IMPACTO
PROJECTOS E ESTUDOS AMBIENTAIS

ZAMBEZIA FORESTRY PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Unofficial English Translation of the Non-Technical Summary

Version for Public Discussion

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FACTSHEET

Prepared by

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LIST OF ACRONYMS AND ABBREVIATIONS

SEA	Strategic Environmental Assessment
ACIS	Association of Commerce and Industry
ACP	Portucel's Concession Area
AEA	Literacy and adult education
AF's	Households
EIA	Environmental Impact Assessment
AID	Area of Direct Influence
AII	Area of Indirect Influence
AIR	Regional Influence Area
ANE	National Administration of Roads
ARA	Regional Water Administration
ART	Road Accident (Transportation)
ASA	Environmental Health Area
ASC	Community Health Assessment
AVC	Areas of Conservation Value
BBOP	Business and Biodiversity Offset Program
BES	Health Epidemiology Bulletin
WB	World Bank
BPN	Low Birth Weight
BR	Republic Bulletin
CC	Advisory Board (of the districts or administrative posts)
CCD	District Advisory Council
CCL	Locale Advisory Council
CENACARTA	National Centre of Cartography and Remote Sensing
CFM	Railways of Mozambique
CLC	Community Liaison Committee
CS	Pro Census and Survey Processing System
CS	Health Center
DALYs	Disability-adjusted life expectancy (Disability-Adjusted Life Years)
DBH	Diameter at breast height
DNEAP	National Directorate of Studies and Policy Analysis
DNT	Non-communicable diseases
DPCA	Guidelines for Accident Contingency Planning
DPDAF	Guidelines for the Deforestation of the Forest Areas Program
COPD	Chronic Obstructive Pulmonary Disease
DTS	Sexually transmitted disease
DUAT	Rights to the use of land
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EN	National Road
EP1	Elementary school from 1st grade
EP2	Elementary school of 2nd degree
EPC	Primary Education Completed
EPDA	Environmental Pre-feasibility Study and Definition of Scope
PPE	Personal protective equipment
ER	Resident Engineer
ER	Regional Road
ESG	General Secondary Education

ESG1	General Secondary School 1st cycle
ESG2	General Secondary School 2nd cycle
ETP	Professional Technical Education
FAO	Food and Agricultural Organisation (United Nations Organization)
HCVF	High conservation value forest
FEB	Biomass Expansion Factor
FL	Lymphatic Filariasis
FSC	Forest Stewardship Council
GOM	Government of Mozambique
GHG	Greenhouse Gases
GIS	Geographic Information System (GIS)
GLI	Manager for Institutional Relations
GPS	Global Positioning System
Hab.	Inhabitants
HIV	Human immunodeficiency virus
HCVA	High conservation value area
HTS	Soil-transmitted Helminthiasis
IAIA	International Association for Impact Assessment
IDS	Demographic and health survey
IFC	International Finance Corporation
IFP	Institute for Professional Training
INE	National Institute of Statistics
INGC	National Institute for Natural Disaster Management
INSS	National Social Security Institute
IPCC	Institutions for community participation and consultation
ARI	Acute respiratory infections
ISO	International Organization for Standardization
STI	Sexually transmitted infections
IUCN	International Union for Conservation of Nature
LFFB	Forest and Wildlife Law
Loc.	Localities
LOLE	Local organs of state law
MAE	Ministry of State Administration
PAT	Land access procedure
DTM	Digital Terrain Model
MICOA	Ministry for the Coordination of Environmental Action
MINED	Ministry of Education
MOH	Ministry of Health
MPD	Ministry of Planning and Development
MPP	Potentially dangerous material
MSE	Multiplier of ecological sensitivity
Mt	Meticais
n	Sample size
NDVI	Normalized Difference Vegetation Index
NT	Technical Standard
CBO	Community-based organization
OHSAS	Occupational Health and Safety Assessment Series
HI	Press Officer
OLC	Community Liaison Officer

Who	World Health Organization
NGO	Non-governmental organization
OSS	Health and safety officer
PA	Administrative Post
PAs	Affected parties
PCF	Program for Conservation of Wild Fauna
PCHF	Program Conservation of Habitats and Flora
PCPHC	Conservation Plan for Historic and Cultural Heritage
PCS	Social Communication Plan
PDs	Displaced parties
AEP's	Environmental Education Program
PES	Economic and Social Plan
PGA	Environmental Management Plan
PGAA	Advance Environmental Management Plan
PGIRE	Integrated Management Program for Waste and Effluents
pH	Hydrogen potential
PIAs	Stakeholders and affected people
PIPD	Integrated protection of pests and diseases
PMA	Water Monitoring Program
PMS	Soil Monitoring Plan
UNDP	United Nations Development Program
Pov.	Village
PRAD	Degraded Areas Recovery Program
PS	Health clinic
PSAA	Small water supply system
PSC	Community health profile
PSS	Health and Safety Plan
PVMS	Plan for Improving Livelihoods
PVSAC	Program for the Recovery of Peasant Farming Systems
PTMPF	Prevention of mother-to-child transmission
REDD +	Reduction of emissions from deforestation and forest degradation
RHEA	Environmental Impact Study Report
RGPH	General Census of Population and Housing
SADC	Southern African Development Community
SDAE	District Service for Economic Activities
SDEJT	District Service for Education, Youth and Technology
SDPI	District Service for Planning and Infrastructure
SDSMAS	District Service for Health, Women and Social Action
SPFFB	Provincial Services for Forests and Wildlife
SRTM	Shuttle Radar Topographic Mission
TB	Gross Rate
TB	Tuberculosis
TDM	Telecommunications of Mozambique
TOR	Terms of reference
EU	European Union
UHF	Ultra High Frequency
UM	Mapping Units
UNCBD	United Nations Framework Convention on Biological diversity
UNFCCC	United Nations Framework Convention on Climate Change

UO	Operational units
USAID	United States Agency for International Development
PICU	Technical Unit for the Implementation of Projects

NON-TECHNICAL SUMMARY

A. INTDOCUTION

The subject of the present Environmental Impact Assessment study (EIA) comprises a forestry plantation in Zambezia, to be established on 120,000 ha - equivalent to about two-thirds of the total area of 174,000 hectares allocated to the Company -with species of the genus *Eucalyptus*.

Generally speaking, the implementation of forestry projects is regarded as a very important contribution to the recovery and utilization of vast rural areas thus contributing to local and national economic development, contributing moreover to the establishment of a new for the country industry, pulp and paper manufacturing.

The proposal for the establishment of the eucalyptus plantations was submitted to MICOA by Portucel Mozambique. Portucel Soporcel group is the largest European producer of uncoated fine paper. In 2008, it was the biggest European producer of bleached eucalyptus pulp (2nd in terms of market sales), and one of the largest worldwide. The Group targets sales to more than 100 countries on five continents, especially to Europe and the United States, and 21% of its exports are to the markets outside the European Union.

Impacto Lda. is the environmental consultant hired by Portucel Mozambique to conduct the environmental impact assessment (EIA) of the activity.

The reports of the environmental impact assessment (REIA) will be submitted for approval to the Ministry for Coordination of Environmental Action (MICOA), in accordance with the provisions of the regulation on the procedure for environmental impact assessment (Decree No. 45/2004 of 29 September) for category A projects.

B. The PROPONENT

The activity is proposed by the company Portucel Mozambique Lda, – Forest and Industrial Development Company. This company is registered in Mozambique and is owned wholly by Portucel Soporcel Group, through the Group's companies Portucel Soporcel International SA and Portucel SA.

The Portucel Mozambique contacts are as follows:

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C. SUMMARY DESCRIPTION OF THE PROJECT

C. 1. Background

Portucel Mozambique presented, in March 2008, an expression of interest to the Government of Mozambique for the implementation of an integrated forestry project, with various components such as establishment of the forestry base, pulp production and green energy, and ultimately paper production, to be implemented in two provinces: Manica and Zambezia. In July of the same year, the Government of Mozambique expressed interest in supporting the project, and actions were initiated to begin its first phase or component – *establishment of the forestry base*. The remaining components of the integrated project will be taken into consideration at a later stage. The subject of the present EIA the forestry base in Zambézia province.

The project envisions the integration of non-contiguous plots of eucalyptus plantations, corridors of protection for water courses, road infrastructure network and population clusters in a single space, which would create spaces dedicated to a variety of other activities including environmentally-oriented activities, agribusiness, social or forest protection. It is expected that the actual forest occupancy rate will be 69% of the total areas allocated to Portucel (with remaining areas available for other activities).

C. 2. Phases of the Project

The main activity of the project is the establishment of a forestry base in several identified parcels. Beyond forest operations, the Project foresees other complementary activities:

- Construction and maintenance of road network and infrastructure, compliant with technical standards for construction and maintenance of forest infrastructure of Portucel Mozambique (NT04);
- Agricultural extension work with a view to fostering higher productivity in agriculture and/or higher agriculture production by local populations;
- Recovery of significant areas of native forest.

The activities to be carried out by the project are summarized in **Table I**.

Table I. Main Activities of the Project

Activity	Construction Phase	Operational Phase
	▪ Preliminary study of the areas; o *Edafoclimatic study;* o *Socio-economic characterization;* o *Delimitation and geo-tagging of forestry parcels;* ▪ Construction of forestry infrastructure; ▪ Forestry operations: o *Site preparation;* o *Planting, fertilizing and plant health treatments;* o *Care and maintenance* ▪ Opening of the road network; ▪ Agricultural extension to communities.	▪ Cutting, transport and replanting; ▪ Soil and water conservation; ▪ Maintenance of the road network; ▪ Establishment of the system for fighting fires; ▪ Recovery of adjacent native forest. ▪ Agricultural extension to communities.

C. 3. Location of the Project

The figure below shows the location of the forestry project in Zambezia.

The area to be afforested in Zambezia province is concentrated on the Ile District and the surrounding areas in the District of Namarrói. The project covers two Districts and five administrative posts (PA), in particular:

- Ile district (Ile-headquarters, Mulevala and Socone); and
- Namarrói district (Namarrói — Namaroi-headquaters and Regone).

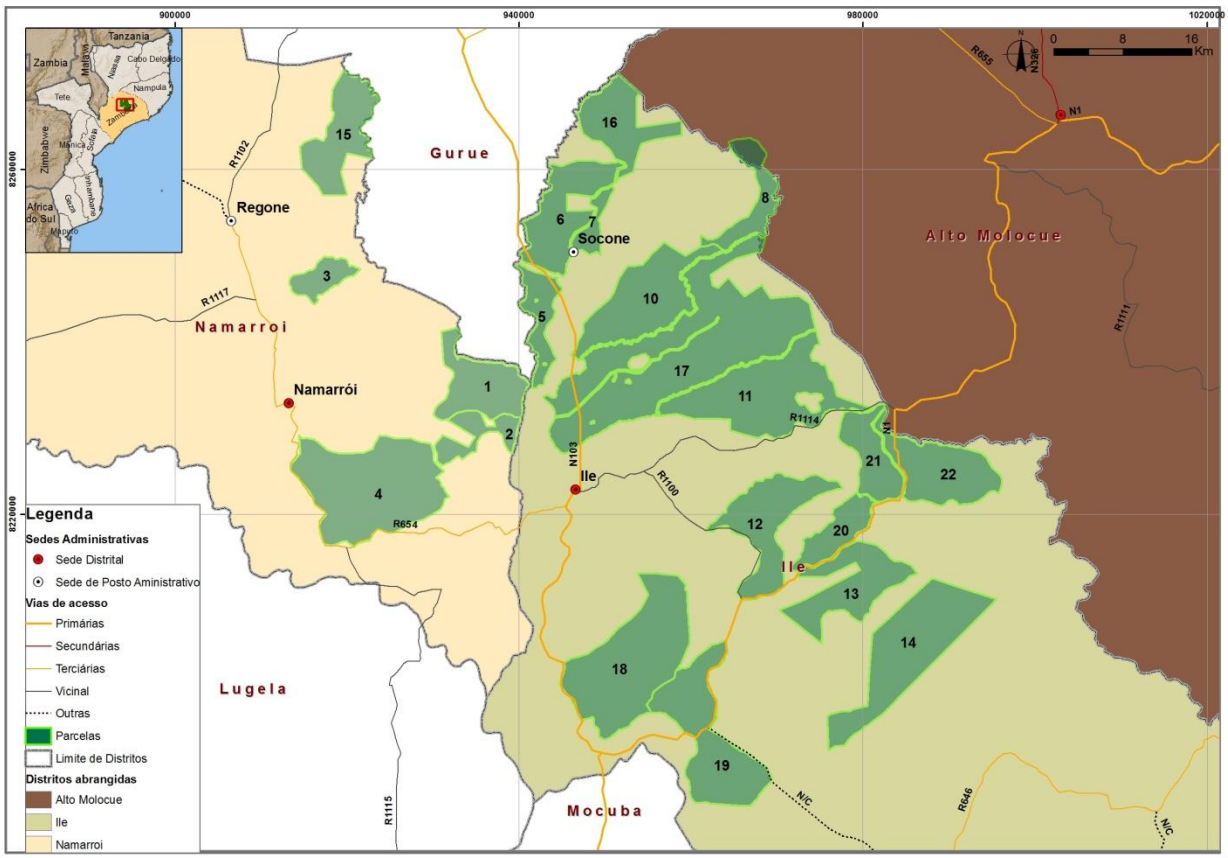

Figure (I). Location of the Plots of the Forest Project in Zambezia

C. 4. Investment Value

The estimated investment value of the project of establishment of the forestry base of Portucel Mozambique in Zambezia is USD 198,000,000 dollars.

C. 5. Main Activities

The project foresees a continuously growing and progressive installation of stands of eucalyptus, particularly hybrid clones GU (*Eucalyptus grandis x Eucalyptus urophylla*), with a spacing of 3 x 3 meters. This activity includes a set of forestry operations, ranging from soil preparation for planting to native forest conservation measures and infrastructure maintenance. The plantations are forecast to cover approximately 69% of the total area allocated to the project in about 12 years. The target rotation period is 8 years, at the end of which the trees will be felled, cleaned and transported to the paper pulp mill.

As a first step, to develop optimal technical solutions, the Company will conduct a set of experimental forest activities in order to assess the feasibility of the project and obtain reliable silviculture solutions and genetic material for the start-up phase of the project. In particular, the Company will install a network of field trials with different genetic material of the genus Eucalyptus from South Africa, Brazil and Portugal will be established to assess their adaptability and forest productivity under different soil and

climate conditions of that exist in the areas of Portucel DUATs. , using the best practices available on the basis of technical benchmarks of Portucel Mozambique.

Forestry operations will be preceded by a planning stage where, for each parcel to be afforested, any areas of environmental protection shall be demarcated and a set of constraints (technical, operational and social) will be applied in order to ensure the establishment of protective buffers around the network of waterways, roads or villages. A set of protective corridors with a minimum width of 100 meters to each side of smaller roads has already been factored into the project design as well as riparian buffers, even up to a maximum width of 200 meters along watercourses and the main roads.

Even though soil, climate, terrain, the degree of slope, types of vegetative cover, etc., might require changing the sequence, intensity or duration of forestry operations, projections are based on an 8-year forestry cycle. At the end of this period, the trees are felled, cleaned and transported to the factory for production of paper pulp (**Figure II**). After cutting, the area is regrown through coppicing (through which the cut-back stumps generate new stems, of which the best are allowed to continue growing into new tree trunks) or replanted anew with the eucalyptus clones for another forest cycle.

Activities	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
(I). Preliminary Study of the areas								
Edafoclimatic study								
Socio-economic assessment								
Delimitation and geotagging of parcels								
II. Obtaining the DUATs								
Community consultations								
Realization of the EPDA								
Preparation of the Forest Project								
Approval of the investment project								
III. Ground Preparation								
Cleaning of vegetation								
Ground preparation								
Installation of forestry infrastructure								
IV. Planting								
Fertilization								
Planting								
Phytosanitary treatments								
V. Maintenance/Maintenance								
Weed control								
Phytosanitary treatments								
Fertilization								
Maintenance of road network								
Cutting back grass								

Figure II. Operational Development Cycle

Operations associated with forest installation aim to obtain a healthy and sustainable afforestation and comprise:

- Preparation of the site —removal of natural vegetation (clearance, removal of trees and spreading or incorporation of plant material into soil);
- Followed by soil preparation, including deep soil mobilization by ripping or subsoil tillage, done along topographic contours and aimed at promoting the development of a good root system of plants and the protection of soil against erosion;
- Forestry infrastructure are installed in parallel – construction of forest roads, the opening of firebreaks around areas to be planted and construction of water points;
- Deep fertilization in connection with digging planting holes or at the time of planting, aimed at the maintenance of soil fertility and the adequate supply of vital nutrients to the development of trees;
- Finally, the planting process – manual or mechanical placement of eucalyptus plants in planting holes, in a pattern of 3 x 3 meters.

C. 6. Complementary Activities

In parallel with the beginning of afforestation and conservation work, forest parcels will be fitted with forest infrastructure: roads, firebreaks and other infrastructure. This infrastructure is critical to support the forestry activities and promote a mosaic pattern and a vertical discontinuity of the forest cover in order to preserve the viability of existing settlements, including for protection against forest fire.

In addition to the existing road network, it will be necessary during the establishment of the project to open up forest tracks of a total length of 1200 km in total across the two provinces. This operation will be performed with graders and/or tractors equipped with caterpillar tracks, segmenting the forest tracks at regular intervals by cut-offs to allow for the run-off and drainage of rainwater. Approximately 240 km of existing roads (forest paths and small roads) will be upgraded, and will complement the network of additional forest tracks to be built. 280 km of perimeter firebreaks of 6 meters in widths will be opened up as well.

Finally, in the areas where roads/firebreaks will intersect with the waterways, the Project foresees the construction of culverts, drain pipes, etc., in order to reduce erosion problems and to allow for the natural flow of water. Generally speaking, use of drainage pipes of 80 cm in diameter at the intersection of the road network with waterways, according to Portucel Mozambique's technical standard for the construction and maintenance of forest infrastructure (NT04). The rehabilitation of two small bridges is also planned, for access to different parcels where the project is to be established.

C. 7. Plantations and Forestry model

A forest plantation with industrial purposes must follow a set of management rules that simultaneously consider economic, social, technical, operational and environmental conditions, optimizing the use of the forest spaces and adding value to society as a whole.

The first phase consists of the installation of plantation of eucalyptus stands, which in turn comprises a set of forest operations beginning with the preparation of the area for planting, fertilizing, planting itself and ending roughly with the last irrigation, according to the forestry model below. From there begins the maintenance activity, described in Portucel Mozambique's technical standard NT02. The installation phase has greater vulnerability for the Project, as the young plants are extremely sensitive to competition with spontaneous vegetation, attacks of pests and diseases, water shortages and high temperatures. Still,

installation activities often require special care to prevent potential environmental impacts, essentially on the soil and water, as well as the disruption of ecosystems with conservation value, archaeological sites and places with historical/cultural significance or leisure sites. All of these aspects will be included in the forest management plan, at local level. As such it is the key element of integrated planning of activities that will be performed in the field at the time of actual implementation.

C.8. Nurseries

Another forestry activity which is fundamental for the success of the project is the establishment of nurseries to produce eucalyptus plants. This has been the subject of conceptual and logistical studies to define the system, process and production mode, as well as the number of nurseries required and their location. In cloning, -- the preferred system for the production of eucalyptus clones is through vegetative propagation using the macro-cutting process --the selection of genetic material to form the plant stock is an essential step. This step has been completed. Production modes have also been defined. The nurseries will produce 6 to 8 million plants and will be located in the middle of core forestry areas, in order to optimize the use of local labor and with a view of transporting plants to planting areas.

Taking into account two production cycles per year, each nursery will have an annual production capacity of 12 to 16 million plants and provide plants for a planting area of about 10,000 ha per year. As the project progresses, modular nursery units will be built in order to meet the demands of planting. In the first phase (2014 - 2016), the construction of five units is projected to meet the needs of the two provinces. In a second stage, when the project is in its full operational phase, the Company will consider and evaluate the need for more nursery units.

C.9. Manpower

The project estimates that it will directly employ about 80 full-time workers, whose employment will depend on the results of training in forestry practices. Skilled workers will be recruited regionally. In addition, the Company will implement a training system that aims to create a specialized workforce and may result in the indirect procurement of about 7 thousand workers in year 7 of the project in Zambezia province.

In fact, with a view to creating a regional corporate sector and a strong connection to the Mozambican services market, the project plans to subcontract forest operations, among others. This will stimulate the establishment of a number of Mozambican-based companies, with solid knowledge about tasks and forest management. These companies may be contracted by Portucel Mozambique for the implementation of forest management-related tasks.

C.10. Schedule of activities

The installation of the forest base in Zambezia province will be gradual, and it is estimated that the planting of 2 thousand ha in the first year will be increased incrementally until the total planted area reaches about 120 thousand ha, after 12 years (**Figure III**).

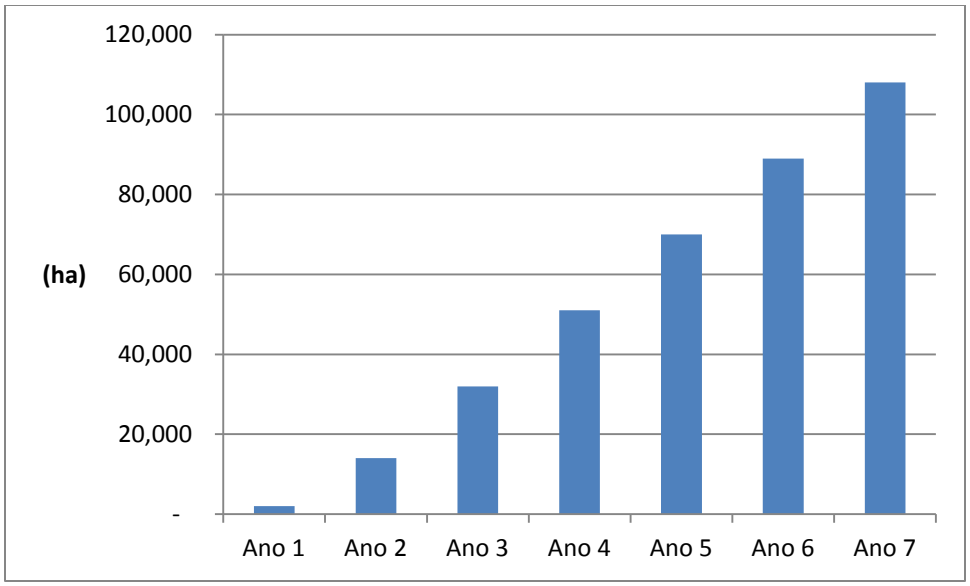

Figure I. Evolution of areas for forestry in Zambezia Province

Figure III. Evolution of the area to be afforested in Zambezia province

The distribution of actual forest areas across five districts in the province is illustrated in the figure below (**Figure IV**). The largest forest stand will be located in Ile (Headquaters), (45,500 ha), followed by the post of Socone (42,700 ha).

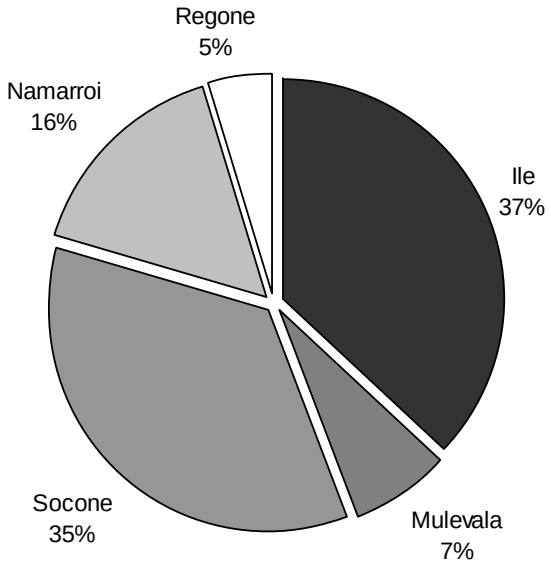

Figure IV: Distribution of planting Area by Five administrative posts of Zambezia province

D. THE AREA OF INFLUENCE OF THE PROJECT

The Area of Direct Influence (AID) and the Area of Indirect Influence (AII) of the project are defined in this section. It is on this basis that the environmental impacts of the project are evaluated.

This definition of the Area of Influence of the project mentioned below is general and indicative. It was left to the individual expert involved in the specialty reports of this EIA to refine and specify this definition according to his/her technical criteria.

The **Area of Direct Influence** of the project consists of the areas of the DUATs allocated to forest plantations, as well as access roads, firebreaks, operational areas, camps and the related infrastructure. The Area of Direct Influence is the area subject to direct impacts on the natural environment (e.g. disturbance on the natural vegetation) and socioeconomic conditions (e.g. occupation of land).

The **Area of Indirect Influence** is related to indirect impacts resulting from the forest planting activities, which means after the installation of forest plantations, and their implications on downstream environmental processes.

E. OBJECTIVES OF EIA AND RELATED STUDIES

E.1. General Objectives

The EIA has the following objectives:

- Identify and assess potential environmental and social impacts from the establishment of forestry projects in Zambezia;
- Propose mitigation measures, monitoring and management of the impacts of projects taking into account biophysical and socio-economic characteristics of the Area of Direct and Indirect Influence;
- Identify measures to increase positive impacts of the projects.

E.2. Specialized Studies

Hydrological Study

The general objective of this study is to ensure that the potential impacts of the project on water are identified and addressed. This study also presents the monitoring plan and environmental management of the water component. Thus, in addition to the characterization of the baseline situation with regard to hydrology and geo-hidrology, this study sought to obtain quantitative data (minimum, medium and maximum flows) and qualitative data (in terms of physio-chemical characteristics) about the water's response to the project, estimating the project's impact on the environment through a model that seeks to quantify the impacts on drainage schemes on the groundwater levels of and on wetlands (*dambos*) in the areas in and around the proposed forestry areas.

Ecology Study

The general objective of this study is to ensure that potential ecological impacts of the project are well identified and addressed, in particular those with greater significance and that deserve special attention on the part of Portucel Mozambique. The study identified special preservation areas within various plots.

Forest Engineering Study

The study focused on the description of the agro-ecological characteristics of the project area, the impacts of deforestation and planting on the existing cultivation systems, including the impacts of the use of

fertilizers and chemicals and the possibility of introduction/spread of pests and diseases. The study also includes recommendations on the practices related to cultivation and phytosanitary controls.

Soil Study

The study focused on the description of the characteristics and distribution of soils in the area of the project, the impacts of deforestation and planting on forest soils, including the carbon balance and the impacts of the use of agrochemicals, the introduction of new production processes and the eucalyptus monoculture. The study also includes an assessment of the suitability of soils for agriculture, the risks of erosion and the pressure of plantations on peasant agrarian systems.

Socio-Economic Study

The general objective of this study is to ensure that the potential impacts of the project on communities in the area of project implementation are properly identified and that effective mitigation measures are proposed. From the socio-economic information collected to characterize the baseline situation, the study identified potential positive and negative impacts of the project on the socio-economic environment. For each impact – during all project phases, from establishment of plantations to harvest– mitigation (if the impact is negative) and enhancement (if the impact is positive) measures were identified. .

Integrated into this chapter is the community health assessment and the potential project impacts on such.

F. APPLICABLE ENVIRONMENTAL LEGISLATION

Portucel Mozambique obtained the **Authorization n. 249/2009** for the completion of the project though **Internal Resolution n. 7/2009 of the Council of Ministers** of Mozambique of 12/22/2009, which defines the terms and conditions for the establishment of the integrated forestry, industrial and energy project in Zambezia province.

The DUATs of 173,327 ha granted to Portucel Mozambique for the development of the forestry project in Zambezia was authorized by the Council of Ministers Resolution 86/2009 and published in the Bulletin of the Republic Series 1, Number 52, of 12/31/2009. All DUAT's forest parcels are presented in annex to the REIA.

The implementation of the new forest project of Zambezia must only be carried out after conducting detailed environmental studies to ensure the prevention of significant deterioration of socio-economic and environmental conditions, as well as health and safety of the population.

The environmental impact assessment of this project took into account the fact that this project intends to be carried out in accordance not only with Mozambican environmental legislation but also appropriate, internationally accepted environmental norms and practices.

The legal and institutional framework applicable to the proposed project takes into account the main sectorial areas, namely:

1) General legal framework in for the environmental sector
2) Environmental management in the context of project activities
3) National policies and strategies
4) International framework.

G. COMMUNITY LEVEL CONSULATIONS

G. 1. Issues Raised through PIAs

Surveying the issues raised by affected parties (PIAs) was carried out through focus group meetings (group leaders, men and women), interviews with local authorities and household questionnaires.

With regard to the household questionnaires, a total of 623 people were interviewed in the districts of Ile and Namarrói, the information is synthesized in the integrated socio-economic report contained within the of the EIA. However, for the collection of the concerns related to the project, three major issues have been analyzed, namely: (i) knowledge of community consultation meetings; (ii) knowledge of the project; and (iii) positive and negative impacts of the project.

G.2 Analysis of Issues Raised

According to the focus groups meetings conducted, the main issues raised by communities were as follows:

- Lack of available areas for the development of the project;
- Preference for food production projects to the detriment of projects from non-food crops ;
- There are already conflicts over land that have forced the populations to move to other areas;
- Need for clear delimitation of Portucel and communities' areas;
- Lack of knowledge about the project;
- Insecurity in relation to their future and their children given the loss of land;
- Most communities are still not clear about the process for acquiring the DUATs because they have not participated in this process, and therefore request that the process be reviewed;
- Communities are not informed about the duration of the project and the areas that it will occupy;
- Lack of channels of communication with the project, through which communities can raise their concerns.

Related to main issues listed above, the household surveys yielded the following results:

<u>Positive impacts of the project</u>

a) The project can bring access to employment;
b) The project may bring more schools, health centers, water pumps;
c) The project may bring improvement of living conditions (bicycle, cell, zinc sheet, cement, solar panels).

<u>Negative impacts of the project</u>

a) The project may cause the loss of land available for farming;
b) The project may bring loss of trees to produce firewood and charcoal;
c) The project may bring increased conflicts within the community.

G. 3. Conclusions

As one can see from the focus group meetings, interviews and surveys, communities reported elevated concern with regard to their perception of lack of land for the project implementation, occupation of lands without consent and due compensation, lack of clarity in relation to the project and the lack of transparent communication mechanisms between the company and the communities. Results suggest that there are communities that are unfavorable to the establishment of the project in their area, which can be an indication of poor communication, and there is therefore the need to establish more effective mechanisms of communication.

Positive impacts perceived by communities emphasize employment and the improvement of social infrastructure and the living conditions of population in general.

H. PRIOR CONSULTATIONS

H.1. Issues raised by PIAs

Surveying concerns raised by people interested in and affected by the project (PIAs) has been accomplished through three previous meetings with public, one in the city of Quelimane and the remaining in the districts of Ile and Namarrói, with the aim of involving and preparing the communities covered by the project to participate actively in the public consultation meetings planned for the final phase of the EIA process.

The aim was to raise awareness about the project and its specifics and publicize Portucel Mozambique's commitment and thereby improve the negative aspects found previously in the consultations at the community level.

The two institutions most relevant to the project from a regulatory standpoint, the Provincial Directorate of Agriculture (DPA) and the Provincial Directorate for the Coordination of Environmental Action (DPCA) were invited to the provincial-level "pre-meeting".

District level administrators, the heads of post, the heads of the villages and the traditional leaders of 1st and 2nd rank in the project areas were invited.

H. 2. Analysis of Issues Raised

Based on these preliminary meetings, the main issues raised during the debate sessions and through comment sheets, were as follows:

- The absence of a communications plan;
- Transparency in recruitment and management of the workforce;
- Concerns regarding the possibility of resettlement;
- Need for preparation and dissemination of the social responsibility program;
- Lack of knowledge about the areas covered by the project (those found within the area of the DUAT);
- Lack of clarity about the process of access to land.

H. 3. Conclusions

Based on the meetings held in the city of Quelimane and in the districts of Namarrói and Ile and the analysis of comments, we found that the participants have knowledge of the Portucel's forestry project in Zambézia province. Main concerns were related to the absence of a mechanism for communication with the communities to allow them to submit complaints related to project implementation. Therefore, there is a need for Portucel Mozambique to establish and publicize harmonised mechanisms for communication with project stakeholders, particularly the communities and local authorities, both traditional and formal.. In addition, Portucel should establish known mechanisms for access to land.

The meetings had good participation, taking into account the number of interventions on the part of participants.

Portucel Mozambique took the opportunity to present ongoing measures with regard to the the land access procedure, grievance management mechanism, livelihoods improvement plans (including agricultural support program of Portucel Mozambique), as well as the outline of its social responsibility policy.

I. IDENTIFYING THE MAIN IMPACTS OF THE PROJECT

The potential social and environmental impacts, positive and negative, have been extensively described; classified and outlined the mitigation measures in order to remedy or annul its negative effect. The most critical impacts of the project are presented in the following table:

Table II. Most Significant Impacts

Impact	Mitigation instrument
The biophysical level	
Fragmentation, alteration and/or loss of habitats	Compensation of biodiversity in ACP: Regone1, Socone_Norte1, Socone_Sul1; Plan of Conservation of Habitats and Flora
Loss of biodiversity	BPF; Compensation of biodiversity in ACP; Plan of Conservation of Habitats and Flora
Water absorption by crops	BPF; Riparian buffers; Water monitoring plan
Increased risk of forest fires	BPF; Prevention System and fire-fighting of Portucel; Recovery of degraded areas
Modification of the aesthetic value of the landscape	Mitigation through offsets; Plan of Conservation of Habitats and Flora
The socio-economic level	
Conflicts in the process of access to land	Portucel's Land Access Procedure Regularization of the acquired areas
Loss of agricultural areas	Plan for improving livelihoods (including Portucel's agricultural support program); Portucel's Social Responsibility Policy
Risk of malnourishment and malnutrition	Plan for improving livelihoods (including Portucel's agricultural support program); Portucel's Social Responsibility Policy
Loss of ecosystem services for communities	BPF; Plan for improving livelihoods (including Portucel's agricultural support program); Portucel's Social Responsibility Policy

Note: *ACP means of Portucel concession areas**,** and BPF is the code of good forestry practices of the Portucel Soporcel group.*

It was concluded that mitigation measures presented and detailed in the Environmental management plan are sufficient to ensure environmental and social viability of the project. The intensity and extent of some of the impacts described require that a systematic monitoring to be conducted by the entities referred to in proposed measures for mitigation.

J. Environmental Management Plan

J. 1. Context

The Environmental Management Plan (PGA) builds on the project's environmental impact assessment, and contains the strategies and actions considered appropriate for minimizing the negative impacts of the project and for increasing its positive impacts, defined in specific programs for management, monitoring, control, preservation or specific activities.

The PGA is a commitment by the proponent to stakeholders and affected parties, with the rules and applicable environmental management standards through the implementation of the programs recommended in this instrument.

The PGA encompasses a series of general and specific recommendations that collectively serve as a basis for environmental management, to effectively manage the environmental impacts during construction and operation phases of the project. The PGA is a dynamic document that can be revised and updated whenever necessary throughout the construction and operation phases of the project and which will serve as a basis for the implementation of an Environmental Management System (EMS).

In this context, the PGA of Zambezia forest plantation project brings together a set of plans, programs and specific guidelines, in particular to meet a wide range of situations, regarding:

- **The occupation of the area**
    - Preparation of forest areas
    - Recovery of degraded areas
    - Contingency planning for environmental accidents
    - Conservation of historical and cultural heritage sites
- **Changes in the baseline environmental conditions:**
    - Water monitoring
    - Soil monitoring
    - Integrated management of waste and effluents
- **Nature conservation:**
    - Conservation of habitats and flora
    - Conservation of wild fauna
- **The human environment:**
    - Environmental education
    - Social communication
    - Restoration of livelihoods

The scope and legal framework, the justification, the main objectives and the proposed environmental actions, specified for the various phases of the project, the expected results and the schedule of proposed activities are outlined for each of these programs.

J.2. Responsibilities and obligations

The Environmental Management Plan contains instructions that allow the proponent, Portucel Mozambique, to integrate into the process of implementation of its forestry project in Zambezia the environmental issues arising from the environmental impact study. The observance of these instructions is the responsibility of the proponent.

Portucel Mozambique will have to ensure that the construction and operation of the forestry project is carried out according to the recommendations of this report.

Portucel Mozambique will have to commit itself to carry out its works in a way that respects local communities and their lands, resources and livelihoods and protects the environment, health and safety of workers and the general public.

In order to achieve this objective, Portucel Mozambique shall:

- Ensure that the PGA is in conformity with the requirements of the government agency responsible for the environment;
- Provide professional staff to support the commitments related to safety, health and environmental protection;
- Monitor, evaluate and report its performance concerning health, safety and environmental protection;
- Ensure that any non-conformities with the PGA be entirely remedied through the implementation of corrective measures;
- Check on a monthly basis for any significant issues of non-compliance in relation to the PGA and identify the steps to take for their correction;
- Comply with all requirements of the PGA, employ such techniques, practices and construction methods to ensure compliance with the project's environmental standards and minimize environmental damage, help control waste, prevent pollution, prevent loss or damage to natural resources and minimize the effects on users and occupants of the land and the public in general;
- Prevent or minimize the occurrence of accidents that could cause damage to the environment and to prevent or minimize their effects. If such accidents occur, restore, to the extent possible, environmental conditions to those resembling the conditions existing before the accident;
- Be open to periodic environmental audits by the relevant government structures and provide the necessary information to do so. On the other hand, Portucel should perform its own audits, to ensure compliance with the PGA;
- If governmental authorities consider that the construction activities need to be agreed to by competent authorities, coordinate with the latter regarding mitigation measures to be implemented. The agreed measures will be implemented as soon as possible, so as to avoid the occurrence of subsequent damage and to repair any damage which may have occurred;
- Prepare and submit to the auditors information regarding the implementation of Portucel Mozambique's social and environmental measures, demonstrating the means through which it will ensure compliance with environmental standards.

J. 3. Environmental Management Team

Portucel Mozambique should put together an environmental management team, comprising qualified professionals who will be responsible for the following areas:

- Preparation of areas to be afforested and recovery of degraded areas;
- Management of solid wastes, effluents, atmospheric emissions and noise;
- Protection of habitats and fauna;

- Environmental education and communication with workers and local communities;
- Prevention and combat of accidents related to the handling of hazardous substances.

More specifically, the tasks of the environmental management team will focus on: the clearing of the land and the preparation of the area for establishing plantations; protection of wildlife and vegetation; monitoring during the phase of deforestation; monitoring and treatment of oil spills; monitoring and treatment of water pollution; the continuous monitoring of impacts arising from construction and implementation of mitigation measures; the implementation of erosion control measures; the work of restoration and rehabilitation during and after the completion of the implementation phase; the supervision of the implementation of the socio-economic mitigation measures (temporary loss of land, loss of access, accidents, the interaction with people and the sacred sites).

The environmental management team must also participate in the project's independent environmental audits, produce environmental reports and provide advice on the management of environmental issues. The reports shall be prepared regularly and will include findings and recommendations for corrective actions to be taken by the various parties involved in the project.

Portucel Mozambique must still appoint a full-time health and safety officer (OSS), whose first task is the preparation of the health and safety plan (PSS). The PSS will include an assessment of possible accidents and emergencies (such as traffic accidents, fires, explosions, spills or releases of hazardous materials and natural disasters), measures to avoid incidents and procedures to respond to incidents and submit reports on accidents.

J.4. Procedures

Portucel Mozambique should develop procedures that specify the activities, methodologies and indicators adopted for the implementation of mitigation measures and/or monitoring recommended in this PGA.

These procedures should detail how the environment will be protected and environmental impacts will be prevented or mitigated during the various phases of the project.

The procedures should be prepared for at least the following activities:
- Preparing the forest plans at the level of operational units;
- Solid waste management;
- Management of sanitation and hygiene in work camps;
- Monitoring of effluents;
- Monitoring of smoke and noise emission by equipment and vehicles involved in the work;
- Storage, handling and transport of hazardous chemicals;
- Location, opening, operation and rehabilitation of quarries and auxiliary infrastructure;
- Capture and storage of water;
- Prevention and containment of spills;
- Fire prevention and response;
- Health and safety of workers.

J.5. Other Regulatory Instruments

Application of the precautionary principle in the definition of forest areas

The forestry plan at local level (Operating Unit) must ensure that forest planting meets a set of requirements of technical, environmental and social nature, preserving natural and socio-cultural values existing in each area of intervention.

The model that is intended for use is that each area declared ready for intervention is identified as such and before the beginning of the intervention program a series of procedures are performed that validate good forestry practices and ensure in particular that:

- Ecological protection areas and dense concentrations of natural vegetation are kept intact;
- Legal authorizations for clearing existing vegetation have been issued;
- Plantation areas have been suitably designed based on topography and natural drainage;
- The equipment and techniques used are appropriate for the terrain, and operators are properly trained;
- Work to clear vegetation is timed to coincide with the proper season (when casual labor is locally available), seeking to reduce the seasonality of the labor force;
- The presence of flora or fauna species with special conservation status of habitats is classified;
- There is no archaeological or historical, social or cultural relics to preserve;
- The ground does not present abrupt gaps (cliffs, caves) or the presence of gas pipelines, oil pipelines and high-voltage power lines.

Documentation of company policy

The conformity of the company's activities with the environmental performance standards presented in the Environmental Management Plan still presupposes the need for Portucel Mozambique to continue and complete a whole set of company policies, namely:

- BPF (review of the code of Good Forestry Practices);
- PGF (incorporation of measures envisaged in the PGA in the Forest Management Plan);
- NT (revision of Technical Standards, incorporating the measures advocated in the PGA);
- ASSO (preparation of the Code for the Environment and Occupational Safety and Health);
- PAT (elaboration of the Land Access Procedure);
- PCS (drafting the final version of the company's Stakeholder Communication Plan and the respective grievance mechanisms)
- PRMS (elaboration, discussion with the relevant stakeholders, and implementation of the plan of recovery of livelihoods of the population affected);
- FLS (definition of the company's Social Responsibility Policy).
- SPCIF (elaboration of the System for Preventing and Fighting Forest Fires).

Setting these policies require structural measures within the company in order to ensure that specific departments or directorates are created for such policies particularly teams for environmental management, communication and support for the improvement of livelihoods, with a main focus on agriculture.

K. SUMMARY OF ESIA FINDINGS

The present forest project in Zambezia is proposed by Portucel Mozambique, which plans to plant 120,000 ha of eucalyptus trees in the DUAT areas totaling 174,000 ha (estimated to cover approximately 69% of the total project area within roughly 12 years), distributed in two districts and five adnimistrative posts: district of Ile (PA headquarters, Mulevala and Socone) and district of Namarrói (PA headquarters and Regone).

Based on this Environmental Impact Study, the project is considered **environmentally viable**, and the benefits associated with it are greater than the damage caused, provided that they are duly minimized.

The key issues for the project are related to the dynamic operational model (how the DUATs were obtained, land access is negotiated and the different levels of grievances of people affected by the project are managed), the need for experimental areas (for gauging the ecological adaptability of species and hybrids of eucalyptus), the pressure on peasant agricultural systems (through the economic pre-feasibility of the project) and the corresponding environmental and socio-economic impacts (biodiversity and habitats, availability of land and access to natural resources, employment expectations and improving the lives of local populations).

The potential environmental and social impacts were described and classified extensively, and mitigation measures were described in order to remedy or reduce the negative effects.

The conclusion regarding the main socio-economic and environmental impacts is that the mitigation measures detailed in the Environmental Management Plan are sufficient for the submission of this Environmental Impact Assessment Report for its approval by MICOA for the issuance of the environmental license for the project. However, many of the impacts described must be duly monitored by the corresponding authorities.

The PGA is a commitment by the proponent to stakeholders and affected parties, with the rules and standards of good environmental management to be applied through the implementation of the programs recommended in this document.

In this context, the PGA for the Zambezia Forestry Plantation project brings together a set of plans, programs and specific guidelines, in particular to meet a wide range of situations with respect to the occupation of the area, changes to the baseline environmental conditions, nature conservation and the human context of the project.

The commitment of the client, Portucel Mozambique, is evident from their ongoing work on the following programs:

1) Stakeholder Communications Plan;
2) Community Engagement Plan (including grievance mechanism);
3) Land Access Procedure and standardized land access agreements;
4) Livelihoods restoration and development plan for affected population.

The company acknowledges the right of communities and families to maintain a certain amount of land as a means of subsistence and for income generation within the areas of its DUATs, in line with the Terms of Authorization of the project. The company has every intention that families and communities improve their quality of life and that there is a climate of mutually beneficial coexistence between the local population and the project. The company furthermore believes that the process of "effective access to land" should be guided by the dialogue with communities or families and without any form of pressure.

In the ongoing dialogue, the company explains the objectives and impacts of the project. In return for the use of the land, the company presents the possibility of creating jobs, improving local infrastructure and enhancing agriculture. Traditional leaders and government authorities are always informed of and participate in these processes as witnesses. If there is no agreement with the family (community), the company then seeks another alternative area, rejecting forcefully any possibility of pressure or aggression. But if agreement is reached, a document is signed with the terms agreed between the parties.

Portucel Mozambique acknowledges that the sustainability of its forest project involves the development of agricultural support programs for communities. The company is working with the International Finance Corporation to develop measures to enhance the sustainability of the forestry operations through environmental and social impact planning and by developing projects in the local communities, as well as in the implementation of community investment and the promotion of the local entrepreneurial sector. On this basis, the Company is evaluating alternatives and strategies for the establishment of the agricultural value chains which will include the communities. These will take into account the following factors:

specific needs of communities; food crops and production; productivity technologies (seeds, fertilizer, irrigation and animal husbandry); storage, packaging, processing and marketing of agricultural production.

The project also brings such positive impacts as:

- Employment opportunities;
- Opportunities to diversify and create new business for small local companies;
- Development of new and improvement of existing infrastructure;
- Contribution to local, regional and national economy;
- Increased tax revenues for the state.

The project activity can be seen as an opportunity for the implementation of sustainable social responsibility projects, in line with the local development plans. The project may create synergies with other projects and development initiatives, which would benefit the economy and contribute to the well-being of the local population. The project may also stimulate the development of enterprises (micro, small and medium-sized companies) in response to the high demand of goods and services on the part of the project.

It is clear that although the EIA has developed a considerable work aimed at assessing the main impacts and corresponding mitigation measures, it is assessed that some monitoring impacts deserves care by competent authorities. In the Environmental management plan that integrates the present EIA, has defined a broad set of guidelines, studies and performances to promote the following stages of project, in particular during the pre-construction, construction, and operation of the project, assuming the environmental and social aspects should always constitute an important component in conjunction with the project and with the environment in which it is inserted.

It is therefore essential to the environmental monitoring of works, in order to supervise the implementation of the proposed measures and solutions, as well as in the formulation of more effective solutions to unforeseen problems, that may occur during the installation of the project, with obvious benefits for the maintenance of high standards of quality of the project and their sustainability.