PROJECT: DEVELOPMENT OF THE NDENDE-DOUSSALA-DOLISIE ROAD AND TRANSPORT FACILITATION ON THE LIBREVILLE-BRAZZAVILLE-POINTE NOIRE CORRIDOR

COUNTRIES: CONGO AND GABON

SUMMARY OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

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SUMMARY OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

**Project Name:** Development of the Ndende-Doussala-Dolisie Road and Transport Facilitation on the Libreville-Brazzaville-Pointe Noire Corridor  
**Project Number:** P-Z1-DB0-088  
**Country(ies):** Congo and Gabon  
**Department:** OITC  
**Division:** OITC-1

**Introduction**

This document presents the summary of the Environmental and Social Impact Assessment (ESIA) of the Project on Development and Paving of the Ndende-Doussala-Dolisie Road and Facilitate Transport on the Libreville-Brazzaville-Pointe Noire Corridor. The 276-km-long Ndende-Doussala-Dolisie road is an important section of the international road linking the Republic of Congo and the Republic of Gabon via the South. The sector objective of the Project on Development and Paving of the Ndende-Doussala-Dolisie Road is to contribute to the buoyancy of the economies of the two countries by boosting trade between them and with other countries of the sub-region. Specifically, the project seeks to: (i) improve the effectiveness of the transport logistics chain and reduce transport costs of goods to make them more competitive on the local and international markets; and (ii) contribute to better living conditions and poverty reduction in towns and localities situated along the subject road.

This summary was prepared pursuant to the ADB Environmental and Social Assessment Guidelines and Procedures for Category I projects and the policies in force in the two countries.

1. **Political, legal and administrative framework**

1.1 **For the Republic of Congo**

1.1.1 **Legislative and regulatory framework**

Congo’s legal framework comprises a few key instruments governing the environmental impact assessment procedure, especially Law No. 003/91 of 23 April 1991 on environmental protection (being reviewed) which stipulates in Part I, section 2 that all economic development projects in Congo must comprise an ESIA. This law is supplemented by: (i) Decree No. 99-149 of 23 August 1999 laying down the organization and operation of the Environmental Protection Fund; (ii) Decree No. 98-148 of 12 May 1998 relating to the duties and organization of the General Directorate of the Environment that manages ESIA procedures; and (iii) Decree No. 2009-415 of 20 November 2009 fixing the scope of application, contents and procedures of assessment and the environmental and social impact notice. This arsenal is supplemented by other statutory instruments. For details, please refer to the project ESIA.

1.1.2 **Institutional framework**

Congo’s environment sector is supervised administratively by the General Directorate of the Environment (DGE), under the Ministry of Tourism and the Environment (MTE). Pursuant to Decree No. 98-148 of 12 May 1998 defining its duties and organization, the DGE is the technical organ that assists the supervisory Ministry in the discharge of its missions in this area. DGE has regional Environment Directorates which support the environmental selection process for projects to be implemented and participate in monitoring.

1.2 **For the Republic of Gabon**

1.2.1 **Legislative and regulatory framework**
Gabon’s Environment Code is a collection of legislative and regulatory instruments including Law No. 16/93 of 26 August 1993 on environmental protection and improvement and Decree No. 000539/PR/MEFEPEPN of 15 July 2005 regulating ESIAs. The main legislative instruments governing the management of forestry, mines, land and expropriations in Gabon are Law No. 16/2001 of 31 December 2001 instituting the Forestry Code, Law No. 05/2000 of 12 October 2000 instituting the Mining Code, Law No. 15/63 of 8 May 1963 laying down land tenure regulations and Law No. 6/61 of 10 May 1961 regulating expropriation for public utility, respectively. This arsenal is supplemented by other regulatory instruments. For details, please refer to this project’s ESIA.

1.2.2 Institutional framework

Gabon’s institutional framework on the environment comprises mainly the Ministry of Water, Forestry, the Environment and Sustainable Development, through the General Directorate of the Environment and Nature Protection (DGEPN) and supervisory institutions and bodies. DGEPN is represented at the grassroots by provincial services comprising provincial brigades grouped zonally. Decree No. 000539/PR/MEFEPEPN of 15 July 2005 regulating environmental impact assessments, was instituted by an Inter-ministerial impact assessment committee (CIEI) that assists the Ministry of the Environment in the administration and management of impact assessments. Other Institutions and bodies under the supervision of the Ministry of the Environment include: the National Antipollution Centre (CENAP), created by Ordinance No. 5/76 of 22 January 1976; the National Man and Biosphere Committee (MAB), created by Decree No. 815/PR/MRSEPN of 10 July 1978 and; the National Environment Council provided for by Decree No. 237/PR/MRSEPN of 4 March 1976.

1.3 For the African Development Bank (AfDB)

The key AfDB environmental safeguards applicable to the project are: (i) AfDB’s Environment policy (2004); (ii) the Bank’s Policy on Involuntary Population Displacement (2003); (iii) the Bank’s Gender Policy (2001); (iv) the Framework for Enhanced Engagement with Civil Society Organizations (2012); (v) the Disclosure and Access to Information Policy (2012); (vi) the Bank’s Integrated Water Resources Management Policy (2000); (vii) the Handbook on Stakeholder Consultation and Participation in ADB Operations (2001); (viii) Bank’s Policy on Poverty Reduction (2001); (ix) Bank’s Policy on Population and Strategies for Implementation (2002); (x) ADB Environmental and Social Assessment procedures for Public Sector Operations (2001).

2 Project Description and Justification

The project has the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
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<tbody>
<tr>
<td>ROAD WORKS</td>
<td><strong>Gabon</strong>: (i) Development of the Ndendé-Doussala section (49km); (ii) Works inspection and supervision; (iii) HIV/AIDS, environmental awareness and road safety campaigns.</td>
</tr>
<tr>
<td></td>
<td><strong>Congo</strong>: (i) Development of the Ngongo-Kibangou section (130km); (ii) works inspection and supervision; (iii) Development of the Kibangou-Dolisie section (93km); (iv) works inspection and supervision; (v) HIV/AIDS, environmental awareness and road safety campaigns.</td>
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**Gabon/Congo border:** (i) Development of border bridge and road linking it to the border (2km); (ii) works inspection and supervision.

**RELATED WORKS**

<table>
<thead>
<tr>
<th>Gabon</th>
<th>(i) Rehabilitation of 50 km of feeder roads to open up agricultural production zones; (ii) Rehabilitation of socio-economic infrastructure; (iii) Sinking of 4 bore holes; (iv) works inspection and supervision.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congo</td>
<td>(i) Construction of parking/rest area between Kayes and Moyombi; (ii) Rehabilitation of 57 km of feeder roads to open up agricultural production zones; (iii) Rehabilitation of socio-economic infrastructure; (iv) Sinking of 16 bore holes; (v) works inspection and supervision.</td>
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</tbody>
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**TRANSPORT AND TRANSIT FACILITATION**

(i) Functional study of single border check point (PCUF) and establishment of a corridor management system; (ii) Construction and equipment of a PCUF at the Gabonese border, including a weighing station; (iii) Works inspection and supervision, training of border services and education of users; (iv) Installation of a pilot goods tracking and radio-communication system on the Pointe Noire-Brazzaville section; (v) Study on harmonization of customs procedures in both countries.

**INSTITUTIONAL SUPPORT FOR THE TRANSPORT SECTOR**

<table>
<thead>
<tr>
<th>Gabon</th>
<th>(i) Technical assistance to executing agency; (ii) Road safety audit on the Lambaréné-Mouila paved section; (iii) Support for the General Directorate of Road Safety.</th>
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</thead>
<tbody>
<tr>
<td>Congo</td>
<td>(i) Feasibility study of Pointe Noire by-pass road;</td>
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<tr>
<td>CEEAC</td>
<td>(i) Technical assistance to ECCAS General Secretariat to implement the facilitation component.</td>
</tr>
</tbody>
</table>

**PROJECT MANAGEMENT AND MONITORING**

| Gabon/Congo | (i) Monitoring-evaluation of project impact; (ii) Financial and accounts audit; (iii) Operation of EAs; (iv) Operation of joint monitoring committee (CMS). |

The Project to Develop the Ndendé-Doussala-Dolisie Road and Facilitate Transport on the Libreville-Brazzaville-Pointe Noire Corridor is in line with both Governments’ avowed desire to strengthen regional integration while ensuring road links that are motorable all year round. The Ndendé-Doussala-Dolisie section is a key missing link of the Yaoundé-Libreville-Brazzaville corridor which is part of the Tripoli-Windhoek Trans African Highway. If this road is built, it will open up remote areas in Ngounié and Nyanga Provinces in Gabon and Niari Department in Congo. These provinces and department harbour extensive but unharnessed agricultural land due mainly to the poor state of transport infrastructure as well as huge mineral deposits and natural forest reserves. The facilitation measures (single border check point, lifting of non physical barriers, etc) that will accompany the project will induce a substantial increase in the volume of trade (mostly agricultural and pastoral products) between the two countries and lead to a drop in transport costs.

### 3. Description of project environment

#### 3.1 Biophysical environment

**3.1.1 Physical environment**

The project area (South-West of Congo and South-East of Gabon) has a tropical humid climate. The rainy season lasts about eight (08) months from October to May, interspersed by a small dry season of roughly one month (from mid-January to mid-February). The dry season is from June to September, or 3 to 4 months. Rainfall ranges between 1,200mm to 1,600 mm yearly, with slightly more abundant rains towards the Gabonese border where the mean hardly drops below 1,500 mm (Tchibanga station). Mean annual temperatures in the project area are around 24°C.
The relief of the area is dominated by three landmarks: the forest-clad Mayombé massif, the Chaillu massif bordering the South-East of Gabon and the Niari Valley made up of savannah plains. The Niari-Nyanga depression, the south-east extremity of a vast north-westerly/south-easterly syncline, thrusts into Gabon’s territory with a maximum extension. Limestone zones in this syncline lie in the crest of this landscape of gently undulating plains.

The project area lies mainly in the basin of Kouilou-Niari, a tributary of the Congo River. This basin covers an area of 55,340 km\(^2\) in the South Wester of Congo. The greatest collector is Kouilou River, called Niari in its middle course and Ndouo in its upper course. The hydrological regime is closely linked to the rainfall regime and follows its variations.

At the hydro-geological level, the project area is dominated by the aquifers of River Congo’s sedimentary basin (secondary, tertiary and quaternary) and the coastal sedimentary basin (secondary, tertiary and quaternary). These aquifers are formed mainly of loose, unconsolidated sedimentary rocks with interstice porosity. These are generalized aquifers situated at depths of 28m to 200 m. The geological substratum is dominated by two major formations: the schistocalcareous series and the schisto-sandstone series (lower level called Mioka series). The soil is mostly of the highly saturated ferralitic class of the clayey-sandy type.

### 3.1.2 Biological environment

The project area has two types of vegetation: a tree and bush savannah (a degraded savannah in actual fact, with a few dotted trees here and there) in the Centre and South of Niari Department and the rainforest in the northern part of Niari extending into Gabonese territory. Gallery forests are found along watercourses crossed by the road between Doussala and Dolisie. Several wildlife reserves and hunting areas were inventoried in the project area:

- **Mount Fouari wildlife reserve:** Created in 1958, it had a surface area of about 15,600 ha and extends from Moungoundi at Ngongo through Gabonese territory to Doussala, with ample savannah and forest biomass. The dominant wildlife in the reserve is *Cob défassa* or horse antelope (Tsoungou). Elephants (*Loxodonta africana*), buffaloes (*Caffer Caffer*) and the harnessed bushbuck (*Kabi*) are also found therein. There has been an inter-state project (Congo, Gabon, DR Congo and Angola) in the pipeline since 2009 to transform this reserve into a transboundary protected area (TPA) with the financial support of Norway and technical assistance of IUCN and PNUE-GRASP;

- **Nyanga-North wildlife reserve:** Created in 1958, it has an area of about 7,700 ha and stretches from Nyanga bridge at Mbengué village (Longana junction) into Gabonese territory. Wildlife and fish here include buffaloes, elephants, kob antelopes, harnessed bushbucks, chimpanzees and large fish in River *Nyanga* and its tributaries;

- **Mount Mavoumbou hunting area:** Created in 1958, it stretches from Mbengué to Moungoudi over an area of 42,000 ha. The dominant wildlife species are: the kob antelope (Tsoungou), elephants (*Loxodonta africana*), buffaloes (*Caffer Caffer*), bushbucks (*Kabi*), bush pigs (*Potamochoerus porcus*), sitatunga, and chimpanzees.

- **Nyanga-South hunting area:** Created in 1958 on about 23,000 ha, it stretches from the Nyanga Bridge at Batsengui into Gabonese territory. Buffaloes, kob antelopes, chimpanzees and other animals are found there.

- **Tsoulou wildlife reserve:** This reserve forms a triangle between Kibangou, Makabana and Yénéganou localities.
- **Conkouati wildlife reserve**: It is situated in the far South of Congo and stretches to the Gabonese border close to Ndindi village in Gabon.

### 3.2 Human and socio-economic environment

#### 3.2.1 Population

##### 3.2.1.1 Republic of Congo

The population of Congo in 2010 stood at 3,990,516, comprising 1,967,538 men (49.3%) and 2,022,978 women (50.7%). It will reach 4,502,913 in 2015, comprising 2,217,063 men (49.2%) and 2,285,850 women (50.8%). With a surface area of 25,941.7 km², Niari Department, the direct project impact zone (figure 1), had a total population of 249,597 in 2010, comprising 122,007 men (48.9%) and 127,591 women (51.1%). Niari Department is a mosaic in terms of its population. The ethnic groups are found along the Dolisie-Doussala road are the Tekes (most numerous group), Punus, Lumbus, Nzebis, Nzebis, Kunis, Kota and others.

##### 3.2.1.2 Republic of Gabon

In 2005, the population of Gabon was estimated at 1,587,685, representing a population density of 5.9/km². The sex ratio is 0.9, comprising 48% men against 52% women. The project’s direct impact zone in Gabon is NGOUNIÉ Province which has a population of 101,415. Only Dola District, whose headquarters is Ndendé, will be affected directly by the project. It hosts the Doussala single border check point (PCUF) and 49 kilometres of the Ndende-Doussala-Dolisie road. This district had a population of 10,000.

**Figure 1**: Map of Project Area
3.2.2 Socio-economic profile of the project area

3.2.2.1 Republic of Congo

Over 50% of Congolese live below the poverty line estimated at CFAF 544.40 per adult per day. The incidence of poverty is highest in semi-urban areas (67.4%), followed by rural areas (64.8%) and other councils or communes (58.4%). In terms of health, malaria is the leading cause of morbidity/mortality in Niairi Department. In 2010, 5,130 cases of malaria were reported, 2,830 of them in Dolisie, 1,213 in Kibangou and 1,087 in Mossendjo. The health situation is marked by a resurgence of erstwhile controlled epidemics (tuberculosis, sleeping sickness, bilharzias) and the alarming spread of HIV/AIDS, whose prevalence is estimated at 4.2%, ranging from 1.3% in Impfondo to 9.4% in Dolisie. Congo’s education system is characterized by a high percentage of illiterate people (90% of them men aged 15-59 years against 78% women aged 15-49 years). School attendance is high with a gross enrolment ratio of over 100% and a net ratio in the neighbourhood of 87%. Although Congo has several watercourses (rivers, streams, lakes), access to drinking water and sanitation facilities is unsatisfactory (some localities have no potable water). Sanitation problems are seen at the level of the disposal of effluents, solid wastes, run-off and human excreta.

3.2.2.2 Gabonese Republic

In Gabon, in terms of social organization, over one in four people live in a household headed by a woman. In over eight out of ten cases, these women heads of households are either single, widows or divorcees. Poverty seems to be harsher in households headed by a woman than those headed by a man. In households headed by a woman, the incidence of poverty is 37% against 31% for those headed by a man. With regard to sanitation, Gabon is characterized by a good geographic coverage of the country, which is a key factor of accessibility to health institutions. However, the prevalence of HIV (8.1%) remains alarming: not only is it higher than the sub-Saharan average (7.7%) but it is also clearly higher than in developing countries (1.2%). At the level of education, the net rate of primary enrolment is evaluated at 92% for the whole country. Girl/boy parity (93% against 92%) is observed, showing that gender is not an issue in access to this level of education in the country.

Overall, Gabon is characterized by a particularly high access rate to drinking water (82.5% of households), especially in urban areas. The detailed analysis reveals that significant disparities exist, biased especially against rural areas where surface water still represents the main source of supply for 59.3% of households. In the country as a whole, only 22% of households have a water system WC. Hardly a quarter of households (25.9%) are equipped in urban areas, the percentage dropping to 6.3% in rural areas.

3.2.3 Economic Activities

In all, the industrial sector in Congo and Gabon (mainly comprising extractive, manufacturing, building and construction industries), remains dominated by the oil industry which plays a very important role in the economy.

4. Alternative solutions considered

4.1 No-project Option

By not implementing the project, the choice will be to leave the road in its current state. This option has the advantage of preserving plants that would otherwise be destroyed, not disturbing
the peace of wildlife, not destroying private property, avoiding relocating tombs and not exposing the population to the risks of accidents and spread of HIV/AIDS. The no-project option will lead to stagnation, or regression of the process of local development. This will be seen, *inter alia*, in: persistent difficulties to travel and access socio-economic infrastructure; persistence of road accidents due to the advanced state of degradation of the road; loss of job opportunities for local manpower on works sites and for the emergence of income-generating activities (IGA) induced by the good state of the road; the loss of missed opportunity to develop economic exchanges.

4.2 Option avec project

Three site variants were studied for: (i) the bridge on Niari River; (ii) the bridge on Nyanga River and (iii) the Single Border Check Point (PCUF) between Congo and Gabon.

4.2.1 Variants on NIARI River

- Variant No. 1 is the current road’s basic itinerary. Its development will not require widening the current right of way. Overall, the planned itinerary is confined to the current route. Thus, the environment will be disturbed only slightly.

- Variant No. 2 is situated to the North of variant No. 1 about 350 metres from the existing bridge. For this variant, a deviation measuring a total linear distance of about 1,300 metres will constitute a new itinerary. A new platform will be opened, requiring clearing, deforestation and felling of several trees in the new right of way. Some farms were noted in this uninhabited section.

- Variant No. 3 is situated to the North of variant No. 2 about 1,050 metres from the existing bridge. For this variant, a deviation measuring a total linear distance of about 2,900 metres will constitute a new itinerary. As in variant No. 2, a new platform will be opened, requiring clearing, deforestation and felling of several trees in the new right of way. Some farms were observed since the zone is uninhabited.

After analysis and discussions of project partners (Congo, Gabon, ECCAS and ADB), variant No. 2 involving the construction of a new bridge on Niari River was chosen – a choice that was motivated by geometric (straighter itinerary), financial (shorter distance of roadway) and environmental considerations.

4.2.2 Variants on Nyanga River

- Variant No. 1 consists of the current road’s basic itinerary. Its development will not require widening the current right of way. Overall, the planned itinerary is confined to the right of way of the current road;

- Variant No. 2 is situated to the North of variant No.1 (very close – about 10 m – from the existing bridge). This variant is characterized by a long deviation of a total linear distance of about 1,400 metres coming from Dolisie. Some houses will be affected towards the end of the deviation.

- Variant No. 3 is situated just to the North of variant No.1 (very close – about 40 metres – from the existing bridge). This variant is characterized by a long deviation of a total linear distance of about 1,950 metres coming from Dolisie. Thus, a new platform will be opened,
leading to bush clearing, deforestation and felling of several trees in the new right of way. As in other deviations, no farms were observed. In contrast, some houses will be affected towards the end of the deviation and some undeveloped land.

After analysis and discussions of project partners (Congo, Gabon, ECCAS and ADB), variant No. 2 involving the construction of a new bridge on Nyanga River was chosen. Here also, the choice stemmed from geometric (straighter itinerary), financial (shorter distance of roadway) and environmental considerations.

4.2.3 Variants of the Single Border Check Point (PCUF)

- **Site No.1: PCUF on Gabonese territory**: This site is at the border on Gabonese territory, nearly 700 metres from the border-bridge. It is positioned just after Gabon’s military station. An area of about 12 hectares was identified for planned works.

- **Site No. 2: PCUF on Congolese territory: Ngongo village**: This site is found on Congolese territory at the level of border-bridge and will occupy the entire Ngongo village which will be relocated. The same land area, 12 hectares, was identified for planned works. Overall, the site will take up Ngongo village, further extending northward and southward. It will be bounded to the West by the border barrier;

- **Site No. 3: PCUF on Congolese territory: South of Ngongo village**: This site is found on Congolese territory, some 1.3 kilometre to the South of Ngongo village, on the road coming from Dolisie. The same 12 hectares were identified for the planned works. Access to the site will be from the Dolisie road via a ramp leading directly to the PCUF site;

- **Site No. 4: PCUF straddling the States of Gabon and Congo**: This site will comprise half of site No.1 and half of site No. 3. Part of works will be carried out on Gabonese territory and part on Congolese territory. An area of eight (8) hectares is envisaged for works on each site. On the Congo side, access to the site will be from the road from Dolisie via a ramp leading directly to the site.

Given the configuration of these sites, it is noteworthy that for sites No. 1, 3 and 4, barring a few trees to be felled for the construction of infrastructure, all environmental impacts will be minor and reversible provided mitigation measures to be defined in the Environmental and Social Management Plan (ESMP) are applied. In contrast, site No. 2 consisting in displacing the entire village, will generate quite significant impacts for the human and general environment. In fact, the population of Ngongo village has lived there for several generations and knit close bonds with the natural environment.

Based on the technical, economic, environmental and social feasibility of the three variants considered in each case, the final option selected by the Contracting Authority is the Doussala-Gabon/Congo border - Nyanga - Kibangou – Dolisie road, with a bridge on Niari River (variant No. 2), a bridge on Nyanga River (variant No. 2) and a Single Border Check Point (PCUF) completely situated in Gabonese territory (variant No. 1).

5. Potential impact and mitigation and reclamation measures

Impacts and mitigation measures were identified based on the ESIA and ESMP conducted in the two countries.
5.1 Positive impact

5.1.1 Works phase

The project will generate positive multi-dimensional impacts in terms of job-creation for the local populations and the development of works-related income-generating activities (catering, petty trading, etc.) especially for women.

5.1.2 Operation phase

The project’s main positive impacts on the bio-physical and socio-economic environment include: (i) the disappearance of air pollution by dust due to unpaved road; (ii) better movement of forestry agents during the discharge of their duties of protection of wildlife and plants; (iii) better access to socio-economic infrastructure; (iv) development of transport-related income-generating activities (catering, commerce, etc.), particularly within the vicinity of PCUF; (v) higher revenue for transporters; (vi) better shipment of agro-pastoral and fishery products; (vii) easier access for NGOs and farmers’ supervisory structures; (viii) lower transport costs and time gains for road users; (ix) lower cost of manufactured products; (x) greater Gabon/Congo population mix; (xi) enhanced value of local handicrafts and easier access to tourist sites in the project area; (xii) improvement of the quality of life for children, women and men through lightening of their workload in terms of transporting agricultural products towards sale points.

5.2 Negative impacts

Works phase

The project’s most significant negative environmental impacts during the implementation phase include: (i) The destruction of property including 254 buildings in 36 villages, the displacement of 1,106 graves in 28 localities, the felling of 1,678 planted fruit and non-fruit trees in 47 villages. In all, 1,024 people will be affected; (ii) Air pollution by dust and smoke generated by works; (iii) The risk of soil and water pollution by liquid and solid wastes from works sites; (iv) The degradation of the quality of surface water to the right of the Niari and Nyanga bridges; (v) the risk of silting of watercourses and disruption of the hydrological regime; (vi) the destruction of plants in the road right of way, the surrounding area of installations, borrow and the right-of-way of access roads to borrow; (vii) the destruction of animal habitats and birds’ nests due to felled trees and trampling by equipment; (viii) disturbance of the peace of animals by construction noises and wildlife crossing road sections; (ix) noise pollution by equipment mobilized for the construction of the road and PCUF; (x) the risks of accidents and drowning by employees during works; (xi) higher risk of accident for the local populations (mostly children); (xii) the risk of spread of STIs and AIDS due to population mix; (xiii) the risk of modification of the drainage of agricultural land.

Operation phase

The project’s most significant negative environmental impacts are: (i) air pollution by exhaust fumes generated by additional traffic (GHG emissions); (ii) the risk of modification of land drainage; (iii) the risk of erosion of bare zones (borrow, quarries, temporary roads, etc) and washout at bridges and other water management facilities; (iv) the risk of disruption of the
hydrologic regime and resizing of water courses; (v) increased pressure on plant resources and wildlife; (vi) disturbance of the peace of animals caused by traffic noises; (vii) disturbance of the crossing of wild animals (presence of high embankments, deep cuts, traffic, etc.); (ix) noise pollution caused by traffic noises; (x) the risk of more accidents.

5.3 Cumulative Impacts

The main cumulative impacts stem from the simultaneous and/or short-term implementation of other projects in the same area, including: (i) the tarring of the Dolisie-Brazzaville section of Congo’s NR1 whose works are far advanced; (ii) the paving of the Mila Mila-Makabana-Mossendjo road in Congo whose technical studies will start very soon; (iii) the paving of the Ndendé-Doussala section (about 45 km) in Gabon whose design studies have just been updated (2012) for an imminent start of works; (iv) SAMLO, a smelting plant, initiated by Mauritius business operators, on the former FERCO site, 14 km from Dolisie, expected to start in 2012; (v) a private tomato processing and packaging company, 6 km from Dolisie, on the Kimongo road, expected to start in 2012; (vi) ASIA-CONGO (former SOCObA), a logging company; (vii) FORELA, a large Makabana-based company specialized in processing wood-veneer and plywood. In both the works and operation phases, air pollution will be slightly amplified by the presence of several projects in the project area. No significant cumulative impact is expected on soils. Positive cumulative impacts linked to marketing of agro-pastoral and fishery products will be enhanced by other projects identified in the area.

5.4 Environmental and social measures

5.4.1 Measures to mitigate and/or offset negative impacts

The following measures are envisaged to mitigate and/or offset the project’s negative impact on the bio-physical and socio-economic environment: (i) compensate all PAPs, before start-up of works; (ii) sprinkle water on road sections under construction, deviations and access roads to borrow sites; cover priming materials stored or being transported to avoid dust flying; (iii) set up bitumen preparation sites away from population centres and ensure proper maintenance of vehicles and equipment; (iv) plant trees along the road where it crosses population centres; (v) replant vegetation on borrow sites, quarries, deviations and other temporary roads after their physical rehabilitation; (vi) establish living and logistics bases, depots and the contractor’s other related facilities in places with less plant cover; (vii) implement anti-erosion measures at crossing structures of water courses; (viii) undertake water management works outside the period of high water; (ix) collect effluents and special wastes for recycling or elimination through appropriate methods; (x) build concrete platforms equipped with sumps for collecting oil and grease used in maintaining and washing equipment; (xi) provide for hydrocarbons separators in drainage networks associated with washing facilities; (xii) comply with standards for the discharge of effluents in surface water; sort and store inert and other wastes considered as household waste in storage places identified jointly with the engineer and competent authorities; (xiii) properly size, brace and maintain water management works to minimize disturbances to the hydrologic regime, and not reduce the flow area to over a third if coffer dams are laid; (xiv) limit the movement of motorized equipment and the destruction of vegetation in the right of way needed for works; (xv) intensify the fight against poaching and illegal forestry exploitation; (xvi) trace access roads to borrow sites; (xvii) formally avoiding areas sensitive to erosion, thickly wooded areas and areas of concentration of wildlife; (xviii) forbid employees of the Contractor and the Control Mission from hunting, buying, selling and transporting products of hunting; (xviii) identify,
develop and properly signal wildlife crossing points in consultation with the resident populations, local authorities and local forestry services.

In addition to the above measures, it will be necessary to: (i) strictly apply programmes for the upkeep and maintenance of site equipment; (ii) reduce the period of workers’ exposure to noise by modifying the distribution of time spent at noisy work stations; (iii) set up beacons and road signs on different sites and public establishments to restrict road accidents; (iv) provide workers with suitable individual protective equipment (boots, dust- and noise-filtering masks, helmets, etc.) ; (v) inform and sensitize labourers and the local populations on risks related to STIs and HIV/AIDS using a gender-differentiated approach; (vi) set up provisional speed-breaks during works; (vii) sensitize students and users of water courses on road safety; (viii) build fences round schools and health centres situated at less than 100 m before road works start; (ix) design and implement a Hygiene, Health and Safety plan at the works site; (x) prepare an emergency intervention plan and regularly test it to limit damage in case of accident/incident; (xi) obtain the agreement of the other users before commissioning a multi-purpose bore hole; (xii) ensure at all times that labourers coming from elsewhere do not violate women and other vulnerable people.

5.4.2 Measures to enhance positive impacts
The advocated measures for enhancing the project’s positive impacts are the following: employ in priority the skilled and unskilled workers coming from the project area; give preference to the residents of resident communities and PCUF during recruitment of unskilled manpower; as far as possible, procure essential goods from local traders; mainstream gender during recruitment of labourers; regularly inform local authorities of unskilled job opportunities; comply with the Labour Codes of Congo and Gabon; arrange to include in the supervision team a suitably qualified gender expert to ensure that the rights of men and women, particularly vulnerable segments, are defended; provide women with technical, financial and organizational support to help them better capitalize on IGA opportunities linked to the presence of the paved road and PCUF; periodically maintain the road and PCUF to sustain the project’s positive impacts.

6. Environmental risk management

6.1 Risk analysis
Environmental risks during the construction phase of the road are linked mainly to accidental spills of petroleum and bituminous products, explosives and other substances used in road construction or the uncontrolled disposal of their residues. Fire remains the major risk as it can cause enormous damage. It can originate from a variety of sources: a short-circuit in electrical installations, human negligence such as forgetting to snuff out a cigarette stub, two vehicles colliding, workers illegally siphoning fuel, etc.

The environmental risk during the operation phase of road structures is mainly linked to accidental spills of petroleum and other chemical products being transported. Such spills are largely caused by road accidents which also claim many human lives. With better traffic conditions for heavy-duty trucks, especially tankers, the risk of accidents due to the carelessness of the rural populations is feared. In fact, accidents involving trucks transporting inflammable products have caused numerous dramatic situations in Africa.
6.2 Safety measures

To limit the risks or effects of accidents, the Contractor should take the following measures: fence off the different bases and regulate access before the start of works; set up beacons and road signs at works sites to restrict road accidents; provide workers with suitable individual protection equipment (safety boots, helmets, dust- and noise filtering masks, gloves, safety harness against falling, etc.); constantly supervise the handling of dangerous substances; store dangerous substances in air-tight containers at secured storage places away from weathering. Keep storage areas under lock and key and check the inventory of these substances; respect the speed limits of 20 km/h at work sites and quarries, 35 km/h in temporary deviations, 80 km/h in open country and 40 km/h in population centres; raise barriers to prevent the public and foreign bodies from entering works sites; work out how vehicles move inside sites and on the road under construction; design and build installations for works, transportation, loading, offloading and storing materials so as not to undermine safety; sufficiently light up the site and surrounding areas to prevent any risk of accident and facilitate the intervention of safety teams; clean scaffolds, passages, bridges, platforms, stairs, stepladders, etc by appropriate means (with sand or salt, etc) to render them unslippery at all times; set up heating and lighting fixtures and depots of easily inflammable or explosive materials to prevent the danger of fire, explosion and choking; forbid smoking in areas and premises where inflammable or explosive materials are deposited or used; execute engineering structure and water management works during low water period if possible; avoid working in population centres on weekly market days.

During the operation phase, it is necessary to: ensure the upkeep of road signs in population centres and areas crossed by animals; call in the police to prevent traders from invading the road in localities with markets; carry out Information, Education and Communication (IEC) actions targeting the resident populations on risks linked to handling of inflammable products.

6.3 Emergency Intervention Plan (PIU)

The emergency intervention plan indicates steps to be followed in managing unforeseen and sudden situations. It aims to limit possible consequences of urgent situations and hence prevent fatal accidents and injuries, reduce damage to site equipment and speed up the resumption of normal activities.

During the works phase, the substantive contractor will prepare an emergency intervention plan factoring in, especially: the Works Manager formally committing to his employees’ safety; sensitization and training of all workers on compliance with safety instructions; formation and training of a safety team ready to intervene at any moment; equipment of the site with safety products and mechanisms (mini pharmacy, extinguishers, etc.); signing of an emergency intervention contract with local hospitals and fire brigade services; providing all workers with a toll-free health telephone number; the conduct of periodic exercises/simulations on the implementation of the emergency plan to guarantee adequate management of emergencies.

In the operational phase of the Ndende-Doussala-Dolisie road, emergencies will be managed by specialized local services in Congo and Gabon: fire brigade, Red Cross, Gendarmerie, Police, etc. With regard to PCUF, the concessionary company will recruit an Environment, Health and Safety Officer who will prepare and implement the PIU, taking into account the real material, financial and human resources. The PIU should be updated and tested once yearly.
7. Environmental and Social Monitoring Programme

Environmental monitoring seeks to ensure that environmental safeguards are effectively complied with before, during and after works. Concretely, this will involve: checking whether all socio-environmental measures identified during various project phases are implemented and whether regulations concerning elements of the environment (air, soil, water, wildlife, plants, wastes…) are complied with.

It is noteworthy that the environmental and social measures advocated in ESMP will be effectively implemented only if they are not consigned in the works Contractor’s contract. The General Secretariat of the Economic Community of Central African States (ECCAS) responsible for supervising works on behalf of the Government of the Republic of Congo and the Government of the Republic of Gabon is tasked primarily with ensuring that the socio-environmental measures advocated in ESMP are implemented, by including them in the Contractor’s contract.

The Contractor is responsible for the effective and efficient application of environmental prescriptions imposed on him by his contract. To be more operational, it should have an internal “environment unit” tasked with compliance with technical environmental clauses after identifying the most delicate environmental constraints on his site, mainstreaming environmental surveillance in the site logbook and serving as interface between the Control Office and the Contracting Authority on environmental and social issues.

The Control Office, recruited by the Contracting Authority, will have an internal Environmentalist to conduct everyday environmental surveillance. Under the authority of the Head of Control Mission, the Environmentalist will ensure the effective implementation of all contractual environmental and social measures, in consultation with local technical services.

Environmental monitoring is an activity of short-, medium- and long-term observations and measures to determine the real and most alarming project impacts compared to expected impacts listed at impact assessment in order to adjust the recommended mitigation measures as appropriate. During works and operation phases, it has to do with indicators related to the trend of sensitive characteristics of some impact receptors affected by the Project, especially: (i) soil degradation; (ii) the quality of surface water; (iii) the degradation/restoration of plant life; (iv) the disturbance of wildlife; (v) the health and safety of the population; (vi) compensation and relocation of displaced populations, etc.

During the works phase, social and environmental aspects are monitored by the Environmentalist/Expert of the Control Mission who reports on a monthly basis to ECCAS, the General Delegation for Major Works (DGGT) in Congo and the General Directorate of Transport Infrastructure (DGIT) in Gabon. In addition to Control Mission services, internal monitoring will be performed by a committee comprising a representative of the environmental units of ECCAS, Congo’s DGGT and Gabon’s DGIT. This committee will prepare a plan to monitor the project’s most preoccupying impacts in order to highlight the real effects on environmental components and validate fears expressed in the impact assessment. This plan will include a definition of environmental and social monitoring indicators helping to observe trends based on previously defined objectives. Table 1 below presents in detail the elements of environmental monitoring.
In the operation phase, the PCUF will be monitored internally by its manager who will recruit an Environment, Hygiene, Health and Safety (EHSS) Officer.

Additionally, external monitoring will be conducted during and after works by an agency authorized by each of the two countries: the General Directorate of the Environment (DGE) in Congo and the General Directorate of the Environment and Nature Protection (DGEPN) in Gabon.

**Table 1: Elements of Environmental Monitoring**

<table>
<thead>
<tr>
<th>Impact Receptor</th>
<th>Monitoring Elements</th>
<th>Monitoring Indicators (as a guide)</th>
<th>Monitoring Officer</th>
<th>Monitorin g Period</th>
<th>Monitoring Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Pollution</td>
<td>Scale of flying dust</td>
<td>Monitoring committee</td>
<td>During works</td>
<td>Monthly</td>
</tr>
<tr>
<td>Soil</td>
<td>Erosion</td>
<td>Washout from borrow and quarries. Scouring at the level of structures during the operation phase.</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Monthly during works phase Half yearly during operation phase</td>
</tr>
<tr>
<td></td>
<td>Pollution</td>
<td>Soil contamination Soil property</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Monthly</td>
</tr>
<tr>
<td>Water</td>
<td>Pollution</td>
<td>Content in heavy metals, conductivity, PH, organic matter</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>Quantity</td>
<td>Availability of water</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Half yearly</td>
</tr>
<tr>
<td>Plant and wildlife</td>
<td>Vegetation of compensation</td>
<td>Success rate of reforestation</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Half yearly</td>
</tr>
<tr>
<td></td>
<td>Disturbance of wildlife</td>
<td>Change in the behaviour of wild animals Frequency</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Quarterly during works phase Annually during operation phase</td>
</tr>
<tr>
<td>Health and safety</td>
<td>IRA, STD, HIV/AIDS</td>
<td>Rate of prevalence</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Monthly during works phase Annually during operation phase</td>
</tr>
<tr>
<td>Health and safety</td>
<td>Accident</td>
<td>Number of accidents during works phase</td>
<td>Monitoring committee</td>
<td>During works</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of accidents during operation phase</td>
<td>Monitoring committee</td>
<td>After works</td>
<td>Monthly</td>
</tr>
<tr>
<td>Compensation for lost property</td>
<td>Destruction of public and private buildings</td>
<td>State of compensation of people affected by works</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Monthly during works phase and annually during operation phase</td>
</tr>
<tr>
<td>Employment</td>
<td>Job creation Improvement of incomes</td>
<td>Number of jobs created Average income in communes concerned by the project.</td>
<td>Monitoring committee</td>
<td>During and after works</td>
<td>Monthly for employment Annually for middle income</td>
</tr>
</tbody>
</table>
8. Cost Estimates

The total cost of environmental and social measures of the Project to Develop and Pave the Ndende-Doussala-Dolisie Road and Develop the Single Border Check Point stands at CFAF 2.289 billion, dominated by health preservation and safety costs, 32.9% (753.5 million), followed by internal and external monitoring costs, 32.3% (740 million) and the cost of wildlife and flora preservation measures, 21% (482 million). These costs are detailed as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Total Cost (CFAF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Planting of trees</td>
<td>132,000,000</td>
</tr>
<tr>
<td>2</td>
<td>Health preservation and safety</td>
<td>753,500,000</td>
</tr>
<tr>
<td>3</td>
<td>Measures concerning soil reclamation and rehabilitation</td>
<td>PM</td>
</tr>
<tr>
<td>4</td>
<td>Measures to preserve wildlife and manage man-fauna conflicts</td>
<td>200,000,000</td>
</tr>
<tr>
<td>5</td>
<td>Measures against illegal logging</td>
<td>150,000,000</td>
</tr>
<tr>
<td>6</td>
<td>Mitigation of impact on trade</td>
<td>100,000,000</td>
</tr>
<tr>
<td>7</td>
<td>Compensation for affected properties</td>
<td>PM</td>
</tr>
<tr>
<td>8</td>
<td>Enhancement of positive impacts on women and vulnerable groups</td>
<td>80,000,000</td>
</tr>
<tr>
<td>9</td>
<td>Enhancement of positive impacts on tourist activities</td>
<td>78,000,000</td>
</tr>
<tr>
<td>10</td>
<td>Building of stakeholders’ capacities</td>
<td>55,700,000</td>
</tr>
<tr>
<td>11</td>
<td>Internal and external monitoring</td>
<td>740,000,000</td>
</tr>
<tr>
<td>12</td>
<td>Maintenance of works</td>
<td>PM</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,289,200,000</td>
</tr>
</tbody>
</table>

9. Public consultations and dissemination of information

Pursuant to ADB environmental and social policies and Congolese and Gabonese regulations governing environmental and social impact assessment (ESIA), the population of the project area, technical services and local associations were informed and consulted during the conduct of this study. The views collected were taken into account in assessing the impacts and defining environmental and social impacts.

9.1 Project information

The presidents of Niari (Congo) and Dola (Gabon) Departmental Boards; the mayors of Dolisie (Congo) and Ndendé (Gabon) City Councils; the mayor of Kibangou City Council; the Préfets of Louvakou, Kibangou and Nyanga Districts, the Préfet of Dola Department and the relevant technical services of Niari and Dola Departments were consulted during the conduct of this project. All persons and services met were informed well in advance of the Project to Develop and Pave the Ndende-Doussala-Dolisie Road. Some were visibly skeptical since the two governments had announced the project several times decades ago. Between September 2011 and March 2012, the Consultant informed, counted and sensitized people living or working in the project right-of-way. All village chiefs and members of village committees were consulted. Public consultations were organized in Louvakou, Kibangou, Nyanga and Ndendé from 19 to 22 March 2012. These sessions meant to inform the public and obtain their views on the project brought together the Consultant, administrative and local authorities, local and departmental technical services, women’s associations and many other people. An official start-up workshop was organized in Dolisie in November 2011. During the workshop, the views and
recommendations of representatives from the two countries, ECCAS, CEMAC and the ADB on the study methodology were obtained. The ADB mission to the project area in May 2013 organized public consultations in Louvakou, Kibangou, Nyanga, Ngongo and Doussala with the population and the Government departments.

The resident population and socio-economic stakeholders expect that the Doussala-Dolisie road development project will have advantages and disadvantages; but the former outweigh the latter.

They are mainly worried about the destruction of sacred sites and graves. In fact, the current itinerary crosses many human settlements, skirting cemeteries and isolated graves. In some cases, these sacred sites will have to be displaced, but in others, they could be avoided. The other disadvantages dreaded by the recipient populations are: the risk of a hike in the prices of foodstuffs; uncertainty that jobs will be created for the local people given that non mastery of migratory flows; the risk of undermining local customs and traditions; the risk of the spread of STIs and HIV/AIDS consequent on massive influx of workers on the works site; the risk of an increase in road accidents due to vehicles over-speeding on the paved road; the risk of greater sexual promiscuity among young girls. To mitigate or offset the above negative impacts, the populations living along the road recommend, inter alia: the organization of sensitization sessions on the consequences of deforestation (71.2%), on STI/HIV/AIDS (67.3%) and on road safety (15.4%) involving NGOs, various associations, Government departments and technical services; the erection of road signs in the population centres crossed (53.5%); the building of speed-breaks in localities crossed and the setting up of a road surveillance brigade.

For the resident population, it is out of question to change the itinerary in case of reduced right of way. They opt for destroying houses and other infrastructure in the road right of way and compensating the victims (96.2%). Information on property affected based on the variants selected is indicated in the Comprehensive Resettlement Plan (CRP) attached as Annex 1 of this summary.

The process of consultation of the population should continue during project design and implementation, especially: (i) during installation of works sites and works; and (ii) during monitoring of ESMP implementation.

10. Climate change

Main challenges: Flooding is the single climatic risk that affects the most people in Congo. Thus, the project is likely to contribute to worsening the risk of floods (road block effect), GHG emissions (destruction of the equivalent of 607 ha of plant cover, exhaust gases from engines during works phase and additional traffic during operation phase).

Adaptation measures: Water management structures were sized and braced to minimize the risk of floods. Nevertheless, it is indispensable to: prevent people from settling or carrying out economic activities in the neighbourhood of these structures; institute a rising-water forecast system by placing a warning station on engineering and water management structures. With regard to the risk of floods, it is necessary to regularly clean gutters and unclog culverts to mitigate the road block effect.

Mitigation measures: Mitigation measures mainly concern: (i) the fight against illegal forestry exploitation while preserving the local peoples’ right to exploit and live off forestry resources in a
sustainable manner; (ii) the planting of trees to demonstrate the net positive gain compared to what was destroyed by works.

11. Additional initiatives

Based on the wishes expressed by the local authorities and resident populations, the following related works are proposed to improve the social and environmental acceptability of the Project to develop and pave the Ndende-Doussala-Dolisie Road and Build the Single Border Check Point:

- Development of about 80 km of related roads to the main road to facilitate access to agricultural production zones and socio-economic infrastructure;
- Construction of classrooms and latrines equipped with wash-hand basins in some schools of the main villages crossed by the road;
- Construction of standpipes in schools and health-centres not yet having one;
- Providing women’s associations and youth groups with light agricultural equipment and materials;
- Distribution of treated bed nets to vulnerable persons in the project area.

12. Conclusion

The Environmental and Social Impact Assessment conducted along the entire Doussala-Dolisie inter-state road itinerary and on the site of the Single Border Check Point (PCUF) reveals that the realization of the project will certainly have potential negative impacts on the biophysical and human environments. But these negative impacts will have no major irreversible ecological impact both on the immediate project area and in neighbouring areas because they can be kept within reasonable technical and financial limits or sometimes offset by adequate corrective measures stated in the proposed ESMP. There are no major ecological and social modifications to justify the non implementation of the project. The project, as designed, is ecologically viable, socially justified and compliant with the socio-economic development strategies and policies of the Governments of Congo and Gabon on the one hand, and the Economic Community of Central African States (ECCAS), on the other.
13. **References and Contacts**


b. ESIA Report of the Project to Develop and Pave the Doussala-Gabon/Congo border-Nyanga-Kibangou-Dolisie Road and Facilitate Transport on the Libreville – Brazzaville Corridor, June 2013


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