



AFRICAN DEVELOPMENT BANK GROUP

PROJECT : DAKAR TOLL ROAD - PHASE 2

COUNTRY : SENEGAL

**EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT**

**DAKAR TOLL ROAD PROJECT - PHASE 2
DIAMNIADIO-AIBD SECTION**

April 2014

Summary of the Environmental and Social Impact Assessment

Name of the project: DAKAR TOLL ROAD - PHASE 2
Country: SENEGAL
Project number: P-SN-DB0-018

1. Introduction

This document summarizes the report of the Environmental and Social Impact Assessment (ESIA) completed within the framework of Phase 2 of the Diamniadio-AIBDAIBD section of the Dakar toll road project.

The Dakar/Thiès highway project is in line with the government of Senegal's aim to develop the country's economic and production support infrastructure, in order to strengthen its regional and international competitiveness. For this purpose, it is envisaged to extend the Dakar-Diamniadio toll road by building the Diamniadio-AIBDAIBD section, in order to improve the connection to the new airport.

2. Project description and rationale

Phase 2 of the DIAMNIADIO-AIBDAIBD Highway project starts East of the Diamniadio interchange and is the continuity of Phase 1. The current section is 16.50 km long and 100 meters wide, except for the right-of-way of the two RN2 interchanges and the provisional ending of the project in the areas surrounding the AIBDAIBD. These works will indeed require a wider right-of-way than that of the current one.



The highway will include the following installations:

- A 24.60 m platform in the link section (2 X 2 carriageways),
- Two lanes totalling 7.00 m in width,
- A paved central reservation of 2.60 m,
- Two emergency lanes of 3.00 m,
- Two embankment berms of 1.00 m.

- Two diffusers,
- 11 structures including two overpasses (PS), six underpasses (PI) and two pedestrian footbridges.
- Three toll stations. The toll road operates as an open system.

PAVEMENT

- Raw gravelly laterite foundation subgrade, thickness = 25 cm;
- Concrete gravelly laterite foundation base, thickness = 25 cm;
- Base layer of crushed stone, thickness = 13 cm,
- Asphalt concrete surface course thickness = 7 cm.

EMERGENCY LANE (EL)

- Concrete gravelly laterite foundation base, thickness = 25 cm;
- Raw gravelly laterite layer of crushed stone, thickness = 13 cm,
- Asphalt concrete surface course thickness = 7 cm.

OTHER INSTALLATIONS

Section	Location	Crossed site or construction works	Projected building works
Diamniadio-AIBDAIBD	Km No 6+200	Railway-RN1	Interchange
Diamniadio-AIBDAIBD	Km No 8+000	Re-establishment of Sébikotane-Tounda track	PI or PS
Diamniadio-AIBDAIBD	Km No 10 + 070	Re-establishment of the Sébikotane-Gandou track	PI or PS
Diamniadio-AIBDAIBD	Km No 13 + 170	Re-establishment of the Sébikotane forest track	PI or PS
Diamniadio-AIBDAIBD	Km No 14 + 550	Re-establishment of the Sébikotane forest track	PI or PS
Diamniadio-AIBDAIBD	Km No 15 + 800	AIBDAIBD	Interchange
Diamniadio-AIBDAIBD	Km No 19 + 200	Thiombokh	Interchange
AIBDAIBD - MBOUR	Km No 23 + 185	Eastern door AIBD-Kirène	PI or PS
AIBDAIBD - MBOUR	Km No 25 + 000	Re-establishment of the Sahel tar road	PI or PS
AIBDAIBD - MBOUR	Km No 27 + 600	Re-establishment of Dabour track	PI or PS
AIBD - MBOUR	Km No 30 + 000	RN1	Interchange
AIBD - MBOUR	Km No 31 + 815	Re-establishment of Dang Dang track	PI or PS
AIBD - MBOUR	Km No 32 + 800	Sindia - Popenguine	Interchange
AIBD - MBOUR	Km No 33 + 900	Re-establishment of Sindia-Popenguine Road	PI or PS
AIBD - MBOUR	Km No 36 + 900	Re-establishment of Sere - Acrobaobab Track	PI or PS
AIBD - MBOUR	Km No 38 + 780	Re-establishment river (existing bridge)	PI
AIBD - MBOUR	Km No 40 + 015	Re-establishment of Guéréo-Nguékhokh track	PI or PS

AIBD - MBOUR	Km No 42 + 315	Western Mbour	Interchange
AIBD - MBOUR	Km No 43 + 020	Re-establishment of Nguékhokh-Ngaparou Road	PI or PS
AIBD - MBOUR	Km No 43 + 960	Keur Dip-Nguékhokh Track	PI or PS
AIBD - MBOUR	Km No 45 + 200	Re-establishment of RN1	PI
AIBD - MBOUR	Km No 47 + 830	Re-establishment of Gandigal - tène toubab track	PI or PS
AIBD - MBOUR	Km No 49 + 900	Northern Mbour	Interchange
AIBD - MBOUR	Km No 50 + 700	Re-establishment of MCDA B - MCDA Track	PI or PS
AIBD - MBOUR	Km No 57 + 500	Mbour- RN1 (end of project)	Circle
AIBD - THIES	Km No 04 + 290	Re-establishment of rural track	PI or PS
AIBD - THIES	Km No 07 + 120	Re-establishment of rural track	PI or PS
AIBD - THIES	Km No 11 + 400	Re-establishment of rural track	PI or PS
AIBD - THIES	Km No 14 + 185	Thiès (end of project)	Circle

The project's area of influence includes:

- Part of the department of Rufisque (Area of Dakar) with the concerned towns of Bargny, Diamniadio and Sébikhotane;
- Part of the department of Thiès (rural community of KEUR MOUSSEU)

In the area of Dakar, the highway right-of-way cuts across the agricultural land located in the rural zones of the towns of Diamniadio and Sébikhotane. The agricultural land of the villages of Déni Malick Guèye, Déni Demba Codou, Déni Babacar Diop, Sébi Ponty, Sébi Kip-Kip, Yam and Yéba are thus concerned by the passage of the highway. For the area of Thiès, the highway cuts across the agricultural land of the rural Community of Keur Mousseu. The highway affects the villages of Touli, Landou, Kessoukhat and Soune.

Rationale for the project

The project is a direct extension of Phase 1 (25 km). At the end of Phase 2, the two phases will be operated as one unique toll road without any differentiation between the two phases. The main objective of Phase 2 is to connect the new international airport (Blaise Diagne International airport or AIBD), which is currently under construction, with the centre of Dakar.

Phase 2 will contribute to significantly improve the country's infrastructure network by connecting the centre of Dakar, the port, Phase 1 and the new airport and by offering a better access to the coastal and interior areas of Senegal.

3. Political, legal and administrative framework

Environmental sectoral policy Letter

The environmental policy is enacted through the following plans and programmes: the National Plan of Action for the Environment (PNAE); the National Action Plan to Combat Desertification (PAN/LCD); the Strategy and Action Plan for the Conservation of Biodiversity; the Climate Change National Implementation Strategy; the Senegalese Forest Action plan; the Environmental Sectoral Policy implemented by the Ministry of Environment and Sustainable Development.

The Economic and Social Development National Strategy (SNDES) 2013 -2017

In the field of road-based transport, the SNDES, through the under-sector of transport infrastructures and services, pursues the following strategic goals: (i) to develop road infrastructure through the development of roads and rural tracks in the production areas, the construction and the rehabilitation of roads and structures; (ii) to develop and modernize transport services, through the development of a modern public transport system in the large cities, the facilitation of transport in the corridors; (iii) to promote good sectoral governorship, with the reinforcement of road safety.

Act n° 2001-01 of January 15, 2001 establishing the Environmental Code, the decree n° 2001-282 of April 12, the 2001 implementing Act n° 2001-01 of January 15, 2001 and certain decrees of application constitute the basis of environmental legislation in Senegal. Articles L. 9 to L 57 of the Environmental Code relate to the prevention and the control of pollution. The Environmental Code is supplemented by five decrees taken on November 28, 2001.

Other legislative texts that also relate to the environment and the management of natural resources and that are likely to challenge the project are as follows:

- Laws relating to the land tenure system: The land tenure system is primarily regulated by: Act n°64-46 relating to the national domain; Act n° 76-66 of July 2, 1976 establishing the State Domain Code; the decree n° 80-268 of March 10, 1980 organizing cattle range land and setting the conditions of use of the pastures;
- Act N°98/03 of January 8, 1998 establishing the Forest Code;
- Act n° 86 - 04 establishing the Hunting and Protection of Fauna Code;
- Act n° 2004-16 of June 4, 2004 establishing the Agro-Sylvo-Pastoral Orientation Law;
- Act N° 81-13 of March 4, 1981 establishing the Water Code;
- Act n° 96-07 of March 22, 1996 supplementing the Local Communities Code, and which oversees skills transfer, in particular the environment and natural resource management skills.

Other texts concerned

- The Local Communities Codes: The project is concerned with these codes since the road crosses local communities as well as forest land, which could suffer negative effects during construction works;
- The Public Health Code: The law defines, *inter alia*, the sanitation rules applicable to dwellings, to industrial facilities, to public roads and the treatment of waste.
- The Forest Code: The forest legislation is based on Act n° 98-03 of January 8, 1998 establishing the Forest Code, and was supplemented by its decree of application n° 98-164 of February 20, 1998. The Forest Code recognizes people's right of ownership over forest formations. Article L 44 of the Code stipulates that any mining activity in forest formations is prohibited without the authorization of the ministry in charge of the environment and the completion of an environmental impact assessment.

- The Mining Code: The Mining Code stipulates that the granting of a licence of exploitation is conditioned by an environmental impact assessment.
- Act n° 81-13 of March 4, 1981 establishing the Water Code makes various provisions to fight against water pollution while reconciling the requirements - in particular related to the drinking water supply, to public health, to agriculture, to the biological life of the receiving medium and to piscicultural fauna - with the protection of sites and water conservation.
- The Highway Code was subject to a modification by Act n° 2002-30 of December 24, 2002, which was supplemented by the decree of application n° 2004-13 setting the Highway Code application rules.
- The Labour Code and its new 2006 decrees of application: In its provisions relating to health, Act n° 97-17 of December 1, 1997 establishing the Labour Code regulates working conditions, in particular with regard to the duration of work, which should not exceed 40 hours a week, night-work, the contracting of women and children and weekly rest, which is compulsory. The text also deals with sanitation and safety issues in the work place and outlines the measures which any activity must comply with to ensure health and safety conditions and which ensure a healthy environment and safe working conditions.
- The Land Legislation: It emanates from several texts, the most important of which are:
 - Act n° 64-46 of June 17, 1964 relating to the national domain;
 - Act n° 76-66 of July 2, 1976 establishing the State Domain code;
 - The Civil Code and the Decree of July 26, 1932, which apply to privately owned land.
 - The Codes of Civil and Commercial Obligations.
- Standards: Some standards have also been elaborated in Senegal with regard to discharges into water and atmosphere: (i) the NS 05.061 standard (Waste Water: Standards of discharges dated July 2001) specifies threshold values for residual waters discharge and threshold values for leaching at the final release points in the sewers or into the medium; (ii) Standard NS 05.062 (Air Pollution: standards of discharges dated October 2003) specifies the standards of discharges for several air pollutants emitted at industrial release points. Strictly speaking, there are no specific standards regulating noise emissions, but the Environmental Code stipulates that “the maximum thresholds of noise not to be exceeded without exposing the human organism to dangerous consequences are fifty five (55) to sixty (60) decibels during the day and forty (40) decibels at night”.

Environmental and social national evaluation procedures

- *Act n°2001-01 of January 15, 2001* establishing the Environmental Code is the main environmental management instrument in Senegal. According to this Act, any development project or activity likely to undermine the environment, as well as all policies, plans, programmes, regional and sectoral studies have to be subject to an environmental evaluation. This code recognizes environmental evaluations as one of the decision-making tools to be used by the competent authorities in charge of the environment.

- *Decree n° 2001-282 April 22, 2001 establishing the Environmental Code* is a legal implementation instrument. To this end, it imposes obligations to both the authorities and to the promoters of project and programmes. It imposes that the realization of any project listed in appendix II be preceded by an environmental impact assessment. This part of the decree determines the procedure to be followed and the contents that the study or the evaluation must comprise.

Decrees relating to impact assessments:

The provisions made in the Environmental Code is are supplemented by five decrees, which are:

- Decree n°009471 of November 28, 2001 defining the terms of reference that should be included in an EIA;
- Decree n°009470 of November 28, 2001 defining the conditions of granting Approval for the activities relating to the environmental impact assessments;
- Decree n°009472 of 28/11/2001 defining the content of the EIA report;
- Decree n°009468 of 28/11/2001 regulating the participation of the public in the environmental impact assessment;
- Decree n°009469 of 28/11/2001 defining the organization/functioning of the technical committee.

The various stages of the Senegalese procedure to carry out EIAs are as follows:

- Review and classification of the project:
- Terms of Reference (ToRs) proposal by the Sponsor validated by the DEEC
- Compilation of an EIA report by an approved Consultant
- Review of the report by the Technical Committee
- Holding of a public hearing
- Formulation of an opinion by the Ministerial Committee in charge of the environment
- Decision of the Minister in charge of the Environment.

The African Development Bank's policies and procedures that were applied in the context of this project are the African Development Bank's 2004 Environmental policy, the 2003 Policy pertaining to the involuntary displacement of population, the 2001 Gender Policy, the 2001 policy and directives pertaining to Co-operation with Civil Society Organisations, and the 2000 Environmental and Social Evaluation Procedures of (PEES) for Private Sector Operations..

As a project co-financed by the Bank and the World Bank, the World Bank's Environmental and Social Safeguard Policies that are applicable to this project are: PO 4.01 “Environmental Evaluation”; PO 4.04 “Natural Habitats”; PO 4.11 “Physical Cultural Resources”; and PO 4.12 “Involuntary Resettlement of populations”.

4. Description of the project's geography

The project's area of influence includes:

- Part of the Department of Rufisque (Area of Dakar) and the towns concerned are: Bargny, Diamniadio and Sébikhotane;
- Part of the Department of Thiès (rural community of KEUR MOUSSA)

The Western part (Diamniadio and Sébikotane) of the study area is located on a plain. The lateritic mountain range land of Diass delimits the study area's Southern and Southeastern part and the cliff of Thiès delimits its eastern border. The terrain alternates between high points and low points, translating in valleys where some villages are nestled.

The area counts a diversity of soils that results from the transformation of the bedrock due to the influence of physical, chemical and biological processes. The soils in question include diors, decks, decks diors, ferruginous and halomorphic soils. Hydromorphic soils appear in the depressions where surface waters converge; these are the Niayes in the north (municipalities of Diamniadio and Sébikotane). The sand-clay mix soil type (deck-dior) is very present in the area of Kirène.

The area of study falls under the Sahelian climate with a maritime influence. The movements of the inter-tropical front define one rainy season (wintering) from July to October and a dry season from November to June. The annual average temperature in the area is 25.3°C. The movements of the inter-tropical front define one rainy season (wintering) from July to October and a dry season from November to June. The annual average temperature in the area is 25.3°C. Precipitations range between an average of 350 and 400 ppm per annum. The wind's mean velocity is about 4.5 m/s. The strongest winds are recorded in the dry season.

The air quality in the area of study is relatively affected by the pollution emanating from the mining of the numerous limestone quarries in the area.

There is a now perennial surface river in the area, however in its higher part, in the Niayes domain, the underground water almost reaches the surface water table. However, it is important to note that the valleys incised in the mountain ranges of Diass are temporary rivers, which mostly flow during the rainy season.

The vegetation cover of the area is typical of the Sudano-Sahelian climate and consists of an arboreal and shrubby savannah. This savannah is today very degraded and shows little diversity because of a decrease in rainfall and anthropic aggressions. Limestone mining is another important factor, which causes the degradation of the vegetation.

In the project area, the forest domain includes the Classified Forest of Sébikhotane, a part of which was de-classified to cater to the project's needs. The woody resources of the area include the stands of the classified forest, natural woodlands occurring on agricultural land and artificial plantations. The classified forest of Sébikotane straddles the departments of Rufisque and Thiès and covers a surface area of 1730 ha, of which 520 ha are located in the department of Rufisque and 810 ha in that of Thiès. The forest was gazetted by Order of the Governor General of French Western Africa n°570 of February 1, 1950. The gazetting of the classified forest of Sébikotane was motivated by the will to create a partial hunting reserve in which certain game species would be introduced and multiplied. The final objective was the creation of a fauna reserve where hunting would be prohibited to all categories of hunters. Only grazing was authorized by virtue of the user rights enjoyed by the neighbouring population. The forest's resources are severely degraded. Illegal charcoal making is the driving cause of destruction of the classified forest. The population's wood harvesting to cover their domestic wood needs and their fire needs is another

source of pressure on the forest. Another observed phenomenon is the presence of agricultural fields and orchards in the classified forest. This phenomenon was largely enhanced by the absence of demarcations in the parts of the forest located at the edge of the village's agricultural land.

In the project area, the most important forms of fauna are avifauna and mammals. The avifauna essentially includes pelicans, geese of Gambia, whistling ducks, turtledoves, pigeons, guinea fowls, ibises, parrots, ducks, francolins, calaos, etc. Fauna mammals primarily includes hares, palm rats, bush pigs, jackals, chives, patas and green monkeys. The classified forest domain constitutes a refuge.

The project area shelters a few scattered agricultural perimeters primarily made up of fields of vegetable farms and arboricultural farms (orchards). These activities are located in the vicinity of basic dwellings, of access roads and in the perimeters of the classified forest of Sébikhotane. Some of these activities are carried out within the plots under construction.

From Diamniadio to the entry of the Sébikhotane municipality (the railway line and the RN2), one encounters many localities, orchards and fields and Lébou villages (DENI Demba Codou, DENI Babacar DIOP, DENI Malick GUEYE, SEBI PONTY). The dominant activities are agriculture, breeding and artisanal fishing in the retaining tank.

From Sébikhotane (the railway and RN1) towards AIBD, one notes a few orchards and fields. In this entire area, the populations are very wary. Their croplands were affected by the AIBD.

The project area includes plots that were developed for residential purposes. The buildings are scattered and most are only at a foundation stage or show limited progress. Breeding activities also take place in the project area. Breeding is obviously one of the most dominant activities in the project area beside agriculture. Breeding activities consist primarily of poultry farming with rather remarkable installations in the project's rights-of-way, as well as a stable.

The project area is characterized by the presence of a cemetery where the various local human communities bury their deceased ones. This space is particularly well protected (surrounded by hard walls and iron gates).

5. Project options and alternatives

The study carried out a comparative analysis between three options:

- The “without project” option (baseline situation);
- the widening the RN1 option (towards Diass-AIBD);
- the “with project” option (development of the Diamniadio-AIBD highway).

OPTION: “WITHOUT PROJECT”

From a purely biophysical point of view, the “without project” option, which consists in not developing the highway, will have no major negative impact on the environment: there will be no harmful effects (dust, pollution) or disturbance to the living environment (noise) that would be generated by the construction works, no demolition, no deforestation, no back filling of

depressions and other water run-offs, no removals, etc.; no disturbance to the living environment of the neighbouring populations; no disturbance to the circulation of goods and people or disturbance to socio-economic activities, no impact on the classified forest of Thiès, etc. This situation would imply that the RN1 would have to be maintained as the access road to the AIBD airport, which would cause severe disturbance and nuisance (traffic jams), and which would lead to users wasting a lot of time. Moreover, the increase in traffic induced by the construction of the AIBD would be significantly less than the traffic generated by the limited capacity of the current RN1 road.

OPTION: “WIDENING OF THE RN1”

Widening the RN1 would be an interesting option as it would allow maintaining the current access to the AIBD layout on part of the section (Diamniadio-Diass-AIBD). This would allow avoiding cutting across the Classified Forest of Sébikhotane as well as the agricultural and mining areas. However, this option would involve important measures to displace the populations of all the crossed urban areas (Diamniadio, Boukhou, Diass, etc.) because of the widening of the lane into a highway (two lanes time two and a central reserve). In addition to these displacements of populations, the construction works would cause serious disruptions to the movement of goods and people, and the deviation lanes that would be required would also negatively affect the agricultural and forest resources within the project area.

OPTION: “WITH PROJECT” (DIAMNIADIO-AIBD HIGHWAY)

This option would improve access to the Blaise Diagne International airport. Also, the project would allow to open up an area that is difficult to access (Yéba, Touly, Thiambokh, Soun, Kirène, Dobour, etc.). However, it would require an incursion into the classified forest of Sebikhotane and expropriation (far less important than for the RN1 option)

6. Potential impacts mitigation and improvement measures

Main positive impacts

The implementation of the project will allow a clear improvement of the state of the communication infrastructure around the AIBD, which will offer the following opportunities:

- (i) A better opening-up of the concerned areas;
- (ii) More intense local socio-economic development (thus reducing poverty) with the capacity, on the one hand, to ensure a fast disposal of the local agricultural and industrial productions as well as enhancing their value and, on the other hand, to acquire materials, inputs and other basic needs products required in the exercise of socio-professional activities, as well as the intensification of the economic and commercial activities around the construction site;
- (iii) Job creation for the youth, in particular at the local level with labour intensive construction works;
- (iv) Support the operation of Small and Medium-sized Enterprises (SME) specialized in road works and the possibility of creating new jobs through the highway management and maintenance company;
- (v) Better access to the airport;
- (vi) Improved urban mobility and development of the exchanges;
- (vii) Good level of road service;

- (viii) Reduction in the risks of accidents through the construction of footbridges;
- (ix) Etc.

Impacts and measures to mitigate harmful effects and improvements to the positive impacts of the project:

In ***the preparation phase***, the expected impacts are inherent to:

- The involuntary displacement of populations, the loss of goods located on the rights-of-way land, the loss of arable land (fields, orchards, etc.). The number of Project Affected People (PAPs) listed on the entirety of the section is 936, of which 759 have lost land earmarked for residential use, and 164 have lost land earmarked for agricultural use,
- Tree felling to clear the building area,
- Relatively large quantities of solid waste will be generated in the preparation phase, following the felling of trees and the clearing of the sites before the building sites are set up. In addition to this waste, a great quantity of rubble will be produced when excavations are done to set up the roadway systems and the various networks,
- With regards to the human environment, the rotations of the vehicles conveying the equipment and construction materials will be likely to obstruct circulation and mobility in general, in addition to the harmful effects (noise, dust) to which the urban populations will be exposed,
- Risks of traffic accident are also noted in light of the considerable size of the construction sites
- Etc.

During the ***construction phase***, the induced negative incidences will potentially include:

- Various pollution (scattering of waste) caused by the construction activities constitute a threat which weighs on public health and sanitation,
- The waste water generated on the various construction sites, in particular those coming from the toilets can constitute sources of pollution,
- The use of machines requiring fuel, oils and greases during their use on construction sites leads one to predict a risk of contamination of subsoil waters by infiltration and also of the surface water,
- The construction of the road will result in proofing surfaces and subsequently lead to a drop in the infiltration capacity. Furthermore, this proofing will lead to an increase in the volumes of storm water flows to evacuate. For this purpose, the project will have to design specific discharge systems for storm water. The dimensions of the collectors and discharge systems of surface waters will have to be designed so that the time of concentration of storm water on the sites is kept very short.
- On the health level, the phase of construction is not deprived of risks with regards to the pollution and harmful effects associated with the construction works. Avoiding these risks will entail choosing the most suitable timing to go ahead with the construction works on the one hand; and on the other hand, to sensitize the population concerned so that it can the required steps to be protected.

The cumulative effects associated with the construction works and the use of the road will translate in noise and air pollution (gas), accidents, physical separations and flooding risks:

- Air pollution: The project's construction works will locally entail an increase in dust in the air because of the frequent displacements of trucks and rolling stocks. With regards the bitumen, its conditioning releases a lot of smoke and toxic gases; the unloading of materials during the preparation of the bituminous mix (mixture of bitumen and basalt), and of the laterite (mixture of cement and laterite) produce a lot dust. The exploitation of the quarries and borrow pits will lead to an increase in air pollution due in particular to dust. All these activities will cause the discharge of polluting fine particulate matter in the atmosphere, but without any major negative effect. Once the toll road starts operating, the traffic will generate particles and increase the concentration of CO, CO₂, O₃ and other particles such as lead, but also an increase in the noise, which could affect the neighbouring populations (respiratory diseases, migraines, stress), in particular in sections where the highway crosses villages.
- Impacts on ground resources: Temporary installations on the construction sites with the presence of machines and trucks can have an impact on the ground, in terms of compaction and destruction of its structure due to repeated passages, but also due to contamination caused by the rejections or pouring of drained oils. Should the site not be developed adequately, the right-of-way areas could generate an important runoff, which might aggravate the phenomenon of erosion in the areas close by. However, these effects on the grounds are relatively moderate and can be significantly mitigated. Any failure to dig out drainage lines may cause storm water runoff to erode the slopes and the lower grounds.
- Negative impacts on underground waters: The building of the road will entail important water requirements especially during the construction phase (wetting the grounds, possibly washing the laterite, needs for the personnel, etc.). One can thus anticipate that there will be important extractions of water resources. The effects of this impact would be relatively moderate - in the event that drill holes are carried out or that water is provisioned on the SDE network- but the impact would be major - should water be sourced from village boreholes. The various waste generated by the workforce can be a source of contamination of the underground water table.
- Impacts on the surface water resources: The destruction of the herbaceous cover following the establishment of the construction sites will have an effect on the surface water regime. One will be able to notice a shortening of retention times following the increase in the runoff coefficients. The quality of surface water will also be deteriorated as a result of an increase in the runoff of storm waters loaded with sediments. Moreover, should an adequate drainage system not be set up, the runoff will increase the process of sedimentation of the existing watercourses and water bodies. In order to ensure that the populations of the villages do not run out of water, water needs for the construction site and activities should be extracted downstream from the areas usually used by villagers or the pastors, so that their needs can be met (food, washing, drinking water for the herds, etc). However, it would be preferable for the water to be extracted from drill holes or water points which have a sufficient capacity, instead of drawing water from the ponds and the wells intended for the cattle and the populations.
- Impacts on the vegetation: The incidences of the construction works on the vegetal formations will be relatively important as the highway layout is opened up. The Classified Forest of Sebikhotane will be the most affected, as the section crossing the forest is

approximately 5.5 km long, which means that close to 13.5 hectares will be deforested. During the building works, one could also express concern over the fraudulent exploitation of forest products (wood, harvested products, etc.) at the level of these classified forests. Given the density of the herbaceous carpet, one could also fear bush fires risks associated with the activities of the building site. The mining of the quarries and borrow pits in new locations could lead to the destruction of the vegetation on these sites. The implementation work, in particular the opening of the new transport route, might trigger the irregular exploitation (fraudulent) of forest products from the Sebikhotane forest (abusive limber cuts, harvested products, etc.). But these effects could be mitigated and offset within the framework of the protocol APIX would enter with the Forest Services.

- Impacts on fauna: The areas crossed by the road do not present a fauna wealth of much interest. However, small fauna is present. Deforestation will certainly lead to a loss of habitat for small fauna present in the Sebikhotane forest. In the same way, the setting up and the operation of the construction site will also disturb the animal life, with the noises generated by the machines likely to frighten small fauna. Finally, one could also be wary of site workers hunting game in the area.

It is certain that during the construction phase, the small fauna will go and look for quieter and safer sites. Another effect will be an increase in the occurrences of death of individuals of small species around the road (as a result of collisions with the vehicles): small rodents, hedgehogs and other insectivorous, some birds, batrachians, etc.

- Disturbance to the living environment of the populations: During the construction phase, the random disposal of solid and liquids waste from the construction site (cuttings, various residues, etc.) could degrade the immediate living environment of the project site, as the waste outlets might turn into wild dumps. The road works, the mining of the quarries, but especially the works relating to demolition and the rebuilding, will generate quantities of relatively important fine dust in all the vicinity. On the other hand, once the road is operational, the risks of dust emanation will be minimal, since vehicles will circulate on tarred roads. The main emissions of noise will possibly come from the following operations: Engines and equipment used for the construction works; circulation of vehicles once the road is operational.

- Risks of social conflicts in the event of that local job are not created: The use of labourers from overseas on the construction sites could also generate conflicts with the local populations, should these labourers fail to respect local customs and habits. Another risk to fear relates to building companies setting up their work teams (particularly the unskilled labour) outside of the intervention areas, which would reduce the possibilities of hiring local people. These situations can create dissatisfaction and local frustrations, which could undermine the smooth operation of works. The failure to hire local labourers during the construction of the road could cause frustrations at the local level, especially considering that unemployment is already very high in the localities. This risk can be avoided by inviting the companies (in the contractual clauses) to privilege local recruitment, relating to hire locally whenever possible. This would allow a greater ownership of the road infrastructure, whilst the participation of the local expertise in the works will boost a feeling of pride.

- The risk of splitting communities and of marginalising the disabled: Once the highway is operational, one could fear that communities get split up or cut off as they might no longer be able to conduct their ordinary activities on either side of the highway. Another constraint concerns the disabled who will no longer be able to cross the roads if suitable installations are not made. Highway crossing that take in to account the needs of the disabled will have to be provided.
- Negative impacts on Agriculture and Breeding: The option to avoid urban areas results in a compulsory incursion into the culture and pasture areas. The construction works will certainly cause the destruction of areas of culture, and so will the storage of materials in these agricultural areas. In these cases, the impacts on the agricultural areas could be relatively important. In the event that cultures and plantations are destroyed, the project will have to proceed to compensations. One notes a significant decrease of range lands in the project area, but also a degradation of the pastures and the fallow land. The project will exacerbate this trend, which could harm animal feed stocks. Once the highway is operational, it will constitute a serious obstacle to the movement of cattle. Cattle movement towards water points, pastures and especially towards the livestock markets will be particularly affected. In last cases, the project will have to make provisions for specific passage points.
- Negative impacts on industrial activities and mining: In spite of their presence in the project area, the construction works will not have a direct incidence on the existing mining activities (sandstone, limestone, laterite or clay quarries, etc.). Also, existing industries will not be impacted (the firm 'Cement of the Sahel', the Kirène mineral water factory, the metallurgical plant, etc.)
- Negative impacts on cultural heritage: At the cultural level, there is no archaeological site or monument of worship in the area that is likely to be disturbed by the works. However, in the event that any cultural heritage is discovered during the highway construction works, the onus will be on the contractor to immediately inform the services of the Ministry of Culture, and the works will be directed in accordance with their directives. However one will note that a part (which has not been used yet) of the Déni Malick Guèye cemetery will be destroyed during the works.
- Impacts of mineral deposits and borrow sites: The project does not plan to open and mine quarries in the project's area of influence. The foreseen laterite and basalt quarries have been authorized and their mining is underway. The mining of quarries and borrow sites will have negative effects on air quality. However, the effects will remain local as the dust concentrates in the air.

An Environmental and Social Management Plan (ESMP) was prepared for this project and aims at ensuring that environmental and social concerns are taken into account in the completion of the construction works and during the operation of the project. Two specific ESMPs (construction phase and operation phase) have been elaborated.

Social measures relating to the losses of goods and displacements of populations:

- Completion of a Resettlement Action Plan (RAP) which identifies, counts and evaluates all the affected goods;

- To compensate the People affected by the Project (PAP);
- To ensure the economic rehabilitation of the displaced people.

Measures for reducing the impact of works on natural resources

- To appreciate the needs of the populations and consult them before using any existing water resources;
- To request the authorization of the forest services before any deforestation operation;
- To mine existing quarries whenever possible in order to minimize deforestation and land erosion;
- To reforest with suitable species the sites of quarries that were temporarily mined;
- To level the temporarily mined quarries so as to avoid land erosion water run-off towards the roadway, and to ensure the replenishment of rivers;
- To avoid storing materials on the path of natural runoffs out of concern for not obstructing the flow of water run-offs.

Compensation measures for the Classified Forest of Sebikhotane

- Payment of the expenditure related to the classified forest of Sébikotane
- Institutional support
- Inventory, mapping, delimitation, demarcation and putting up billboards
- Development and validation of a forest management plan
- Setting up of a forest nursery
- Nursery, plantation and protection technical materials and equipment
- Purchase of 2 pick up vehicles for monitoring and coordination
- Implementation of technical planning activities arising from the aforesaid the forest management plan.
- Monitoring and evaluation

Pollution control measures

- Collect oils and other toxic products in suitable tanks;
- Set up public latrines in building sites' installations;
- Set up draining gutters along the axis and in particular at the crossings of urban areas;
- Store bituminous products on a concrete platform in order to minimize any form of degradation and pollution of the grounds and water tables (wells) arising from the discharge of toxic products;
- Avoid storing the products on private grounds or fields;
- Build the ditches/channels' discharge systems away from the dwellings so as to preempt the risks of flooding bordering dwellings;
- Build the discharge system out of private grounds (fields, etc.) in order to prevent the discharge ditches from degrading the fields;
- Discard the solid residues resulting from the scouring of the platform in places authorized by the local populations in order to avoid degrading arable land;
- Prohibit any laterite deposit on the rain water run-off pathways.

Measures to mitigate dust

- Watering of work surfaces

- Supply and equip the personnel and the populations bordering the work sites with dust masks
- Information and preliminary sensitizing of bordering populations
- Medical follow-up of the workmen and the local populations
- Regular follow-up of the effectiveness of the application of these measures.

Measures for provisioning construction sites with water

- Drilling
- Rehabilitate existing village wells and wells in disuse
- Plan installing water cisterns and developing water storage basins

Measures to manage storm waters: Integrate draining structures in the design of the works so as to guarantee perennial flows, in particular in the catchment area, in consultation with the National Forestry Commission services to find solutions to any arising flooding problems.

Measures for resolving conflicts

Several types of conflicts can occur in the project's preparation and execution phases. To resolve these conflicts, the following mechanisms are often used:

- Additional explanations: explain in detail how the Project will be carried out;
- Call on community leaders (customary chiefs, etc) to arbitrate the conflict;
- Local conciliation commissions nominated by the town halls;
- Courts as a last resort.

Measures to avoid social conflicts

- Inform/negotiate with the populations before occupying the private land;
- Recruit local labour as much as possible;
- Avoid extending fields of the quarry towards the cultural fields.

Measures to fight against the risks of transmission of the STIs/HIV/AIDS: Inform and sensitize the personnel and the populations with the support of the medical Districts and local NGOs.

Measures for improving traffic

- Become familiar with the urban traffic plan with the collaboration of the Roads Management Directorate
- Hold public awareness campaigns with the populations

Measures relating to service roads in the urban areas crossed by the Highway

- Build feeder roads
- Installation of interchanges

Organization of the implementation of the ESMP

- *The APIX, through its Environment and Rights-of-way Clearance Directorate* will supervise the construction works and will have to facilitate the mission of the environmental monitoring regional committee (EMRC) set up at the regional level.

- ***The Environment and Listed establishments Directorate (DEEC):*** Within the framework of a Protocol of Assistance to the Project, the DEEC will be responsible for the external follow-up of the ESMP of the implementation of the environmental and social measures of the project at the national level.
- ***The Water and Forestry Department (DEF):*** the DEF, through the IREF of Thiès, will supervise the deforestation activities in the Classified Forest of Thiès, as well as the pruning and afforestation activities around the schools where construction works will be carried out.
- ***Services of the Ministry of Health:*** the Ministry will take part in the monitoring of sanitation and public health issues (monitoring of water born diseases; monitoring of STIs/HIV/AIDS, monitoring of respiratory diseases, etc.).
- ***Labour Directorate:*** will have to ensure that the working conditions in the completion of the work (working hours, wages, protection, hygiene and safety in the workplace, etc.) are complied with
- ***The Services of the Ministry of Social Affairs*** will have to ensure that the disabled are best taken care of within the framework of the project.
- ***Communities targeted by the project:*** will take part in the sensitizing of the populations and in the activities of social mobilization. In each targeted community, the local engineering departments will ensure close monitoring the implementation of the recommendations of the ESMP. They will take part in the social mobilization; the adoption and the distribution of the information contained in the ESMP and will take care of the management and the maintenance of the built infrastructure.
- Construction ***companies and construction works control Bureaus:*** the private Companies in charge of the completion of the works must comply with the directives and other environmental and social regulations contained in the contractual documents. The Bureaus in charge of the control of construction works must ensure that the environmental measures contained in the contractual documents are carried out in an effective and the efficient manner.
- ***NGOs and Other associations:*** they will take part in informing, educating and raising the awareness of the actors of transport system and of the populations of the project's receiving areas about the environmental and social aspects related to the works and to the road. The Association for the Disabled will have to ensure, within the framework of the project, that the disabled are best taken care of and monitored.

7. Environmental risk management

Health risks of the populations and workforce:

From a health perspective, there are risks of transmission of STIs/HIV/AIDS because of the presence of temporary foreign labourers, generally made up of isolated young men, which tends to increase the contacts with girls and women within the local population, in the construction works areas. It is also necessary to flag the risks of propagation of the diseases such as STIs/HIV/AIDS, associated with, in certain construction sites, the arrival of foreign workmen to the locality, which can lead to gender related conflict resolutions. These risks can be avoided or reduced through the implementation of a public awareness campaign targeting the workforce and the local populations.

Safety risks related to the construction works and the operation of the highway:

A study of the risks related to the activities of the project was carried out. The methodology used comprises mainly three stages:

- Identification of the dangers and dangerous situations related to the work on a road construction site;
- The estimation for each dangerous situation of the gravity of the potential damage and the frequency of exposure;
- Prioritisation of the risks to determine the action plan's priorities.

Safety measures

- Put up road work signage to minimize the risks of accident in the course of the works;
- Sensitize the site workers on the safety measures to be taken;
- Set up a programme to sensitize the personnel on the precautionary measures to take as regards the transportation of materials.
- Install a speed limit system (essentially billboards) and inform the personnel about the risks of accidents;
- Avoid working at the hours of rest in the sections crossing cities;
- Systematize the wearing of individual protective equipment (mask, etc.);
- Carry out the works on half-lanes at the places where the deviation lanes are likely to disturb dwellings or fields;
- During the laterite loading operations, equip the personnel with dust masks to avoid the effects caused by the flying dust;
- Built speed bumps where the construction works cross urban areas;
- Make provisions for crossing structures (footbridges) accessible to the disabled where the construction works cross urban areas;
- Etc.

8. Monitoring and Evaluation Programme

Environmental and social monitoring

The purpose of environmental monitoring is to ensure that the following measures and conditions are respected: (i) the measures suggested in the impact study, in particular the mitigation measures; (ii) the conditions outlined in the Environmental Code; the decree of application and decrees relating to the ESIA; (iii) the commitments made to the local communities and ministerial authorities; (iv) the requirements relating to the other laws and regulations in terms of sanitation and public health, of the management of the population's living environment, natural resource and environmental protection. The environmental monitoring will relate to both the construction phase and the operation phase and is ensured by the APIX.

Environmental and social follow-up

The purpose of environmental monitoring is to check, on the ground, the accuracy of the evaluation of certain impacts and the effectiveness of mitigation or compensation measures envisaged by the EIA, and for which an uncertainty remains. The knowledge obtained through environmental monitoring will allow the parties to correct the mitigation measures and to possibly revise certain environmental protection standards. The Monitoring programme describes: (i) elements having to be monitored; (ii) monitoring methods/systems; (iii) monitoring responsibilities; (iv) monitoring periods. Environmental and social follow-up is ensured by the DEEC.

9. Public consultations and distribution of information

During the course of the investigations, the APIX team held public consultations in the villages that the highway project goes through. The public meetings held in each village that the highway project goes through enabled the promoter to provide explanations on the toll road project. The exchanges with the people attending the meetings allowed keeping a register of the concerns of the populations, but also to bring answers to their concerns. The Governor of Dakar, chair of the Operational team, in charge of the rights-of-way clearance, travelled with his collaborators and the Prefect of the Department of Rufisque, to the localities of the area and held in the Diamniadio Town hall an awareness meeting with the local populations on the Highway project. The future relationship between the State and the populations within the framework of the aforesaid project were also discussed. A press release calling the owners of the affected pieces of land to make themselves known was widely diffused through the media and led to the identification of many plot owners.

In addition to the public consultations, a public audience was held on February 19, 2013 to collect the concerns of the local populations.

Furthermore, this summary will be published on the African Development Bank's website for 60 days before the project is presented to the Board of directors.

10. Complementary initiatives

The road project is construed as a development project that will focus not only on rehabilitating the roadway, but also on supporting the rehabilitation of socio-economic infrastructure (building or repair of drill holes and wells, repairs of existing clinics or schools, markets, access roads; women centres; places of worship; etc.) located along the roadway and that require mild repair. All the urban areas crossed by the right-of-way (be they directly or indirectly affected) will have to profit from these development measures. An amount has been allocated in the budget to support these communities. APIX will thus initiate a support programme targeting the communities directly affected by the project, through development actions focusing on collective infrastructure: drill holes and wells; access roads; schools, health centres; markets; women centres; places of worship; etc.

In addition, the Company EIFFAGE, which forms part of the New Conceded Highway (SENAC SA), voluntarily set up a socio-economic and environmental Observatory as part of its corporate social responsibility. This initiative forms part of an open and collaborative relation with other actors concerned by the Highway. The Observatory aims to identify some of the major mutations resulting directly or indirectly from the construction and the opening of the highway

infrastructure. It will measure these changes and evaluate them in order to generate a rigorous knowledge set about the incidences associated with the use of this equipment and to share these findings with the concerned public and private actors, at the local, regional and national levels. SENAC intends to pursue, with the support of the Bank, the activities of the observatory for the second phase of the highway.

Several income generating micro-projects for the women were initiated during Phase 1 of the highway. Women have gathered in a co-operative project called SUNU YAYE, through which SENAC gave them access to the concession plots, on which they farm vegetables. SENAC also provided them with seeds in addition to a training session on organic agriculture.

11. Conclusion

The realization of Phase 2 of the highway is a project of national importance. It will allow to significantly improving the country's infrastructure network by connecting the centre of Dakar, the harbour, Phase 1 and the new airport by offering a better access to the coastal and interior areas of Senegal.

However, this section, despite the reduction of its length (approximately 17 km), is not without negative consequences on the physical environment and the quality of life of the populations in the area. The main harmful consequences are the health and safety hazards related to the works, the clearing of the classified forest and the loss of goods and land.

The integration of the environmental dimension into the planning, design and construction of the highway projects, is necessary to maximize the highway's benefits to the populations and to mitigate its negative impacts on the generations to come. The environmental monitoring and evaluation of the real short and medium term impacts associated with of the operation of the road will allow the project to be evaluated.

The implementation of the project will allow a clear improvement of the state of the communication infrastructure around the AIBD, which will contribute to an improved opening-up of the concerned areas, local socio-economic development, a fast disposal of the local agricultural and industrial productions as well as enhancing their value, job creation for the youth, work opportunities for Small and Medium-sized companies specialized in road works, a better access to the airport and the reduction of the risks of accidents thanks to the building of footbridges.

12. References

The documents consulted for the compilation of the summary are as follows:

- EXTENSION OF THE DIAMNIADIO-AIBD HIGHWAY ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (EIA), July 2013
- RESETTLEMENT ACTION PLANS FOR DIAMNIADIO-AIBD HIGHWAY EXTENSION PROJECT (RAP), September 2013

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