

# SENEGAL MUNICIPAL SOLID WASTE MANAGEMENT PROJECT

(P161477)

## EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL ASSESSMENT (ESIA) FOR THE REHABILITATION OF THE MBEUBEUSS DUMPSITE

### 1. INTRODUCTION

Senegal is currently preparing a Senegal Solid Waste Management Project (PROMOGED). The project will be funded by French Development Agency (AFD), the Spanish Agency for Cooperation and Development (AECID) and the World Bank IDA. The project will be implemented by the "Unite de Coordination et de Gestion (UCG) at the Ministry of Urbanism, Housing and Living Environment. The project will benefit the following agglomerations: Dakar; Thiès; North (including the regions of Saint-Louis and Matam); and the Casamance (comprising of the regions of Ziguinchor, Sedhiou, and Kolda).

#### **Project Development objectives :**

The project development objective is to strengthen the governance of solid waste management in Senegal and improve solid waste management services in selected municipalities.

Specifically, the project will:

- propose a series of reforms and targeted policy actions designed to improve institutional, regulatory and financial governance in the sector;
- improve domestic solid waste management all along the chain, while promoting integrated waste management in target communities, by reinforcing inter-communal planning and execution;
- To create contextualized and sustainable management systems, with maximum feasible implication of the private sector.
- improve the socio-economic performance of the sector by making profitable use of waste;

The project is structured around the following components:

- **Component 1: Strengthening Sector Governance and Institutional Capacity:** This component aims to strengthen the institutional framework governing the sector, ensure the effectiveness of investments, and create a favorable environment for private sector investments in the solid waste sector.
- **Component 2. Improving Solid Waste Infrastructure and Service in Selected Agglomerations:** To improve solid waste services for citizens in targeted municipalities especially women, this component will finance waste management facilities and equipment needed to establish or improve (where it already exists) the delivery of waste management services in Greater Dakar and three secondary agglomerations, namely, Thiès (Thiès, Mbour and Tivaouane), North (Saint Louis and Matam), Casamance (Ziguinchor, Kolda and Sedhiou).
- **Component 3: Project management, coordination, communication, monitoring and evaluation.**

As part of this project, the Mbeubeus dumpsite in Dakar will be rehabilitated.

### 2. CONTEXT AND OBJECTIVES OF MBEUBEUSS'S DUMPSITE REHABILITATION

Rehabilitation of the dumpsite is a means of reducing the current impacts noted within and around the dumpsite. This environmental and social impact study of the Mbeubeuss dumpsite rehabilitation project is an essential step in the rehabilitation of the site under sustainable ecological and social conditions.

The installation of a transfer and sorting station (CTT) and a composting platform is part of the rehabilitation of the dumpsite, which aims to stop the process of environmental degradation and the reintegration of the dumpsite in the natural environment.

The Mbeubeuss dumpsite is still in operation and will remain so until the new treatment infrastructures are built and operational. The approach of the project provides for a gradual rehabilitation of the Mbeubeuss dumpsite linked to the setting up of sorting and composting infrastructures. The purpose of the Mbeubeuss dumpsite disposal operation is to:

- restore the site;
- store in environmental and sanitary safety non-recoverable waste during the rehabilitation phase;
- sort and valorize in matter and in compost of the reusable materials

The waste that will transit through the Sorting and Transfer Center (CTT) at Mbeubeuss will come mainly from the departments of Guédiawaye and Pikine in Greater Dakar.

### **3. THE TECHNICAL OPTIONS OF THE RESORPTION**

The project consist in setting up a CTT and a composting platform for the valorization of solid waste. The Sorting and Transfer Center (CTT) allows the sorting of the incoming waste stream. Sorted products are sent to recovery channels. Sort refusals (residues generated by the sorting process) go to dumpsite for disposal at the trap level.

The composting platform will accommodate waste from a selective collection. The proposed technology uses windrowing cover membranes and computerized control to ensure a waste-free transformation into fertilizer in any season without odor, leachate leaks and no greenhouse gas emissions. The Mbeubeuss dumpsite will be redeveloped for the slopes, domes and surrounding areas. The work will include the following operations:

- Various earthworks;
- The remodeling of the dome and outlines;
- the final adjustment of the slopes;
- The final cover of the site;
- The service tracks;
- rainwater recovery;
- Landscaping.

### **4. METHODOLOGY OF THE STUDY**

The methodology adopted by the consultant is based on the terms of reference approved by the Department of the Environment and Classified Establishments (DEEC). The highlights of the methodological approach consist of the documentary review, meetings with stakeholders, field visits punctuated at times by in situ measurements including measurements of physicochemical quality (pH, electrical conductivity, salinity). surface water and groundwater.

The prediction was based on a matrix that links the sources of impacts with the components of the receiving environment. This linking takes the form of a grid where each identified interrelation represents a likely impact of a project element (source of impact) on one or more components of the environment.

Thus, the impacts of the Mbeubeuss resorption are evaluated within the framework of this project according to 4 criteria:

- Intensity, expressed as a "strong, medium, low" index. This index takes into account the strength of the impact and the value of what is touched and its sensitivity;
- Extent, expressed in terms of affected geographical areas (punctual, local or regional)

- Duration, expressed as an index (short, medium, long), limited or not to the dredging and exploitation period;
- Importance of the affected component: minor, average or major.

#### 4. INITIAL CONDITIONS OF THE ENVIRONMENT

The Mbeubeuss landfill is located in the Atlantic littoral zone in the Niayes sector. It is located between the municipalities of Malika and Keur Massar and currently covers more than 114 ha. Between 2008 and 2017, Mbeubeuss increased from 64 ha to 114 ha, characterizing a significant increase inside Lake Mbeubeuss mainly and on the perimeter of the 2008 perimeter. Successive deposits of waste resulted in an elevation of the landfill, thus offering a modified topography. high. This artificial topography breaks with the original landscape. It has the shape of a dyke whose height at the highest point is close to 10 meters.

The amount of waste buried at the Mbeubeuss site would reach 11 million tonnes, or about 39 million cubic meters of waste. The operation of the Mbeubeuss landfill can be likened to a bio-physico-chemical reactor giving rise to complex reactions and evolutions that lead to the chemical, physical and biological transformation of waste.

Over the last two years of operation, recorded data show that, on average, 92.5% of buried waste comes from households. As for market waste and waste from private sector economic activities, they constitute respectively 5% and 2.5% of the total amount of waste buried in Mbeubeuss.

The land use of the landfill shows a great diversity of actors. Beyond the waste piles at the landfill site, there is also a significant presence of facilities within the landfill, ranging from storage areas for recovered equipment, to places of business (storage sites, garages, restaurants, etc;), residency sites, mechanic workshops, UCG buildings, recent companies bustling in the plastic press, vegetable plots, commercial activity areas. However, most of the physical facilities are positioned at the entrance to the landfill between Baol and Gouye Gui.

There are several platforms within the landfill including:

- The Yemen platform: it is currently the main platform;
- The Darou platform: it is used if the conditions of access and spills are not met at Yemen level,
- The Wembley platform: it is used exclusively in the rainy season given the difficulties of access to the main platform of Yemen.

The waste eligible for the Mbeubeuss landfill consists of heterogeneous and anisotropic materials. Of the total waste stream received at the landfill, most waste categories are 37% fine, 22% putrescible, 9% plastic waste, 7% complex waste and 7% textile waste. including sanitary textiles. At proportions less than or equal to 3% there are glasses, metals, paper, cardboard, incombustible and unclassified fuels and DMS.

From the point of view of the water quality around the discharge, the measured conductivities are between 2,000 and 24,000  $\mu\text{S} / \text{cm}$ . Chloride analyzes show concentrations between 370 and 8200 mg / l. This is representative of the salty character of the waters present in the area. The COD is high in the PZ2 and PZ3 market wells (310 and 300 mg / l respectively), the BOD5 is detected on the canal water and the TOC is high on the upstream cetane ES4, on the channel ES5 and on the cetanes ES15 and ES16 (26 to 60 mg / l). Overall, the organic load of the analyzed waters is low. Nitrate, Nitrite and Ammonium ions are measured in concentrations above the reference values in the majority of samples. These concentrations may be representative of an impact of market gardening or poor sanitation. Sulphates are detected in high concentrations on ES4, 590 mg / l and on ES16, 2600 mg / l.

Analyzes of metals generally reveal few high concentrations. Concentrations above the reference values are still observed in the majority of the samples for nickel (from 15 to 25  $\mu\text{g} / \text{l}$ ) and copper (from 7 to 18  $\mu\text{g}$

/ l). High concentrations are observed for Zinc on PZ2, ES4 and ES5 (respectively 150, 320 and 130 µg / l). Chromium, Arsenic, Selenium, Lead, Molybdenum, Antimony and Mercury are not detected on any of the samples. On the other hand, the waters of Lac Mbeubeuss are characterized by contamination with hydrocarbons, iron, selenium, zinc, sulphate, fluoride and fecal coliforms.

The November 2018 census enumerated 1880 people working in the dump. Of these 1880s, we have 977 people working in the dump and having no installation or place of business (self-employed), 497 fixed installation managers, 230 workers who are employed by the fixed installation managers. In 2008, 861 people had an activity at the dump. The number of workers has increased considerably and more or less in proportion to the increase in the perimeter of the dump. We also note the presence of vulnerable layers that are active in the dump such as children (168) and mentally ill (8) including 7 men and 1 woman.

The Mbeubeuss landfill includes 523 fixed installations in the Mbeubeuss landfill. These facilities are located from the main entrance to the platform. They consist mainly of: soil potting, collectors' shelters, shops, garages, fuel depots, sand depot, restaurant and others (sheet metal worker, caretaker's lodges, artisan workshops, bar, pig food storage). The bulk of this infrastructure consists of rudimentary equipment often from recovery. Thus, the collectors' shelters and the storage areas (packs) consist of rags, pieces of fabric, tarpaulins, cardboard boxes or plastic bags. The modes of habitas are very precarious

The garbage collection and recycling activity generates related activities such as catering, small shops with on-site shops, downstream channels for recovered materials and coexists with others (fuel storage, storage and sale). sand, mechanical repair activities, market gardening, pork farming).

Around the Mbeubeuss landfill, there is a large livestock activity, particularly of broilers and pigs, which employs young men and women in the area and is a significant source of employment for them. of income.

The biophysical and socio-economic context of the Mbeubeuss landfill allows the identification of environmental and socio-economic issues

- **Issues related to the environment and the living environment**

- ☞ Substantial reduction of pollution;
- ☞ Preservation of biodiversity;
- ☞ Recovery of organic and vegetable materials for organic farming;
- ☞ Coastal zone protection

- **Socio-economic issues**

- ☞ Preservation of health and public safety;
- ☞ Gender and the protection of vulnerable groups;
- ☞ Securing land and improving the living environment

- **Institutional and political issues**

- ☞ Environmental management;
- ☞ Intercommunality between the municipalities of Malika and Keur Massar

## **5. CONSULTATION OF THE PUBLIC**

The meetings with the stakeholders and those relating to the organization of the public consultation held in Keur Massar commune and that of Malika, show strong support of the population and administrative authorities to the resorption of the Mbeubeuss landfill. Thus, the main concerns are:

- ☞ for Technical and Administrative Services, they consist of the loss of activities in the landfill, impacts on the quality of groundwater and surface water, air pollution in riparian areas, health impacts

related to the presence of the landfill, the management of the impact of the landfill, the recruitment of workers for the realization of the facilities, priority must be given to the local population.

- ☛ for the local elected representatives, the concerns are the various pollutions around the landfill, the assaults related to the presence of the landfill, the olfactory nuisances of the neighboring populations, the nuisances related to the release of fumes, the high attendance of children in level of landfill, degradation of agricultural parcels, continued degradation of Lake Mbeubeuss, recurrent traffic jams caused by the proximity of the weighbridge with the road
- ☛ for the local populations, the fears are essentially a heavy pollution heavy pollution in the surrounding neighborhoods of the dump, the frequent release of smoke, the deterioration of the health conditions of the surrounding populations, the insecurity around the landfill, the low level of lighting of neighborhoods around the dump, increased crime in Keur Massar, livestock theft around the landfill, assaults and recurrent flights in the surrounding areas of the landfill, the deterioration of water, attendance at the dump by children, juvenile delinquency, the use of various drugs by young people at the landfill, the abundance of school, youth unemployment, the dangers of reuse clothes, bottles, dried fish in landfill and sold within the population, the lack of youth involvement and persons resources of the area, the communication failures between the populations and the project carriers, the low presence of the police in the landfill
- ☛ for recuperators, concerns are related to the loss of revenue related to recovery, difficulties in reinserting from the dump, accidents in the platform, non-satisfaction with the waste pickers' office, communication difficulties within association, weak communication with the UCG, the bad image of the load collectors, the risk of total losses of the income, the risk of not taking into account of all the recuperators of the discharge in the census, the absence of recuperators during the census, the existence of several investigations without purpose for the recuperators, the lack of recognition of the actions of the association, the difficulties of insertion of the workers of the discharge, the absence of insurance to be built into waste recovery centers, conflicts between waste pickers and the risks of increased crime in case of non-reintegration of dump workers

## 6. IDENTIFICATION AND EVALUATION OF IMPACTS

### ▪ Positive impacts

The impacts are mainly related to the compensation of the people affected by the project. All PAPs will have to be compensated in a fair manner taking into account the identification made. The positive impacts also concern the support of PAPs in their socio-economic reintegration and the integration of vulnerable groups into specialized reception facilities. Work on the resorption will require the creation of jobs in construction sites. The positive impacts of the project identified in the impact analysis show that the establishment of waste recovery facilities and the gradual rehabilitation of the dump will significantly improve the health and the environment.

The resorption and rehabilitation of the dump will eliminate chronic emissions related to the activity of the dump. This is the flight of dust, surface and deep fires on the dump

The gradual absorption and coverage of the dump will contribute to the reduction effect of smoke pollution. The site's cover, its fence and its layout will make it possible to avoid the contact with the waste, to reduce the atmospheric pollutions and water thus reducing the risks of diseases, improvement of the living environment and reduction of the expenses of health. The surroundings of the dump will be more attractive and less polluted. As a result, this change in the site's vision could affect the cost of land. The reduction of waste deposits on the site will improve the living conditions and health of workers and local populations. The rehabilitation of the dump will result in the long-term decline of pulmonary diseases in neighborhoods near the dump.

- **Negative impacts**

The negative impacts mainly concern nuisances related to the resorption works, the risks related to the start-up of the installations.

Negative impacts also relate to the economic losses of waste pickers and other workers in the landfill, as well as the owners of vegetable gardens and concessions that will be affected by the project.

- The pre-construction activities mainly concern the release and securing of the rights of way, the demolition and dismantling of the fixed installations of the landfill. It is expected that land and vegetation cover will be degraded, there will be risks of pollution of surface water and dust, the production of large amounts of noise and solid waste.
- Economic losses are expected at the level of places of business, agricultural activities or recovery around the landfill. The realization of the project will lead to a disruption of the economic activities of the actors of the landfill
- The liberation of rights of way and the demolition and dismantling of some existing buildings can be sources of social tension if all the settlement procedures are not well done
- The opening of trenches and laying of cables will cause temporary congestion in the project area
- The negative impacts are also related to the destructuring of the soil following excavations and earthworks; soil degradation in the agricultural perimeters adjacent to the site (connection to the CTT primary network and the composting platform); dust clearing during excavation; the increase in noise pollution due to machinery noise, health risks and worker safety
- The leaching of household products and medical waste by storm water that produces toxic leachates is an important source of alteration of groundwater quality.
- The different interventions (movement of the machines, loading and unloading operations, excavation, and various works) will generate high noise levels
- The importance of the planned work on an environment consisting mainly of waste can lead to harm to people's health. Thus, the risks of diseases with worker-waste contact is important.
- The flight of waste into the air (compaction of waste and remodeling of the dome) can cause inhalations by people
- The risk of accidents with the equipment involved in the construction sites for the transport of materials and personnel is important
- Etc.

The risk analysis revealed 14 dreaded central events.

- Collision risks;
- Risk of assembly failure (truck and skips) / truck overturn during unloading;
- Fire starts in the garbage reception areas;
- Fire starting in the sieve;
- Fire starting in the baler;
- Fire starts in the ball storage building;
- Fire starting in the feed hopper;
- Suspension of compost dust;
- leaking or overflowing leachates;
- Putting combustible dust in suspension + presence of an ignition source;
- Fire start in the building compost storage;
- Risks of biological and chemical contamination;
- Loss of containment of diesel fuel + ignition source
- Loss of integrity of the GE

From these dreaded events, we have:

- 6 who have an unacceptable level of risk;
- 8 whose level of risk is important

These six (6) unacceptable risk level events are likely to result in major accidents and create significant damage to property, people and the environment. This is the reason why they will be quantified according to the possibilities.

Given the flammable or combustible nature of the products on the site of both platforms, fire and explosion, as well as water and soil pollution represent the main risks related to the products for the facilities of the various activities.

## **8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

The Environmental and Social Management Plan includes:

- mitigation measures for identified negative impacts;
- the environmental selection process or screening;
- the environmental monitoring program;

The following elements should be monitored:

- Monitoring and control of the quality of surface water and groundwater around the site and surroundings.;
  - Air quality monitoring; it is a question of following and analyzing the impact of the project on the improvement of;
  - Follow-up of the liberation of the rights of way and the expenses: these are the places of business, the concessions, the agricultural surfaces located in the zone of influence of the site;
  - Monitoring the health of local populations through epidemiological surveys on infectious and respiratory diseases.;
  - Road safety monitoring. It concerns safety in relation to the strategic position of the site in relation to the two communes and the VDN3 and the disturbances associated with the level of car traffic and the risk of accidents.
- institutional arrangements for implementing monitoring;

For the correct implementation of monitoring and surveillance activities, institutional arrangements are needed to mitigate the negative impacts of the resorption project. Thus, it is a question of creating an interinstitutional synergy, in particular for the roles and responsibilities of each institution in the execution whose:

- Water and forests direction;
  - The municipalities of Malika and Keur Massar;
  - Department of the Environment and Classified Establishments;
  - Dakar Regional Environmental Monitoring Committee;
  - The Management Committee with the recuperators;
- measures to strengthen environmental management.

Given the new or even precursory nature of an environmental impact study on the resorption of landfill and construction of CTT and composting platform and the low feedback of experiences to date, capacity enhancements are of great importance. importance. The ESMP monitoring committee will have to explore similar projects in order to better carry out sui generis activities and propose corrective measures. In this sense, a benchmarking initiative must be considered before the operation of the facilities (CTT and composting platform)

The estimated costs of the environmental and social management plan and monitoring are evaluated as follows:

- Costs of mitigation measures for negative impacts: **140,000,000 FCFA**
- Costs of environmental and social monitoring measures: **53,000,000 FCFA**
- Costs of technical strengthening measures: **37,000,000 FCFA.**

## SENEGAL MUNICIPAL SOLID WASTE MANAGEMENT PROJECT

(P161477)

### EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL ASSESSMENT (ESIA) FOR THE EXPANSION OF THE EXISTING MBAO TRANSFER STATION

#### **A. Description of Project**

Senegal is currently preparing a Senegal Solid Waste Management Project (PROMOGED). The project will be funded by French Development Agency (AFD), the Spanish Agency for Cooperation and Development (AECID) and the World Bank IDA. The project is being prepared and will be implemented by the "Unite de Coordination et de Gestion (UCG) at the Ministry of Urbanism. The project will benefit the following agglomerations: Dakar; Thiès; North (including the regions of Saint-Louis and Matam); and the Casamance (comprising of the regions of Ziguinchor, Sedhiou, and Kolda).

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Specifically, the project will:

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- Component 3: Project management, coordination, communication, monitoring and evaluation.

The project aims at improving solid waste management services in several agglomerations (Component 2), produced by selected residential, administrative, commercial and industrial zones, especially the Dakar port zone. The collected waste will be sent to the Sorting and Transfer Center (CTT) in Mbao. A Transfer Station has already been constructed in Mbao back in 2011 by the Government. As part of the PROMOGED, the transfer station will be expanded to add capacity for manual sorting of waste to reduce the flow of waste going to the treatment and disposal facilities. Recyclable waste, such as paper, cardboard, and packaging, will be collected separately, and forwarded to the Mbao Sorting Center, purpose-built for separating recyclable waste. The Mbao CTT will also receive waste from 19 municipalities constituting the city of Dakar, in addition to the municipality of Mbao. In this process, priority will be given to manual sorting, primarily because it provides work for more people. To transport waste material, garbage trucks will have to be emptied directly, down gravitational chutes, into 30-cubic-meter containers. The containers will then be hauled to the sanitary landfill. The innovation here is a new loading system designed to optimize the cost of transporting waste to processing sites.

Sorting and Transfer Centers (CTT) operate midway between collection and processing of waste. Their main purpose is to allow the cost-saving offloading and reloading of garbage into larger containers.

## **B. Site Description, with Environmental and Social Implications**

On the basis of an analysis of the bio-physical and socio-economic context of the project site, we assessed a number of socio-environmental implications. Special attention will have to be paid to these implications during the design and construction phases, as well as in the operational phase, when the Center becomes operational.

The CTT is located inside the Mbao Forest Reserve. It can be reached by a public access route leading to Keur Massar, near the toll highway. The area is inside a fenced perimeter, where the existing transfer station is located.

- ⇒ To the north, the site is bordered by the Senegalese Water Service (SDE) access route and the Mbao forest reserve;
- ⇒ To the south, it is bordered by a relay station of the national telecommunications corporation (SONATEL), and by a stretch owned by the Pikine-Diamniadio toll highway company;
- ⇒ To the east, it is bordered by the Mbao forest reserve; and
- ⇒ To the west, it is bordered by the SONATEL access route and the Mbao forest reserve.

The survey identified three impact zones:

- A restricted survey zone, where the planned constructions are technically feasible. This zone covers 3 hectares. It includes a built-up area, where previous constructions are already present, and a second area, open for development.
- A more detailed survey area, which will be directly impacted upon by planned construction work. In accordance with recommendations of the Environmental Code, this zone extends over a radius of 500 meters around the site. This is where impact-sensitive units were identified.
- An extended survey area, or zone of socio-economic impacts of the project. This is the zone selected for socio-economic surveys. It includes all the municipalities whose waste is transported directly to the Mbao Sorting and Transport Center.

The following major environmental and social issues were identified:

- Preservation of forest resources;
- Preservation of socio-economic property and business;
- Preservation of the living environment, health and safety of populations in the neighborhood;
- Protection of water resources: This includes guaranteeing water quality by protecting water resources from accidental contamination by hydrocarbons, etc.;
- Management of drainage channels;
- Management of workers' safety and the security of neighboring communities;
- Management of debris from land clearing and tree cutting;
- Management of workers' safety at the Center for Sorting and Transport;
- Management of risks related to the breeding and spread of opportunistic fauna.

### **C. Institutional and Legal Framework for Project Implementation**

The institutional and legal framework for the implementation of the project requires the application of relevant international and national regulatory norms; stipulates roles and responsibilities of the project unit and other actors directly involved in project implementation; specifies legal and regulatory constraints governing operations within the Government's Environmental and Social Management Plan; analyzes discrepancies

between Senegalese law and banking security policy guidelines; addresses laws on cultural assets in the country, and recommends the establishment of proper institutional mechanisms for the protection of cultural assets.

Roles and responsibilities of the project unit and other agents directly involved in implementation, legal and regulatory constraints governing operations within the Government's Environmental and Social Management Plan (ESMP):

- The Directorate of Environmental Affairs and Classified Agencies, through the Regional Directorate of Environmental Affairs and Classified Agencies (DEEC/DREEC), is responsible for:
  - Approving environmental and social impact assessment (ESIA), and monitoring environmental and social impacts;
  - Assisting the PROMOGED team in drafting public tender documents, project execution check sheets, and construction documents (plans and specifications);
  - Assisting the PROMOGED by organizing capacity building programs for technical service agencies;
  - Monitoring compliance with environmental regulations;
  - Ensuring that the interests of populations in the project area are respected;
  - Conducting regular environmental inspections of works at the project site;
  - Forwarding a quarterly inspection report to PROMOGED and helping the project to conduct monitoring operations.
  
- The following are the responsibilities assigned to the PROMOGED
  - To request and file the monthly reports on project implementation from the Monitoring Mission and to analyze and take appropriate mitigation measures;
  - To conduct its own supervisory mission every other month;
  - To enforce respect for the safety and quality of life of populations in the construction zone;
  - To function as an interface between the project, local communities, and other agents involved with, or impacted by, the project;
  - To make sure that contracting enterprises observe recommendations in relevant environmental and social impact surveys;
  - To take charge of capacity-strengthening programs for technical services in the municipality;
  - To coordinate project implementation, along with internal monitoring of environmental and social aspects of project work; and to organize monitoring of environmental and social impacts of construction work.
  
- The work contractors is responsible for drafting its Environmental and Social Management Plan (ESMP). The plan must be approved by the PROMOGED, the Directorate of Environmental Affairs and Classified Agencies, jointly with the Regional Directorate of Environmental Affairs and Classified Agencies (DEEC/DREEC), and the Regional Commission for Environmental Monitoring (CRSE). The enterprise must

implement measures related to environmental and social regulations; and hire an official in charge of Environmental Hygiene and Security.

- The Monitoring Mission (MdC) is responsible for: drafting a detailed environmental and social monitoring plan to be approved by the PROMOGED, the Directorate of Environmental Affairs and Classified Agencies with the Regional Directorate of Environmental Affairs and Classified Agencies (DEEC/DREEC), and the Regional Commission for Environmental Monitoring (CRSE); implementing the plan; and

ensuring environmental and social monitoring of construction work, including due diligence on environmental and social measures contained in the construction contracts.

#### **D. Project Impacts and Risk Factors**

Identification and quantitative analysis of positive and negative impacts

##### **a. Positive Impacts of the Project**

During the construction phase:

- Jobs will be created;
- Small retail business activity will pick up;
- The local economy will benefit from the project;
- The project will help boost import tax volume.

During the operational phase:

- Jobs will be created;
- Living conditions for the population in Dakar region will improve.

##### **b. Negative Impacts and Environmental Risks Posed by the Project**

The following is an overview of negative impacts of the project in the construction and operational phases:

- **During the construction phase**

IMP1: Destruction of 264 bushes and tree saplings;

IMP2: Disruption of wild life habitats;

IMP3: Degradation of air quality; diffusion of greenhouse gases; rising noise pollution;

IMP4: Degradation of the acoustic environment;

IMP5: Unsightly changes in landscape; occurrence of eyesores.

- **During the operational phase**

IMP6: Atmospheric pollution and diffusion of greenhouse gases;

IMP7: Worsening traffic jams in Dakar city;

IMP8: Mechanical pollution from scattered machine parts and particles, degrading the landscape;

IMP9: Disturbance and degradation of the acoustic environment.

### **Overview of risks posed by the project during the construction and operational phases**

- **During the construction phase:**

RISK1: Soil erosion;

RISK2: Soil contamination;

RISK3: Water contamination;

RISK4: Disruption of livestock transhumance patterns, plus an increased likelihood of accidents;

RISK5: Occurrence or recurrence of asthmatic and other acute respiratory infections related to air pollution;

RISK6: Accidents due to the movement of vehicles and engines at the work site;

RISK7: Accidental excavations of ancient cultural, historical or archeological relics;

- **During the operation phase**

RISK8: Accidents involving personnel waiting for vehicles;

RISK9: Traffic pile-ups caused by the simultaneous arrival of numerous garbage trucks;

RISK10: Accidents during weighing operations;

RISK11: Accidents during maintenance work at the weighing station;

RISK12: Accidents during maintenance work on the weighing platform;

RISK13: Accidents related to inspection procedures;

RISK14: Workplace accidents related to mislabeling of incoming garbage;

RISK15: Outbreaks of acute respiratory infections;

RISK16: Air pollution at the work site due to vehicle exhaust gases;

RISK17: Accidents during offloading and storage of garbage;

RISK18: Accidents during inspection at the opening of garbage sacks and in the pre-sorting phase;

RISK19: Accidents during load clearing operations at the wharf;

RISK20: Excessive accumulations of debris in the storage area;

RISK21: Accidents occurring as trucks exit the work site;

RISK22: Atmospheric pollution caused by stevedoring work;

RISK23: Accidents occurring during stevedoring operations;

RISK24: Accidents caused by operators handling of sack opening machines;

RISK25: Accidents related to canal and trench scouring and unclogging operations;

RISK26: Accidents caused by overloaded trucks or containers;

RISK27: Accidents related to machine maintenance and cleaning;

RISK28: Physical stress caused by speed-ups in the sorting process;

RISK29: Traffic jams;

RISK30: Discomfort experienced while sorting;

RISK31: Stress in the sorting or pre-sorting cabin;

RISK32: Risks related to cramped postures and stressful motions;

RISK33: Risks related to the location of specific workstations;

RISK34: Risks related to a scarcity or impractical location of chutes;

RISK35: Risks related to work rhythm speed-ups;

RISK36: Risks related to sorting options;

RISK37: Problems caused by load handling during container offloading operations;

RISK38: Risks related to noise levels in drivers' and operators' cabins;

RISK39: Deteriorating eyesight and vision impairment;

RISK40: Dust-choked work stations;

RISK41: Excessive heat in the work place;

RISK42: Accidents during the transfer of garbage into receptacles;

RISK43: Risk of contracting acute respiratory infections while moving sorted garbage into receptacles;

RISK44: Accidents caused by wrong positioning of conveyors in trenches;

RISK45: Stresses due to faulty machine/operator coordination;

RISK46: Risks related to poorly adapted workstations;

RISK47: Risks related to faulty machine-to-machine coordination;

RISK48: Accidents due to poorly organized working conditions;

RISK49: Accidents caused by trailing cables on pedestrian walkways;

RISK50: Accidents related to improper threading of high guide wires;

RISK51: Accidents during the unrolling of tubes and wires;

RISK52: Improperly organized work stations;

RISK53: Risk of tightly packed bales catching fire;

RISK54: Accidents due to movement in poorly lit places;

RISK55: Accidents caused by failure to respect work zone demarcations;

RISK56: Accidents caused by improper handling of sacks on multilevel shelves;

RISK57: Accidents caused by loads bursting at the seams during storage;

RISK58: Accidents caused by truck loading with stevedoring machines;

RISK59: Accidents related to improper distribution and sacking of unsorted garbage;

RISK60: Accidents caused by the presence of glass in garbage;

RISK61: Accidents caused by the presence of broken glass in garbage;

RISK62: Accidents caused by the presence of oversized packages;

RISK63: Accidents caused by the presence of infectious disease treatment waste from hospitals in transported waste;

RISK64: Water resource contamination;

RISK65: Soil contamination;

RISK66: Outbreaks of hearing and related diseases;

RISK67: Proliferation of plastic;

RISK68: Disturbances due to failure to recruit local labor;

RISK69: Gender-based violence;

RISK70: Accidents occurring during transport of electrical appliances and other objects;

RISK71: Fire outbreaks;

RISK72: Biological hazards;

RISK73: Chemical hazards;

RISK74: Physical hazards;

RISK75: Breeding and spread of opportunistic wild life;

RISK76: Child labor;

RISK 77: Risk related to the inrush of labor to the project site.

## **E. Surveys and Interviews Conducted**

Two types of surveys and interviews were organized. The purpose was to gather data on agents involved. Focus group sessions were held for farmers and livestock herders. Individual interviews were organized for personnel of technical services and local authorities.

During focus sessions with herders and farmers, the exhibition of scale models showing planned constructions and the garbage collection circuit helped considerably to persuade them the project was worthwhile. Focus group sessions for various stakeholders discussed the following topics:

- How would the public view the project?
- Opinions and apprehensions concerning the project;
- Expected environmental impacts;
- Likely impacts of the project on economic business;

- New stresses occasioned by the presence of the Waste Sorting and Transport Center in the community of Mbao;
- Support requirements;
- Need for capacity building programs for project monitoring personnel;
- Youth employment opportunities in the planned Sorting and Transport Center;
- General Recommendations.

### **Interviews with Service Personnel**

Interviews with personnel from technical services and decentralized local government authorities covered a wide variety of topics. Issues specific to each project zone where installations were to be sited were taken into account. At the same time, recommendations of a more general type, common to all sites, were considered. Before meetings with institutional agents, we visited different sites. Our aim was to take note of the way each site was structured, its exact location, its situation in relation to nearby houses, the human and socio-economic activities conducted there, the physical features and geographical characteristics, etc. This exercise more or less determined the identification of stakeholders.

### **Major concerns expressed by different groups of personnel:**

- The emission of nasty smells during the operational phase at the site;
- Pollution of underground water;
- The risk of accidents due to the arrival of garbage trucks;
- Disruption of livestock transhumance movements, entailing accident risks;
- Sound pollution caused by frequent ins and outs of garbage trucks;
- Proliferation of used plastic bags, endangering livestock;
- The risk of livestock exposure to toxic wastes;
- Traffic jams near the Waste Sorting and Transport Center;
- Worries that the site would become less accessible due to work on the new Regional Express Railway (TER);

- Long-term storage of waste at the site;
- Apprehensions about the local population being excluded from project contract negotiations;
- The shrinking of the agro-pastoral zone caused by the construction of the Waste Sorting and Transport Center.

## **Summary of Recommendations**

### **For the Public:**

#### **⇒ Raising awareness**

- Village chiefs are to be brought into the communication process of the Solid Waste Management Coordination Unit (UCG);
- The Lebou community in Mbao is to be associated with the project through the organization of public meetings, traditionally known as *penc*. The aim is to bring the community to accept the project. It is a fact that the project cannot succeed without community involvement;
- Principal dignitaries of the Lebou community are to be informed of the advantages to be drawn from the siting of the Solid Waste Sorting and Transport Center at Mbao. At the same time, care must be taken to explain attendant inconveniences;
- Before organizing an open consultative meeting with the general population, a smaller consultative meeting must be held with the municipal council.

#### **⇒ Support services for the population**

- The project will supply fertilizer and manure to farmers and market gardeners working in the Mbao nature reserve;
- The project will recruit local labor;
- The project will support the community by supplying it with decent drinking water. This can be done by advocating the shifting of some resources from the water processing plant in Thiaroye to the nature reserve;
- In hiring workers for the Solid Waste Sorting and Transport Center, priority must be given to local labor;
- A special support component for the municipality of Mbao must be developed as part of the program;
- A shuttle service must be organized for garbage collectors. This will ensure that collectors do not loiter all over the nature reserve. One good reason is that visitors, including students and children, come regularly to the reserve, and their safety must be ensured;
- The project should help the water supply and forestry services in their supervisory work.

⇒ **Communication:**

- A proper communications strategy must be implemented, to make sure that grassroots communities are involved in the project, and aware of its usefulness;
- To ensure public approval of the project, all communities in the project area should be invited to participate in public consultative meetings, in construction work, and in the actual running of work sites.

⇒ **Good practices**

- Care must be taken not to allow people to build houses near the project site, as was the case with the Mbeubeuss dump site;
- In effect, bad habits and practices developed at Mbeubeuss must not be imported to Mbao;
- Care must be taken to ensure that the Solid Waste Sorting and Transport Center at Mbao does not turn into a source of pollution;
- Care must be taken not to exceed the Center's storage capacity, sorting capabilities, and transport capacity. Respect for these limits will reinforce the community's trust in the project;
- To keep garbage from giving off foul smells, it must not be left stagnant for more than 24 hours;
- When tree cutting becomes necessary, all forestry service regulations and exigencies must be complied with;
- The project should provide money to finance programs designed to offset negative impacts of its work.

**For institutional agents:**

The main recommendation put forward by the generality of agents interviewed and consulted was this: It is necessary to draft an efficient communications strategy. This strategy must be designed for, and staffed by personnel drawn from, all participative groups and communities directly or indirectly concerned with the project. And to stimulate their commitment, it will be necessary to set up a permanent framework for dialogue. This is the key recommendation. In addition to this, the project was requested to take a number of other specific recommendations into account:

- In the Environmental and Social Impact Management Plan (PGES), it will be necessary to define the precise mechanism that will enable the Directorate of Environmental Affairs and Classified Agencies (DEEC) to receive resources earmarked for institutional reinforcement programs, in support of project monitoring services;
- All available documents on the legal status of project sites should be gathered together in a single Environmental and Social Impact Survey document;
- In the descriptive section of the document, a prevailing wind compass diagram should be presented, indicating the potential impact of waste particles on residential units in the immediate and surrounding areas of the sites, with indications as to wind speed and direction;

- A model situation should be established, for reference purposes;
- Risks related to each workstation should be analyzed, with an emergency plan listing security measures to be taken into consideration;
- An inventory should be drawn up of Classified Installations for Environmental Protection linked to the project;
- To reinforce institutional capabilities, discussions should be held with the Directorate of Environmental Affairs and Classified Agencies, focused on capacity strengthening for the environmental monitoring process;
- Contact should be established with health structures in the nearest project zones, in order to collect data on the health situation. Such contacts will also facilitate prompt action in emergency cases requiring evacuation or medical assistance of personnel at the Center;
- Protective measures must be taken for the population, for the environment, and for users of waste materials from the Center, regarding proper handling of waste;
- All stipulations of the Labor Code must be observed and integrated into the contract process, the support system, medical coverage, subscription to Social Security and the Medical Insurance Scheme, or to the Senegalese Retirement Insurance Institution (IPRES), so that all personnel are provided with the minimum necessary coverage.

## **F. The Environmental and Social Impact Management Plan (PGES)**

### **a. Measures Involved**

#### **Minimizing Noise Pollution**

- It will be necessary to use the least noisy equipment, and to make sure it is regularly maintained;
- Working staff will have to be supplied with individual protective equipment such as ear plugs or muffs, and helmets;
- The time any worker spends exposed to high noise levels will have to be limited;
- Noisy machines will have to be insulated or isolated.

#### **To minimize unpleasant smells**

- As garbage arrives at the site, a preliminary sort should be conducted, to eliminate waste materials likely to rot, or to reduce their quantity;
- The length of time waste is stored must be shortened, and stored waste must be protected from bad weather;
- Deodorant solutions can be sprayed over stored waste;
- Workers should be supplied with individual protective equipment.

#### **To minimize health risks**

- Health safety instructions must be clearly displayed;
- Personnel must be informed about risks involved in waste handling. They must be provided with individual protective gear such as masks and gloves, of appropriate design and in sufficient quantities;
- Wherever working conditions, safety precautions and hygienic norms make it necessary, care must be taken to ensure that personnel wear their individual protective gear properly and regularly;
- Workers must undergo health checks before hiring. After they are hired, they must be given regular health check-ups;
- Dressing rooms and decent toilets with water faucets must be built into the facilities, with enough to serve each part of the site;
- Physical conditions at the work place, such as ventilation, should be up to acceptable standards;
- Workers must be kept informed about health risks, hygienic practices, and general cleanliness.

### **Preventing and managing contamination after accidental leakages, and the spillage of dangerous substances**

- Good practice norms and regulations governing the storage and handling of dangerous substances must be applied;
- Machines must be subject to regular technical inspection and maintenance;
- Properly waterproofed garages must be constructed for the maintenance and refueling of vehicles and machines;
- Absorbent floor cover such as sawdust or sand must be spread in sufficient volumes in areas where dangerous materials are stored and handled;
- Hazardous waste such as used oil and dirty rags should be collected separately, and sent to an enterprise specially equipped to process them.

### **Management of waste products, including construction site and end product waste**

- Materials used must be non-polluting or minimally so; and they must be recyclable;
- To reduce waste at the start of the work process, preference must be given to the use of returnable packaging, and throwaway shavings and parings must be cut to a minimum;
- Waste material sorting must be organized systematically, so as to make subsequent handling easier;
- Separate types of waste matter should be directed toward a processing chain that conforms to regulatory norms, and possesses local facilities for recycling, processing, or eliminating waste;
- The project must keep track of especially toxic or dangerous waste substances. This can be done by ticketing such wastes with identification labels.

### **Management of especially toxic or dangerous wastes**

- Toxic or dangerous wastes must be collected and stored in sealed bags or bins;
- Containers of toxic waste should be stored together in waterproof and weatherproofed areas;
- Toxic waste treatment must be entrusted to certified specialist firms capable of using waste to generate energy. Where it is necessary to eliminate such wastes, proof of final elimination must be registered on returned identifying labels.

### **Management of ordinary waste matter**

- Ordinary waste materials must be collected and sorted where generated;
- A conscious effort must be made to encourage profitable reuse of waste materials like cement bags, bits of plastic, and pieces of wood, for producing energy;
- End product waste should be systematically removed to a location agreed upon jointly by the community and the team in charge of supervising construction work;
- Properly equipped trucks must be used when transporting waste materials, to prevent chips, dust or other waste flying off or dropping in transit;
- Cleanliness within and around the Waste Sorting and Transport Center must be ensured;
- Waste matter dropped in transit or left after canal scouring operations must be collected and sorted;
- End product waste materials should be removed to the final elimination site.

### **Management of outflowing liquid waste**

- A system of decantation or organic purification, designed to reduce biodegradable organic content, must be provided for sewage water. This can be done by constructing water-tight septic tanks, divided into compartments, and designed for periodic emptying. Alternatively, sewage water treatment can be entrusted to a certified specialist firm;
- A system of pre-treatment must be provided for water used in washing cars and trucks. Decantation basins, for example, constitute an option. An alternative is to entrust such water treatment to a certified specialist enterprise;
- A separate, leak-proof maintenance bay, equipped with an oil separator and sludge filter, should be installed for the maintenance of machines and vehicles;
- On rainy days, waste matter should be covered to prevent leaching;
- Runoff leach suspensions and sludge from garbage compaction should be collected for treatment, or handed over to a certified specialist firm for processing.

### **To manage dangerous substances**

- Vehicles used for transporting dangerous substances must be fit for purpose, equipped with hazard prevention appliances and fire extinguishers;

- Drivers must be tested for competence, as well as for their ability to observe safety regulations and to initiate emergency procedures in case of leakages or spillages of dangerous substances, explosions, or fire outbreaks. Such emergencies are particularly likely in accidents when vehicles get overturned;
- Drivers must be routinely checked for their observance of traffic regulations like speed limits, avoidance of drunk driving, and abstinence from drug abuse;
- Drivers must be provided with printed safety data forms for the substances they transport;
- Products delivered at work sites must be inspected to make sure that their registration data and labels are correct, and that no packaging has been tampered with;
- Vehicles must be routed through safe areas. They must avoid sensitive, off-limit zones and nature reserves;
- At each work site, tracks or corridors reserved for fuel transport must be clearly demarcated from lanes for the general public.

### **Storage of hazardous substances at the construction site**

- Construction plans for project facilities must be submitted to the Works Inspection and Control team;
- Before constructing a fuel storage reservoir, a declaration of Classified Installations for Environmental Protection (ICPE) must be submitted to the Regional Directorate of Environmental Affairs and Classified Agencies in Dakar;
- Workers must be informed about risks related to the products handled, and procedures for preventing accidents;
- A leak-proof storage reservoir must be constructed for storing diesel fuel. Applicable specifications are as follows: (i) If the reservoir comprises just a single basin, the reservoir should measure at least 100% the volume of the basin. (ii) If the reservoir comprises more than one basin, the applicable volume of the reservoir should be at least equal to the larger of the following volumes:
  - 100% of the capacity of the larger basin, or
  - 50% of the total capacity of all basins within the same reservoir.
- Safety instructions must be prominently displayed; and care must be taken to ensure that safety data forms accompanying each substance are within reach in the storage area;
- Care must be taken to ensure that storage areas are leak-proof; where necessary, they should be rendered weather-proof against rain etc.
- Recommendations for the storage of chemical substances must be observed, with special attention to the need to keep incompatible substances securely separate;
- Strict attention must be paid to product labels;
- Fire extinguishers and other safety equipment must be installed;
- In the operative phase, pesticides and other anti-rodent chemicals may be used; care must be taken to eliminate risks linked to their use;

- Absorptive materials and sponges must be provided to deal with likely leaks and spillages of chemical substances. Sponges can help to retrieve dangerous substances after spilling.

### **Handling hazardous substances at the construction site**

- Purpose-built, sealed off areas should be created for handling dangerous substances. These areas should be equipped with absorbent kits for sopping up accidentally spilled or leaked liquids;
- Workers should be informed about risks posed by various substances, and ways of preventing or dealing with them;
- Workers should be supplied with individual protective gear such as masks and gloves;
- Contaminated soil should be collected and isolated in leak-proof containers, in a weatherproofed area, pending decontamination or assignment to a certified specialist firm for treatment.

### **Measures for the preservation of natural habitats and biological resources**

- Boundaries assigned to the project site must be respected. Forestry regulations, especially those forbidding logging, should be enforced;
- Care should be taken to ensure that project personnel observe national laws governing hunting and wildlife protection;
- Night work should be avoided. It requires artificial lighting, which confuses birds;
- Regular fire prevention and fire-fighting exercises should be organized for personnel at construction sites.

### **Measures for curtailing the spread of opportunistic animals**

- Leftover food or other such garbage must not be left out in the open at the work site. It is likely to attract birds and stray dogs;
- Waste should not be left untreated for long periods. Such garbage attracts opportunistic animals like rodents, which in turn attract predators and reptiles;
- Niches and potential hiding places for animals should be destroyed. Regular exercises in rat control and anti-pest spraying should be organized.

### **Avoiding blockages of natural drainage channels**

- Before construction begins, a topographic survey should be conducted to identify potential flood basins;
- Gravel and other building materials should be kept away from runoff water channels;

- A water drainage system should be created to drain runoff water away from the site.

### **Managing impacts on air quality**

- Vehicles transporting dusty materials should be covered to keep the dust from flying off;
- Construction and work sites, and routes leading to them, should be regularly sprinkled with water;
- Only properly equipped vehicles and machines should be used. Their maintenance should be regular and rigorous;
- Burning of waste matter on project sites should be forbidden;
- On access roads, a speed limit of 30 kilometers/hour should be enforced;
- Sorting zones should be well ventilated.

### **Measures for safeguarding water resources**

- Rules and good practice norms for the storage and handling of hazardous materials should be observed;
- Sealed off areas should be provided for refueling vehicles and machines, as well as for their maintenance;
- Gravel and leftover construction materials should not be allowed to block runoff drainage channels;
- When drainage channels get blocked, they should be promptly cleared;
- Leached waste and sludge from compacted waste should be collected and processed. Alternatively, they should be entrusted to a certified specialist firm for treatment;
- A drainage system for rainwater should be constructed within and around the project site.

### **C. Specific Environmental, Hygienic and Safety Provisions**

- Specific provisions should be included for hygiene, health and cleanliness at and around project facilities;
- Specific measures should be adopted for safety and security at construction sites;
- Specific measures should be adopted for controlling vehicle traffic at construction sites, with clear security instructions.
- Regular information campaigns about sexually transmitted diseases, HIV and AIDS should be organized for communities living near project sites.