala.r-velo@arm.mg

The contacts at the African Development Bank (ADB), relating to the RN9 development project are:

- Mamady Souare, Chief Transport Engineer, Department of Transport and Information Technology, African Development Bank, BP 323 - 1002 Tunis Belvédère, Tunisia Tel: (216) 71 10 1987, Email: m.souare@afdb.org
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- Rachel ARON, Senior Social Development Expert, Environment and Climate Change Division (ONEC 3); Department of Energy, the Environment and Climate Change (ONEC), African Development Bank, P.O. Box 323 - 1002 Tunis Belvédère, Tunisia Tel: (216) 71 10 2792, Email: r.aron@afdb.org