REPUBLIC OF MOZAMBIQUE
MINISTERY OF LAND ENVIRONMENT AND RURAL DEVELOMPMENT

NATIONAL SUSTAINABLE DEVELOPMENT FUND

MOZAMBIQUE CONSERVATION AREAS FOR BIODIVERSITY AND DEVELOPMENT _ PHASE 2 (P166802)

Pest Management Plan (PMP)

July 2018

List of Abbreviations

ANAC	National Conservation Areas Administration
BioFund	Biodiversity Fund
CA's	Conservation Area
CAADP	Comprehensive African Agriculture Development Program
CABI	Not-for-profit inter-governmental organization based in the United Kingdom
CBSV	Cassava Brown Streak Virus
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMD	Cassava Mosaic disease
NDH	National Directorate of Health (DNS- Direcção Nacional de Saúde)
DANIDA	Danish International Development Agency
DNEA	National Directorate of Agrarian Extension *(DNEA - Direcção Nacional de Extensão Agrária)*
DNSA	National Directorate for Agrarian Services *(DNSA - Direcção Nacional de Serviços Agrários)*
DPA	Provincial Directorates of Agriculture (*Direcção Provincial de Agricultura)*
FAO	United Nations Food & Agricultural Organization
GDP	Gross Domestic Product
GEF	Global Environmental Fund
GOM	Government of Mozambique
IFAD	International Fund for Agriculture Development
IRLCO-CSA	International Red Locust Control Organization for Central and Southern Africa
IIAM	Agricultural Research Institute of Mozambique (*IIAM - Instituto de Investigação Agrária de Moçambique)*
INNOQ	National Institute for Standardization and Quality
IPM	Integrated Pest Management
IP	Integrated Production
ILM	Integrated Landscape Management
PMP	Pest Management Plan
PDO	Project Development Objective
JMPM	Joint Meeting on Pesticide Management
M&E	Monitoring & Evaluation
MINAGRI	Ministry of Agriculture and Food Security
MISAU	Ministry of Health
NGO's	Non-Governmental Organization
PARP	Poverty Reduction Action Plan
PEDSA	Strategic Plan for Agricultural Development
PMP	Pest Management Plan
REDD	Reducing Emissions from Deforestation and Forest Degradation
SDAE	District Services for Economic Activities

SDPI	District Services for Planning and Infrastructure
USAID	United Stated Agency for International Development

MOZBIO PROJECT - FASE II

Pest Management Plan

Pest Management Plan (PMP)

Executive Summary

Introduction

MITADER's approach for management of Conservation Areas is based on a newly adopted Integrated Landscape Management approach (ILM) to natural resource management. The ILM approach combines initiatives to foster rural development, such as access to rural credit, rural infrastructure, and land tenure security, with initiatives to promote sustainable management of natural resources, including biodiversity protection (mainly through conservation areas, but also through community-based and private-managed conservation areas) and restoration of degraded habitats. These initiatives take place in larger landscapes, which encompass different land uses, such as productive agriculture, livestock forestry and conservation areas including urban settlements. This approach of managing the wider Conservation Areas Landscapes is highly relevant to CAs, as most threats, including population pressure, come from outside their boundaries.

The MozBio phase II, has as Project Development Objective (PDO) to improve management of targeted Conservation Areas Landscapes and enhance the living conditions of communities in these Conservation Areas Landscapes. MozBio Phase 2 (this project) builds on MozBio1 results, integrates lessons learned, and seizes emerging opportunities to contribute to the overall MozBio Program goals.

The document was produced on the basis of consultation with the Administrators and Conservation Area (CA) team members in all target ACs, along with a wide range of interviews carried out with various stakeholders. Interviews and on-going dialogue with Mozbio staff at national level and others involved in the design of Mozbio2 were conducted throughout the working period. Public consultation meetings was carrying out at strategic places: Matutine (Elephant Coast Landscape), Sussundenga (Chimanimani Landscape) and Marromeu (Marromeu Complex Landscape). Along those consultation, 163 participants were recorded, include representatives of communities, civil society, government, private sector and ONG's.

The main objectives of the meetings was to discuss the lesson learned from MozBio 1 implementation and the safeguard instruments, process and requirements to MozBio 2. The principal issue from Pest Management Plan was to consider in the PMP diseases and pest in livestock and agriculture.

Description of the Mozbio phase II project

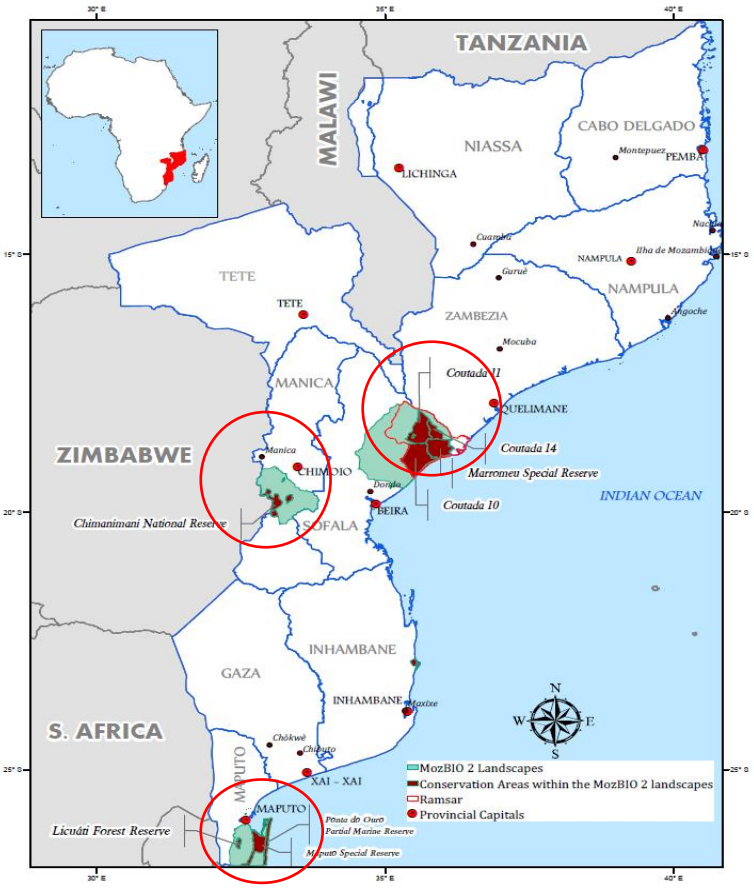
The Project will contain the following components: (i) Component 1: Strengthening Capacity of National Conservation Institutions and Financial Sustainability of the CA system; (ii) Component 2: Improving Conservation Areas Management in target landscapes; and (iii) Component 3: Promoting conservation-compatible rural development and integrated landscape management in target landscapes. The project will have positive social and environmental benefits at local, national, and global levels. At the local level, the project will directly benefit local people living in the targeted landscapes (Elephant Coast landscape, Chimanimani Landscape, and Marromeu Complex Landscape), through the promotion of conservation-compatible livelihood activities.

During the implementation of the Component 3, subprojects related with agriculture, livestock and/or forestry there might be a need to manage pests and/or diseases, that if not controlled could be negatively detrimental to the productivity or human/animal health. It is known that the use of pesticides may potentially have negative consequences on the agro-ecosystem. The program will support the improvement of productive systems which consequently boost productivity, but these

gains cannot be achieved without the improvement of synthetic fertilizers and pesticides, mainly insecticides, herbicides and fungicides for certain activities. Agrochemicals will be used in agricultural, livestock activities to control pests and diseases, increasing the risk of further pest problems as well may have negative health, environmental and economic implications and this represents environmental risks and of public health.

Project target areas

In particulary the Component 3 of MozBio Project phase II, would include interventions within landscape's : (i) Elephant Coast landscape, including two CAs (Maputo Special Reserve (MSR), and Ponta do Ouro Partial Marine Reserve (PPMR), including Inhaca island), and immediately adjacent land areas in the Matutuine District (including private and community areas); (ii) Chimanimani Landscape, including the Chimanimani Reserve and its buffer zone, the three existing Forest Reserves (Moribane, Zomba e Maronga) and immediately adjacent land areas in the Sussundenga District; (iii) the Marromeu Complex Landscape, including the Marromeu Reserve, Hunting Areas 10, 11, and 14, and immediately adjacent land areas in Marromeu, Cheringoma, and Muanza Districts.



Policy, regulatory and institutional framework for implementing the PMP

An effective Integrated Pest Management (IPM) will result from a good and creative combination of the Mozambique's policy and institutional framework and prevailing good practices with those of the World Bank.

The Ministries of Agriculture and Food Security (MASA), Land, Environment and Rural Development (MITADER) and the Ministry of Health (MISAU): these are the institutions responsible for ensuring that the regulations are translated into the set of actions that will guarantee that pesticides are managed in a way that does not pose a threat to human, plant and animal health and to the overall health of the environmental components.

The Institutional capacity to manage pesticides, are represented at central, provincial and district levels. (i) at central level According the Diploma (nº153/2002) the Ministry of Agriculture and Food Security (MASA), through its Registration Unit, is the official agency responsible for the registration of pesticides and the issuing of permits for their use, after approval by the National Directorate of Health (DNS), the National Directorate for Environmental (DINAB) and the National Institute for Agrarian Research – Department of Animal Science (IIAM/DCA); (ii) at provincial level, the control is under taken by the Provincial Directorates of Agriculture and Food Security (DPASA) and Environmental Provincial Directorates (DPTADER); (iii) at district level, the use, handling and transport of pesticides is controlled by the SDAE, that works with a team of extension agents responsible for controlling and training the different beneficiaries, as well as entities that import synthetic fertilizers and pesticides (agrochemicals).

Additionally, the World Bank, through OP. 4.09, supports strategies that promote Integrated Pest Management (IPM) approaches, such as biologic control, cultural practices and the development and use of pest resistant or tolerant crop varieties. The objective of the Policy on Pest Management (OP 4.09) is to minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, environmentally and social sound pest management. It aims to promote the use of biological control and reduce the use of synthetic chemical pesticides; and consolidate the legislative powers of the countries and their institutions to promote and ensure a safe pest management. More specifically, this policy aims, among other objectives: (a) Determine which activities related to pest management in WB financed operations is based on the principles of integration and seek to reduce the use of synthetic chemical pesticides; (b) ensure that the dangers to health and environmental risks associated with pest management, especially the use of pesticides are minimized and can be managed effectively by the user.

This policy is used if it is foreseen the acquisition of pesticides or application equipment (both indirectly through the project, as indirectly through co-financing or counter-parties Governments that finance) (ii) the project can affect the Pest Management even though without obtaining pesticides. This includes projects which may (I) conduct extensive use of pesticides and the subsequent increase in risk to health and environment; (ii) maintains or expand current unsustainable Pest Management practices, not based on the principles of IPM, and/or significantly jeopardize health or the environment.

For the present Integrated Pest Management plan, National legislation, the international conventions that Mozambique adhered to and the World Bank Safeguard Policies apply. For the implementation of MozBio phase II, are considered lessons learned from MozBio phase I and the integrated pest management prepared on the scope of the Integrated Agriculture and Natural Resources

Management Project, "Sustenta" and the Forest Investment Project, MozFIP also financed by the World Bank and under the aegis of the National Sustainable Development Fund.

Pest management in Mozbio phase-I: Lesson learned

During the implementation of MozBio phase I, the use of pesticides for pest control was minimal in agriculture and null in livestock, since there was no investment in large scale in agriculture and livestock activities. The treatment for risks and uncertainties caused obeyed the following: (i) the identification of possible risks (pests, diseases, climate facts) present in certain activities; (ii) identification of probable causes of each risk; (iii) mitigation proposal, giving priority to those with higher probability of occurrence and those with greatest impact.

Elephant Coast Landscape: At the level of the Maputo Special Reserve and Ponta D'Ouro Marine Partial Reserve, the agriculture activity was carried out on an area of 7 hectares in the communities of Maphanga, Mhala, Ndelane, Mabuloco and Ticalala in the Administrative Post of Machangulo. The activity took a conservation agriculture approach was implemented through distribution of improved seeds and technical assistance to 142 families, totalizing around 3000 (three thousand) beneficiaries, from which more than 70% were women.

The main crops produced were corn, beans and peanuts, and the identified pests were corn borer, fall armyworm. Pest mitigation of pests includes demonstration fields for knowledge transfer about the application of pesticides and dissemination through the presentation of plays related to activities that are harmful for conservation, including pest management. Application of pesticides was not promotede, however some chemicals such as abamectin, deltamethrin, acetates and tinidoclotrithe, to combat amphibians, lizards and mites, respectively. The use of chemicals took into account an observation of nationally acceptable limits and verification of the final disposal of the packaging.

In general, the agriculture activity at REMPPO is practiced by the minority, being livestock the main activity. Because it is a conservation area with the most of the buffer zone being concessioned, the availability of land for agriculture is limited.

Chimanimani Landscape : In the context of MozBio phase I, 11 (eleven) communities of the buffer zone of Chimanimani reserve were supported for the agriculture, being Tsetesra, Mussapa, Goto-Goto, Phedza, Mahate, Nhahedzi, Mpunga, Zomba, Maronga, Macoca, Muoco respectively. Support was provided for the supply of cement and technical assistance. The main objective was to produce for subsistence and the surplus for the local market on a small scale, based on ecological principles such as crop rotation and biologic control through the use of a variety of resistant seeds.

The project has as target group, local associations of small farmers and benefited about 1000 (one thousand) individuals, from which 60 % are women. Agriculture activity was oriented for more commercial crops locally such as the inclusion of garlic and potato for trade, associated with the production of maze and beans for food security/subsistence. This activity was implemented in an area of about 40 hectares in two campaigns (2017/2018).

The approach of the agricultural activity was without the use of chemical fertilizers and the prevention of pests and diseases considered the establishment of 1 demonstration fields and implementation of

[1] Demonstration fields: Also referred as "machambas" are areas on an average of 0.5ha, used for testing sustainable agricultural techniques. Sowing, pest prevention activities among other technologies are tested. This

post-harvest management system. The main pest verified was the fall armyworm, which although in small scale, has caused damages mainly in the maize crop. The existence of the irrigation project, PROIRRI, with the aim of increasing the agricultural production through irrigation systems in the central region of the country is a positive aspect that considers the synergies between the 2 (two) project agriculture (MozBio) production and availability of water resources (PROIRRI). However, the implementation of PROIRRI and MozBio 1, did not consider risks of contamination related to pests and diseases capable of propagating through water. Although no incident has been reported, it is considered a potential risk requiring attention. Some success stories of MozBio -1 in this region consider increased production by about 40% without the use of chemical fertilizers. (See report on the main achievements of the MozBio 1 project in the Chimanimani National Reserve).

Marromeu complex landscape: Results of preliminary public consultations of the preparation MozBio phase II, involving key stakeholders such as management of the reserve, heads of hunting areas 11, and 14, community leaders, district services of economic activities (SDAE), district services of Planning and Infrastructure (SDPI), board of *Sena Sugar State*, it has been found that there are currently two types of agriculture practice in the landscape of Marromeu, each with different pest and disease control techniques; in contrast with the surrounding districts of Cheringoma and Muanza, the district of Marromeu is characterized by two sectors: (i) family sector - characterized for practicing shifting agriculture in very small plots or in the lands of *Sena Sugar State*, which are fallow. In this sector, the use of inorganic compounds to combat pests and diseases is very week-almost nill, this due to weak economic power associated with the lack of knowledge/information and access to improved production technologies linked to the use of synthetic fertilizers.

Livestock - The breeding of animals in the landscape of Marromeu, falls under the category of small livestock where the families are limited to poultry (chicken, ducks, pigeons, etc) and pigs, the raising of cattle and goats by the family sector, is not practiced due to the high prevalence of tsetse fly making this activity unsustainable. Thus, livestock activity by the family sector only has technical assistance from SDAE - Marromeu, very limited due to lack of internal capacity and budget to ensure the good assistance, distribution of quality inputs including pesticides management; (ii) commercial sector- more than 80% of land is under the management of Sena Sugar State, whose main activity is sugar-cane production under monoculture and irrigation through “pivots”, where the risk of propagation of pests and diseases is higher, and this crop can be attacked by more than 80 species of pests, and great variety of weeds.

Environmental, occupational ad public health potential impacts, mitigation measures and monitoring

The landscape approach of MozBio-2 project, for the agriculture and livestock value chain will finance large and medium sized enterprises to respond to the demand and commercial competition, which consequently entails the increase of agricultural areas and shifting livestock activity to increase the number of animals looking at the market perspective. Associated to this fact, commercial agriculture is characterized by the practice of monoculture where the problem of pest control no longer locates in “small family farms” and is also an economic specifically for medium scale projects that will imply on increased control measures associated with the increase on the use of chemical products.

approach aims to ensure that farmers living far from the demonstration fields can gain access to areas near their homes or farms where such technologies are being implemented.

The strategy for implementation of suggested mitigation measures is to provide training to farmers in the use of chemicals as well as in the use of integrated pest management approaches (IPM).

Environmental and social impacts

MozBio2 is a category B project since potential direct negative environmental and social impacts will be minor, site specific, reversible and easily manageable. Project environmental and social impacts will in part result from construction of civil works as well by chemical used in agriculture and livelihood activities, that could affect water, soil, air quality, human health which could be affected by abstractions and diversions or due to the discharge of fertilizers, nutrients, and different chemicals to be used for pest management. Thus, the strategy to manage these impacts associated with pesticides, first pass through their pre-identification.

Table 3. Potential impact and mitigation measures.

Pesticide management issue	**Potential impact**	**Mitigation measure**	**Indicators of monitoring**
Excessive use of (out-of-dated) chemicals, disposal of containers in rivers and stream, use of non-authorized and/or non-labelled pesticides.	Decrease in water quality for consumption and irrigation Proliferation of aquatic Weeds Loss of biodiversity in particular of aquatic species	Application of Pesticides Regulation (type, labelling and quantity); Promote recycling of containers; Monitor aquatic biodiversity and weeds.	Number of farmers using pesticides properly (observing expiration dates and dosages); Number of aquatic weeds; Abundance (n/ha) of plant resource species (e.g. medicine, food); Patterns of water quality referred in the regulation (Decree 18/2004)
Excessive use of (out-of-dated) chemicals, use of non-authorized and/or non-labeled pesticides	Increase in soil toxicity	Regulatory application of pesticides (type, labelling and quantity); Promote the use of cultural and biological control measures	Patterns of soil quality referred in the regulation (Decree 18/2004); Number of farmers using biological and cultural measures.
Excessive use of (out-of-dated) chemicals, use of polluted water	Poor crop yield; Unacceptable levels of pesticide residues in harvested produce and in the food chain.	Regulatory application of pesticides (type, labelling and quantity); Promote the use of cultural and biological control measures	Productivity per crop; Quality of the product; Number of farmers using biological and cultural measures.
Use of empty pesticide's packages, washed and disposed	Poisoning of workers/farmers and detrimental effects on human health	Promote the recycling of packages;	Observed changes in the following areas: Number of farmers

in rivers, consumption of polluted water, excessive use of chemicals	Toxicity to fish	Regulatory application of pesticides (type, labelling and quantity); Monitor aquatic biodiversity and fishing activity; Promote first aid training to farmers.	recycling containers; Number of packages washed and disposed in rivers; Patterns of water quality referred in the regulation (Decree 18/2004); Fishing yields; Number of farmers trained in first aid.
Application without Protective equipment	Increased number of accidents and injuries	Promote the use of protective equipment; Promote first aid training	Number of workers/farmers using protective equipment; Number of workers/farmers trained in first aid; Number of accidents/injuries per season.

Overall, pesticide misuse may also result in: (i) Elimination of the natural enemies of crop pests and consequent loss of natural pest control that keeps the populations of crop pests very low; and (ii) Development of pest resistance to pesticides, encouraging further increases in the use of chemical pesticides (vicious cycle). The exact IPM approach should be defined according to site conditions and capacity of the farmers to adopt and implement new techniques.

The following principles of IPM shall be considered:

- Grow a healthy crop. The focus is on cultural practices aimed at keeping the crop healthy. Selection of varieties that are resistant or tolerant to pests is an important aspect. Attention to soil, nutrient and water management is part of growing a healthy crop. Many IPM programs therefore adopt a holistic approach and consider a wider range of agro-ecological parameters related to crop production.

- Manage the agro-ecosystem in such a way that pests remain below economic damaging levels, rather than attempt to eradicate the pest. Prevention of pest build up and encouragement of natural mortality of the pest is the first line of defense to protect the crop. Non-chemical practices are used to make the field and the crop inhospitable to the insect pest species and hospitable to their natural enemies, and to prevent conditions favorable to the build-up of weeds and diseases.

- Decisions to apply external inputs as supplementary controls are made locally, are based on monitoring of pest incidence and are site-specific. External inputs may include predators or parasites (bio-control), labour to remove the pest manually, pest attracting lures, pest traps, or pesticides. The choice of external input varies for each situation. Pesticides are generally used if economically viable non-chemical pest control inputs are not available or failed to control the

pest. They are applied only when field monitoring shows that a pest population has reached a level that is likely to cause significant economic damage and the use of pesticides is cost-effective in terms of having a positive effect on net farm profits. Selection of products and application techniques should aim to minimize adverse effects on non-target species, people and the environment.

The IPM approach shall include a wide variety of techniques that can be applied under IPM approaches, which applicability will depend on various factors, including: the crop, the cropping system, the pest problems, the climate, the agro-ecological conditions, etc.

Guidelines for the preparation of specific PMP

In case of selection of subproject with potential to pest development, a specific Pest Management Plan shall be prepared, based on the principles defined in this PMP. Like in MozBio phase- I, the Good Practices Manual should be prepared by the project safeguard officer and EMP's should be prepared by a consultant to be hired to develop the Category "B" Environmental and Social Study with assistance of the safeguard officer. None of the project should be initialized without these documents approved.

The document shall include:

Description of the Subproject – identification its location, area, cropping system, the climate, the agro-ecological conditions, technologies to be used, water source, the potential pest problems (key pests for each target crop).

Legal and Institutional Framework – including at the district and Administrative level

Identification of alternatives for pest management – Identification of current management of the identified key pests in the region and existent IPM experiences– in consultation with agricultural authorities, NGOs, extensionists and farmers, including the identification of farmers' indigenous IPM tactics. Identification of the pesticides authorized in Mozambique (Annex- I), for the identified key specie. Identification of alternatives techniques on consultation with research institutions as IIAM or even international institutions that usually supports MASA as well World Bank Environmental and Social Polices approved for the project.

Definition of a strategy to manage the pest – identifying measures to be implemented along the crop cycle since the project preparation stage, to site preparation and planting, including cultural practices that can help prevent build-up of pests, listed in section 7 of this report. Select an appropriate blend of IPM tools.

Awareness and training to promote IPM and the safe use of pesticide – for extension agents, farmers and local communities; it shall include strategies to communicate with local communities, farmers, including the preparation of specific materials with photos/figures or even videos.

Monitoring and Evaluation – define a monitoring plan to ensure regular fields monitor and the preparation of quarterly evaluation reports.

Capacity building, training and awareness-raising campaigns

Implementation of MozBio phase II project will provide technical assistance to agriculture and livestock value chain through extension workers at landscape level. The success or failure of implementation of Integrated Pest Management will depend on the prior training of the technical staff (extension agents) of the target landscape institutions. The trainings/capacity building must be divided into two models (i) Training of landscape trainers – all technical staff from the relevant institutions and Landscape Management Unit (LMU's) technical team should be trained, these trainings should be delivered by FNDS's safeguards team and value chain and knowledge transfer specialists. (ii) Trainings/capacity building of producers – once the training of trainers has been completed, training of landscape producers will be undertaken by Landscape Teams and Landscape Institutions (SDPI, SDAE, etc) with follow-up from the Safeguards Team (FNDS). After being trained, the landscape technical staff will act as instructors in their landscapes.

FNDS's safeguard team will coordinate and oversee the involvement of local communities in the IPM, oversee awareness campaigns for local communities related to human health and environmental impacts of pesticides, and the training of pesticide users.

The materials to be emphasized in the training of technical staff include, but are not limited to: pesticide management, sanitary certification of plant and animal products, adequate use of agrochemicals, integrated pest management integrated production and organic production, adequate application of pesticides, protection equipment, transport and storage of pesticides, health and safety of users at work, according to the needs and specificities of each approved project. The success of implementation of IMP will depend on the training of beneficiaries, which must know and dominate all the stages and procedures of the IMP.

There should also be training on the safe use of pesticides, which should include the following topics: Pesticide selection, Pesticide labeling, Pesticide transport, Pesticide mixing and loading, Pesticide storage, Disposal of pesticide packaging, Obsolete pesticides, calibration of the product, quantity and application of pesticides, Determination of the amount of chemical to be used, Important precautions related to the application of pesticides, toxicity, Human protection and First Aid.

SDAE's extension agents, DPTADER technical staff, MAIP technical staff, SDPI technical staff, amongst other relevant institutions, the potential beneficiaries of the target landscape, should be actively involved in the preparation, design, implementation, execution and monitoring of IPMR. The LMU's provincial teams should monitor the implementation of these specific individual Plans for each project, giving all the needed technical support to the involved producers/beneficiaries.

Experiences of the SUSTENTA and MozBio phase I projects being implemented show that the language and frequency of trainings are a crucial factor in the transfer of knowledge. This is one of the activities under responsibility of the knowledge transfer specialist and to ensure the adequate language to the different target groups with special attention to local extension agents and commercial agriculture farmers.

PMP implementation budget

The overall required budget for implementation of the PMP is estimated at US$ 1,041,900.00.

Sumário Executivo

Introdução

O MITADER adoptou uma nova abordagem para a Gestão de Áreas de Conservação baseada no maneio de recursos naturais através da Gestão integrada de Paisagem (ILM). A abordagem ILM combina iniciativas para promover o desenvolvimento rural, como acesso ao crédito rural, infraestrutura rurais e segurança de posse de terra, com iniciativas para promover o maneio sustentável dos recursos naturais, incluindo a protecção da biodiversidade (principalmente através de áreas de conservação mas também através de áreas de conservação comunitárias e privadas) e restauração de habitats degradados. Essas iniciativas ocorrem em paisagens maiores, que abrangem diferentes usos da terra, como a agricultura produtiva, pecuária, sivicultura e áreas de conservação, incluindo assentamentos urbanos. Essa abordagem de gestão de Paisagens de Áreas de Conservação mais amplas é altamente relevante para as ACs, já que a maioria das ameaças, incluindo a pressão populacional, vem de fora de seus limites.

A fase II do MozBio, tem como objectivo de desenvolvimento do projecto (PDO): melhorar a gestão das Paisagens das Áreas de Conservação alvo e melhorar as condições de vida das comunidades dentro e ao redor destas Áreas de Conservação. A MozBio Fase 2 (este projecto) baseia-se nos resultados do MozBio 1, integra as lições aprendidas e aproveita as oportunidades emergentes para contribuir para os objectivos gerais do Programa MozBio.

O documento foi produzido com base na consulta aos membros da equipe da Área de Conservação e Administradores das referidas áreas de Conservacao das paisagens alvo do projecto, aliado a um amplo processo de entrevistas realizadas com várias partes interessadas. As entrevistas envolveram representantes do Mozbio a nível nacional e outros envolvidos na concepção do Mozbio2. As reuniões de consulta pública foram realizadas em locais estratégicos: Matutuine (Paisagem da Costa Elefante), Sussundenga (Paisagem Chimanimani) e Marromeu (Paisagem do Complexo Marromeu). Ao longo dessas consultas, foram registrados 163 participantes, incluindo representantes das comunidades, sociedade civil, governo, sector privado e ONG's.

Os principais objectivos das reuniões foram discutir e avaliar as lições aprendidas com a implementação do MozBio 1, e os instrumentos de salvaguarda incluindo, processo e requisitos para a implementação do MozBio 2. A principal questão do Plano de Gestao de Pragas foi sobre a necessidade de considerar doenças e pragas na actividade pecuária e agrícola.

Descrição da Fase 2 do Projecto MozBio

O Projecto irá conter a seguintes componentes: 1) Fortalecimento da Capacidade das Instituições Nacionais de Conservação e Sustentabilidade Financeira do Sistema das Áreas de Conservação; 2) Melhoramento da Gestão das Áreas de Conservação em paisagens alvo; e 3) Promover o desenvolvimento rural compatível com a conservação e o maneio integrado da paisagem nas paisagens alvo. O projeto terá benefícios sociais e ambientais positivos ao nível local, nacional e global. Ao nível local, o projeto beneficiará directamente as pessoas locais que vivem nas paisagens alvo (Paisagem da Costa dos Elefantes, Paisagem de Chimanimani e Paisagem do Complexo Marromeu), através da promoção de actividades de subsistência compatíveis com a conservação.

Durante a implementação do Componente 3, subprojectos relacionados com a agricultura, pecuária e / ou silvicultura, pode haver a necessidade de gestão de pragas e / ou doenças que, se não controladas, podem prejudicar negativamente a produtividade ou a saúde humana / animal. Sabe-se que o uso de pesticidas pode ter consequências negativas no agroecossistema. O programa apoiará a melhoria dos

sistemas produtivos que, consequentemente, aumentam a produtividade, mas esses ganhos não podem ser alcançados sem a melhoria dos fertilizantes sintéticos e pesticidas, principalmente inseticidas, herbicidas e fungicidas para certas actividades. Os agrotóxicos serão utilizados em actividades agrícolas, pecuárias para o controle de pragas e doenças, aumentando o risco de mais problemas de pragas, bem como podem ter implicações negativas na saúde, ambientais e económicas e isso representa riscos ambientais e de saúde pública.

Área de Implementação do Projecto

Em particular, a Componente 3 do Projecto MozBio fase II, incluiria intervenções dentro da paisagem: (i) Paisagem da Costa do Elefante, incluindo duas ACs (Reserva Especial de Maputo (MSR) e Reserva Marinha Parcial da Ponta do Ouro (PPMR), incluindo a Ilha de Inhaca) e áreas de terra imediatamente adjacentes no distrito de Matutuine (incluindo áreas privadas e comunitárias); (ii) Paisagem de Chimanimani, incluindo a Reserva de Chimanimani e sua zona de amortecimento, as três Reservas Florestais existentes (Moribane, Zomba e Maronga) e áreas de terra imediatamente adjacentes no Distrito de Sussundenga; (iii) a Paisagem do Complexo Marromeu, incluindo a Reserva de Marromeu, Coutadas 10, 11 e 14, e imediatamente áreas adjacentes nos distritos de Marromeu, Cheringoma e Muanza.

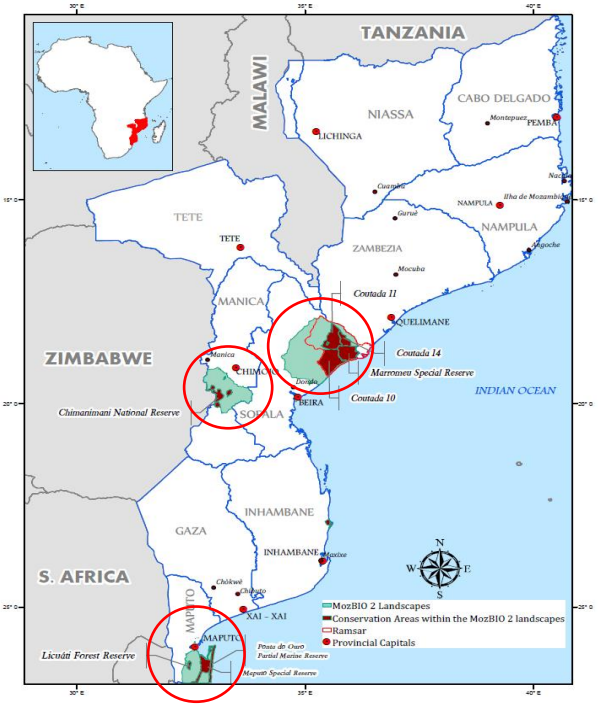


Figura 1. Mapa da área de implementação do projecto

Política e Quadro Legal e Institucional para a Implementação do PMP

Uma Gestão Integrada de Pragas (MIP) eficaz resulta de uma criativa e eficiente combinação da política e do quadro institucional de Moçambique e das boas práticas prevalecentes com as do Banco Mundial.

Os Ministérios da Agricultura e Segurança Alimentar (MASA), da Terra, Ambiente e Desenvolvimento Rural (MITADER) e da Saúde (MISAU): são as instituições responsáveis por assegurar que os regulamentos sobre pesticidas sejam traduzidos num conjunto de acções que garantam que os pesticidas são geridos de uma forma que não representa uma ameaça para a saúde humana, vegetal e animal e para a saúde geral dos componentes ambientais.

A capacidade institucional para gerir os pesticidas está representada a nível central, provincial e distrital. (i) a nível central segundo o Diploma (nº153/2002) o Ministério da Agricultura e Segurança Alimentar (MASA), através da sua Unidade de Registo, é o órgão oficial responsável pelo registo de pesticidas e pela emissão de licenças para a sua utilização, após aprovação pela Direcção Nacional de Saúde (DNS), Direcção Nacional do Ambiente (DINAB) e pelo Instituto Nacional de Investigação Agrária - Departamento de Ciência Animal (IIAM/DCA); (ii) a nível provincial, o controlo está a cargo das Direcções Provinciais da Agricultura e Segurança Alimentar (DPASA) e das Direcções Provinciais do Ambiente (DPTADER); (iii) No nível distrital, o uso, manuseio e transporte de agrotóxicos é controlado pelo SDAE, que trabalha com uma equipe de agentes extensionistas responsáveis pelo controle e treinamento dos diferentes beneficiários, bem como por entidades importadoras de fertilizantes e agrotóxicos sintéticos (agroquímicos).

Além disso, o Banco Mundial, através do OP 4.09, apoia estratégias que promovem abordagens de Gestão Integrada de Pragas (GIP), tais como controle biológico, práticas culturais e desenvolvimento e uso de variedades de culturas resistentes ou tolerantes a pragas. O objectivo da Política de Gestão de Pragas (OP 4.09) é minimizar e gerenciar os riscos ambientais e de saúde associados ao uso de pesticidas e promover e apoiar a gestão segura, eficaz, ambiental e social de pragas. Tem como objectivo promover o uso do controle biológico e reduzir o uso de pesticidas químicos sintéticos; e consolidar os poderes legislativos dos países e suas instituições para promover e garantir uma gestão segura das pragas. Mais especificamente, esta política visa, entre outros objetivos: (a) Determinar quais actividades relacionadas ao manejo de pragas em operações financiadas pelo Banco Mundial são baseadas nos princípios de integração e procurar reduzir o uso de pesticidas químicos sintéticos; (b) garantir que os perigos para a saúde e os riscos ambientais associadas a gestão de pragas, especialmente o uso de pesticidas, sejam minimizados e possam ser gerenciados de forma eficaz pelo usuário.

Esta política é utilizada se estiver prevista a aquisição de agrotóxicos ou equipamentos de aplicação (tanto indirectamente por meio do projecto ou através de cofinanciamento ou contrapartes de Governos que financiem) (ii) o projecto pode afectar a Gestão de Pragas mesmo sem obter pesticidas. Isso inclui projectos que podem (I) conduzir o uso extensivo de pesticidas e o subseqüente aumento do risco à saúde e ao meio ambiente; (ii) mantém ou amplia práticas actuais insustentáveis de Gestão de Pragas, não com base nos princípios da GIP, e / ou comprometendo significativamente a saúde ou o meio ambiente.

Pelo presente Plano Integrado de Gestão de Pragas, a legislação Nacional, as convenções internacionais às quais Moçambique aderiu e as Políticas de Salvaguarda do Banco Mundial aplicam-se. Para a implementação da fase II do MozBio, são consideradas as licções aprendidas da fase I do MozBio e a gestão integrada de pragas preparada no âmbito do Projecto de Agricultura e Gestão Integrada dos Recursos Naturais (Sustenta) e o Projecto de Investimento Florestal (MozFIP) também financiado pelo Banco Mundial e sob a égide do Fundo Nacional de Desenvolvimento Sustentável.

Gestão de Pragas na fase I do Mozbio: Lições aprendidas

Durante a implementação da fase I do MozBio, o uso de pesticidas para controle de pragas foi mínimo na agricultura e nulo na pecuária, uma vez que não houve investimento em larga escala nas actividades agrícolas e pecuárias. O tratamento dos riscos e incertezas causados obedeceu ao seguinte: (i) identificação de possíveis riscos (pragas, doenças, factores climáticos) presentes em determinadas actividades; (ii) identificação de causas prováveis de cada risco; (iii) proposta de mitigação, dando prioridade àqueles com maior probabilidade de ocorrência e com maior impacto.

Paisagem Costa dos Elefantes: Reserva Especial de Maputo e da Reserva Marinha Parcial da Ponta D'Ouro: a actividade agrícola foi levada a cabo numa área de 7 hectares nas comunidades de Maphanga, Mhala, Ndelane, Mabuloco e Ticalala no Posto Administrativo de Machangulo. A acctividade adotada pela agricultura de conservação foi implementada através da distribuição de sementes melhoradas e assistência técnica a 142 famílias, totalizando em torno de 3.000 (três mil) beneficiários, dos quais mais de 70% eram mulheres.

As principais culturas produzidas foram milho, feijão e amendoim, e as pragas identificadas foram broca-do-milho, lagarta-do-cartucho. A mitigação de pragas por pragas inclui campos de demonstração para transferência de conhecimento sobre a aplicação de pesticidas e disseminação através da apresentação de peças relacionadas a atividades que são prejudiciais à conservação, incluindo o manejo de pragas. A aplicação de pesticidas não foi promovida, porém alguns produtos químicos como abamectina, deltametrina, acetatos e tinidoclotrithe, para combater anfíbios, lagartos e ácaros, respectivamente. O uso de produtos químicos levou em conta a observação de limites nacionalmente aceitáveis e a verificação da disposição final da embalagem. Em geral, a atividade agrícola no REMPPO é praticada pelos minoritários, sendo a pecuária a principal atividade.

Por ser uma área de conservação com a maior parte da zona tampão sendo concessionada, a disponibilidade de terras para a agricultura é limitada.

Paisagem de Chimanimani: No contexto da MozBio fase I, 11 (onze) comunidades da zona tampão da reserva de Chimanimani foram apoiadas para a agricultura, sendo Tsetesra, Mussapa, Goto-Goto, Phedza, Mahate, Nhahedzi, Mpunga, Zomba, Maronga, Macoca, Muoco respectivamente. Apoio foi fornecido para o fornecimento de cimento e assistência técnica. O principal objetivo era produzir para subsistência e excedente para o mercado local em pequena escala, com base em princípios ecológicos, como rotação de culturas e controle biológico, através do uso de uma variedade de sementes resistentes.

O projecto tem como público-alvo associações locais de pequenos agricultores e beneficiou cerca de 1000 (mil) indivíduos, dos quais 60% são mulheres. A actividade agrícola foi orientada para culturas mais comerciais localmente, como a inclusão de alho e batata para o comércio, associada à produção

de labirinto e feijão para segurança alimentar / subsistência. Esta actividade foi implementada em uma área de cerca de 40 hectares em duas campanhas (2017/2018).

A abordagem da actividade agrícola foi sem o uso de fertilizantes químicos e a prevenção de pragas e doenças considerou o estabelecimento de campos de demonstração e implementação do sistema de maneio pós-colheita. A principal praga verificada foi a lagarta-do-cartucho, que, embora em pequena escala, causou danos principalmente na cultura do milho. A existência do projecto de irrigação, PROIRRI, com o objectivo de aumentar a produção agrícola através de sistemas de irrigação na região central do país é um aspecto positivo que considera as sinergias entre a produção de 2 (dois) projectos agrícolas (MozBio) e disponibilidade de recursos hídricos (PROIRRI). No entanto, a implementação do PROIRRI e do MozBio 1, não considerou os riscos de contaminação relacionados a pragas e doenças capazes de se propagar através da água. Embora nenhum incidente tenha sido relatado, é considerado um risco potencial que requer atenção. Algumas histórias de sucesso do MozBio -1 nesta região consideram o aumento da produção em cerca de 40% sem o uso de fertilizantes químicos. (Ver relatório sobre as principais realizações do projeto MozBio 1 na Reserva Nacional de Chimanimani).

Paisagem do complexo de Marromeu: Consultas preliminares da fase de preparacoa do MozBio II envolvendo os principais interessados, tais como gestão da reserva, operadores da Coutadas 11, e 14, líderes comunitários, serviços distritais de actividades econômicas (SDAE), serviços distritais de Planejamento e Infraestrutura (SDPI), conselho de Sena Sugar State, tem sido descobriram que existem actualmente dois tipos de práticas agrícolas na paisagem de Marromeu, cada uma com diferentes técnicas de controle de pragas e doenças; contrariamente aos distritos circunvizinhos, de Cheringoma e Muanza, o distrito de Marromeu é caracterizado por possuir dois sectores : (i) Sector familiar- caracterizado por praticar agricultura itinerante em parcelas familiares muito pequenas ou nas terras da Sena Sugar State, que se encontram em pousio. Neste sector o uso de compostos inorgânicos para o combate de pragas e doenças é muito baixo- quase nulo isto devido ao fraco poder económicos associado a falta de conhecimento/informação e acesso a tecnologias de produção melhoras ligadas ao uso de fertilizantes sintéticos.

Pecuária - a criação de animais na paisagem de Marromeu, recai na categoria de animais de pequeno porte onde as famílias limitam-se apenas na criação de aves de capoeira (galinhas, patos, pombos etc) e suínos, a criação de bovinos e caprinos pelo sector familiar não é praticado devido à alta prevalência da mosca tsé-tse tornando esta actividade não sustentável. Assim, actividade pecuária pelo sector familiar conta apenas com assistência técnica do SIDAE- Marromeu, muito limitada por falta de capacidade interna e orçamento para distribuição de insumos de qualidade; ii) sector comercial - mais de 80% das terras estão sob a administração da Sena Sugar State, cuja actividade principal é a produção de cana-de-açúcar sob monocultura e irrigação por meio de “pivôs”, onde o risco de propagação de pragas e doenças é maior; esta cultura pode ser atacada por mais de 80 espécies de pragas e grande variedade de ervas daninhas.

Impactos ambientais, ocupacionais e potenciais de saúde pública, medidas de mitigação e monitoramento

A abordagem paisagística do projecto MozBio-2, para a cadeia de valor da agricultura e pecuária, financiará as grandes e médias empresas para responder à procura e à concorrência comercial, o que consequentemente implica o aumento de áreas agrícolas e a deslocação da actividade pecuária para aumentar o número de animais olhando para a perspectiva do mercado. Associado a este facto, a agricultura comercial é caracterizada pela prática da monocultura onde o problema de controle de

pragas não mais se localiza em “pequenas propriedades familiares” e é também uma economia específica para projectos de média escala que implicará no aumento de medidas de controle associadas ao aumento sobre o uso de produtos químicos.

A estratégia para a implementação de medidas de mitigação sugeridas é fornecer aos agricultores treinamento no uso de produtos químicos, bem como o uso de abordagens integradas de gestão de pragas (GIP).

Impactos ambientais e sociais

O MozBio 2 é um projecto de categoria B, uma vez que potenciais impactos ambientais e sociais negativos directos serão menores, específicos do local, reversíveis e facilmente geríveis. Os impactos ambientais e sociais do projecto resultarão, em parte, da construção de obras civis e também de produtos químicos usados na agricultura e actividades de subsistência, que podem afectar a água, o solo, a qualidade do ar, a saúde humana que pode ser afetada por abstrações e desvios ou de fertilizantes, nutrientes e produtos químicos diferentes para serem usados no maneio de pragas. Assim, a estratégia para gerenciar esses impactos associados aos agrotóxicos passa pela pré-identificação.

Tabela 1. Identificação de impactos e potenciais medidas de mitigação

Questão da Gestão de Pesticidas	Impacto Potencial	Medidas de Mitigação	Indicadores de Acompanhamento
O uso excessivo de produtos químicos, desatualizados, descarte de embalagens sobre rios e córregos, o uso de pesticidas não autorizados e / ou não-rotulados	Perda de comunidades vegetais; Fragmentação de habitats; Perda de algumas espécies de animais mais sensíveis; Perturbação de funções ecológicas;	Deixar de lado porções representativas principais de cada tipo de vegetação como áreas; de conservação na área do projecto; Identificar, colher sementes de árvores estabelecidas e recolocação de mudas de espécies de preocupação especial; Estabelecer lotes de plantio especificamente para a propagação de espécies da floresta que são importantes recursos para as comunidades;	Número de agricultores que utilizam pesticidas corretamente (observando as datas de validade e dosagens);

	Alteração dos padrões, estrutura e composição	Dentro dos DUATs devem ser identificadas e geridas áreas sensíveis para garantir a sua preservação e conservação; Identificar áreas adequadas de baixa sensibilidade para o estabelecimento das machambas deslocadas;	
	Redução da qualidade de água para consumo e irrigação; Proliferação de ervas aquáticas; Perda da Biodiversidade em particular das espécies aquáticas; Escoamento de pesticidas e propagação de pragas e doenças que têm impacto sobre os sistemas de águas;	Aplicação do Regulamento sobre Pesticidas (tipo, rotulagem e quantidade); Promover a reciclagem dos recipientes; os campos irrigados e actividades lineares devem evitar ecossistemas sensíveis; Monitorar a biodiversidade aquática e ervas daninhas; Gestão de águas pluviais deve garantir que a água poluída não corre em zonas húmidas e outros ecossistemas sensíveis; As águas superficiais e subterrâneas devem ser monitoradas regularmente em busca de traços de poluentes de pesticidas;	Número de plantas aquáticas; Abundância (n/ha) de espécies de plantas (por exemplo, medicinais e alimentares); Os padrões de qualidade da água referidos no regulamento (Decreto 18/2004)
Uso excessivo de produtos químicos, desatualizados, uso não-autorizado e /ou gestão de pesticidas não rotulados	Aumento da toxicidade do solo	Aplicação reguladora de agrotóxicos (tipo, rotulagem e quantidade); Promover o uso de medidas de controlo culturais e biológicas	Padrões da qualidade do solo referidos no regulamento (Decreto 18/2004); Número de agricultores que utilizam medidas biológicas e culturais.
Uso excessivo de químicos, desatualizados, uso água poluída	Baixo rendimento de culturas ; Níveis inaceitáveis de resíduos de pesticidas nos produtos colhidos e na cadeia alimentar.	Aplicação Reguladora dos pesticidas (tipo, rotulagem e quantidade); Promover o uso de medidas de controlo culturais e biológicos	Produtividade por cultura; Qualidade do produto; Número de agricultores que utilizam medidas biológicas e culturais

Uso de pacotes de pesticidas vazios, lavados e descartados em rios, consumo de água poluída, uso excessivo de produtos químicos	Envenenamento dos trabalhadores / agricultores e efeitos prejudiciais sobre a saúde humana; Toxicidade para as espécies aquáticas;	Promover a reciclagem dos pacotes; Aplicação Reguladora dos pesticidas (tipo, rotulagem e quantidade); Monitorar a biodiversidade aquática e as actividades de pesca; Promover a formação em primeiros socorros para os agricultores.	Mudanças observadas nas seguintes áreas: Número de agricultores reciclando embalagens; Número de embalagens lavadas e descartadas nos rios; Padrões da qualidade das águas referidos no regulamento (Decreto 18/2004); Rendimentos de pesca; Número de agricultores com formação em primeiros socorros.
Armazenamento inadequado de resíduos de pesticidas	Contaminação dos recursos de terra e água;	Os recipientes vazios de pesticidas devem ser descartados de acordo com as Directrizes da FAO sobre Opções de Gestão de Recipientes Vazios de Pesticidas (FAO 2008); De acordo com as Directrizes do FAO (2008) a queima de recipientes vazios de pesticidas deve ser fortemente proibida	
Aplicação sem Equipamentos de Protecção	Aumento do número de acidentes e lesões	Promover o uso de equipamentos de protecção; Promover a formação em primeiros socorros	Número de trabalhadores/produtores que utilizam Equipamentos de proteção; Número de trabalhadores/ agricultores treinados nos primeiros socorros; Número de acidentes/ lesões por Época.

No geral, o uso indevido de pesticidas também pode resultar em: (i) Eliminação dos inimigos naturais das pragas e consequente perda do controle natural de pragas que mantém as populações de pragas agrícolas muito baixas; e (ii) Desenvolvimento de resistência a pragas a pesticidas, incentivando novos aumentos no uso de pesticidas químicos (ciclo vicioso). A abordagem exacta do GIP deve ser definida de acordo com as condições do local e a capacidade dos agricultores de adotar e implementar novas técnicas.

Os seguintes princípios de GIP devem ser considerados:

- Cultive uma safra saudável. O foco é em práticas culturais destinadas a manter a cultura saudável. A seleção de variedades resistentes ou tolerantes a pragas é um aspecto importante. A atenção ao maneio do solo, nutrientes e água faz parte do cultivo de uma cultura saudável. Muitos programas de GIP, portanto, adotam uma abordagem holística e consideram uma gama mais ampla de parâmetros agroecológicos relacionados à produção de culturas.
- Gerenciar o agroecossistema de tal forma que as pragas permaneçam abaixo dos níveis econômicos prejudiciais, ao invés de tentar erradicar a praga. A prevenção da formação de pragas e o incentivo da mortalidade natural da praga é a primeira linha de defesa para proteger a cultura. Práticas não químicas são usadas para tornar o campo e a cultura inóspitos para as espécies de

insetos e hospitaleiras para seus inimigos naturais, e para prevenir condições favoráveis ao acúmulo de ervas daninhas e doenças.

- As decisões de aplicar insumos externos como controles suplementares são feitas localmente, são baseadas no monitoramento da incidência de pragas e são específicas do local. Insumos externos podem incluir predadores ou parasitas (biocontrole), trabalho para remover a praga manualmente, iscas de atração de pragas, armadilhas de pragas ou pesticidas. A escolha da entrada externa varia para cada situação. Os pesticidas são geralmente usados se insumos de controle de pragas não químicos economicamente viáveis não estiverem disponíveis ou falharem no controle da praga. Eles são aplicados somente quando o monitoramento de campo mostra que uma população de pragas atingiu um nível que provavelmente causará danos econômicos significativos e que o uso de pesticidas é custo-efectivo em termos de ter um efeito positivo nos lucros líquidos da propriedade. A seleção de produtos e técnicas de aplicação deve ter como objectivo minimizar os efeitos adversos sobre espécies não-alvo, pessoas e meio ambiente.
- A abordagem GIP deve incluir uma ampla variedade de técnicas que podem ser aplicadas sob abordagens GIP, cuja aplicabilidade dependerá de vários factores, incluindo: a cultura, o sistema de cultivo, os problemas de pragas, o clima, as condições agro-ecológicas, etc.

Diretrizes para a preparação de PMP específico

No caso de seleção de subprojeto com potencial para o desenvolvimento de pragas, um Plano de Gestão de Pragas específico será preparado, com base nos princípios definidos neste PMP. A semelhança MozBio I, o Manual de Boas Práticas deve ser preparado pelo oficial de salvaguarda do projeto e o EMP deve ser preparado por um consultor a ser contratado para desenvolver o Estudo Ambiental e Social da Categoria "B" com a assistência do oficial de salvaguarda. Nenhum projeto deve ser inicializado sem esses documentos aprovados.

O documento deve incluir:

Descrição do Subprojeto - identificação de sua localização, área, sistema de cultivo, clima, condições agroecológicas, tecnologias a serem utilizadas, fonte de água, potenciais problemas de pragas (principais pragas para cada cultura-alvo).

Quadro Legal e Institucional – incluindo arranjo de implementação a ao nível distrital e administrativo
Identificação de alternativas para a gestão integrada de pragas - Identificação da actual gestão das principais pragas identificadas na região e experiências existentes do MIP - em consulta com autoridades agrícolas, ONGs, extensionistas e agricultores, incluindo a identificação das táticas indígenas de MIP dos agricultores. Identificação dos pesticidas autorizados em Moçambique (Anexo-II), para a espécie chave identificada. Identificação de técnicas alternativas em consulta com instituições de pesquisa como o IIAM ou mesmo instituições internacionais que normalmente apoiam o MASA, bem como políticas ambientais e sociais do Banco Mundial aprovadas para o projeto.
Definição de uma estratégia para gerenciar as medidas de identificação de pragas- a serem implementadas ao longo do ciclo da cultura desde a fase de preparação do projeto até a preparação e plantio do local, incluindo práticas culturais que podem ajudar a prevenir o desenvolvimento de pragas, listadas na seção 7 deste relatório.

Selecção do modelo apropriado para a gestão de pragas - Conscientização e treinamento para promover a GIP e o uso seguro de pesticidas - para agentes de extensão, agricultores e comunidades locais; Ele deve incluir estratégias para se comunicar com as comunidades locais, agricultores, incluindo a preparação de materiais específicos com fotos / figuras ou até mesmo vídeos.

Monitoria e Avaliação - defina um plano de monitoramento para assegurar o monitoramento regular dos campos e a preparação de relatórios de avaliação trimestrais.

Treinamento e capacitação

A implementação do projecto da fase II do MozBio proporcionará assistência técnica à cadeia de valor da agricultura e pecuária através de extensionistas a nível da paisagem. O sucesso ou fracasso da implementação da Gestão Integrada de Pragas dependerá do treinamento prévio do corpo técnico (agentes de extensão) das instituições-alvo da paisagem. Os treinamentos / capacitação devem ser divididos em dois modelos (i) Treinamento de instrutores de paisagem - todos os técnicos das instituições relevantes e a equipe técnica da unidade de implementação da paisagem devem ser treinados, esses treinamentos devem ser realizados pela equipe de salvaguardas da FNDS e especialistas em transferência de conhecimento. (ii) Treinamentos / capacitação de produtores - uma vez que a formação de instrutores tenha sido completada, a formação dos agricultores e pecuaristas na paisagem será realizada pela Equipe das Unidades das Paisagens e Instituições locais (SDPI, SDAE, etc) com o acompanhamento da Equipe de Salvaguardas (FNDS) . Depois de treinados, a equipe técnica da paisagem actuará como instrutores em suas paisagens.

A equipe de salvaguardas da FNDS coordenará e supervisionará o envolvimento das comunidades locais na implementação do Plano Integração de Gestão de Pragas, supervisionará campanhas de conscientização para as comunidades locais relacionadas à saúde humana e aos impactos ambientais de pesticidas e o treinamento de usuários de pesticidas.

Os materiais a serem enfatizados no treinamento do pessoal técnico incluem, mas não estão limitados a: maneio de pesticidas, certificação sanitária de produtos vegetais e animais, uso adequado de agroquímicos, produção integrada de manejo integrado de pragas e produção orgânica, aplicação adequada de pesticidas, proteção equipamentos, transporte e armazenagem de agrotóxicos, saúde e segurança dos usuários no trabalho, de acordo com as necessidades e especificidades de cada projeto aprovado.

Também deve haver treinamento sobre o uso seguro de pesticidas, que deve incluir os seguintes tópicos: Seleção de pesticidas, Rotulagem de pesticidas, Transporte de pesticidas, Mistura e carregamento de pesticidas, Armazenamento de pesticidas, Descarte de embalagens de pesticidas, Pesticidas obsoletos, calibração do produto, quantidade e aplicação de pesticidas, Determinação da quantidade de produtos químicos a serem utilizados, Precauções importantes relacionadas à aplicação de pesticidas, toxicidade, proteção humana e primeiros socorros.

Os extensionistas do SDAE, o pessoal técnico do DPTADER, o pessoal técnico do MAIP, o pessoal técnico do SDPI, entre outras instituições relevantes, os potenciais beneficiários do cenário-alvo, devem estar activamente envolvidos na preparação, concepção, implementação, execução e monitorização do Plano de GIP. As equipes provinciais da LMU devem monitorar a implementação desses Planos individuais específicos para cada projecto, dando todo o apoio técnico necessário aos produtores / beneficiários envolvidos.

Experiências dos projectos SUSTENTA e MozBio fase I sendo implementados mostram que a linguagem e a frequência dos treinamentos são um factor crucial na transferência de conhecimento. Esta é uma das actividades sob a responsabilidade do especialista em transferência de conhecimento e para garantir a linguagem adequada aos diferentes grupos-alvo, com atenção especial aos agentes locais de extensão e agricultores agrícolas comerciais.

Orçamento de implementação do PMP

O orgamento indicativo necessário para implementação do presente PMP é de um total US$ 1,041,900.00.

INDEX

1 INTRODUCTION

MITADER's approach for management of Conservation Areas is based on a newly adopted Integrated Landscape Management approach (ILM) to natural resource management. The ILM approach combines initiatives to foster rural development, such as access to rural credit, rural infrastructure, and land tenure security, with initiatives to promote sustainable management of natural resources, including biodiversity protection (mainly through conservation areas, but also through community-based and private-managed conservation areas) and restoration of degraded habitats. These initiatives take place in larger landscapes, which encompass different land uses, such as productive agriculture, livestock forestry and conservation areas including urban settlements. This approach of managing the wider Conservation Areas Landscapes is highly relevant to CAs, as most threats, including population pressure, come from outside their boundaries. This approach also entails a stronger presence and decentralized coordination mandate at the local level, through the establishment of Landscape Management Units, and multi-stakeholder coordination platforms.

The MozBio phase II, has as Project Development Objective (PDO) to improve management of targeted Conservation Areas Landscapes and enhance the living conditions of communities in these Conservation Areas Landscapes. MozBio Phase 2 (this project) builds on MozBio1 results, integrates lessons learned, and seizes emerging opportunities to contribute to the overall MozBio Program goals. The MozBio SoP is part of the Bank's "Integrated Landscape Management Portfolio", which includes Bank-financed projects that are implemented in a coordinated manner to maximize impact on; (i) improved well-being of rural populations; and (ii). Sustainable management of renewable natural resources (forestry, wildlife, fisheries and land). A particularly relevant project to MozBio 2 is the Agriculture, livestock, forest-based and Natural Resources Management project "to integrate rural households into sustainable value chains in the Project Area".

The approach of the project MozBio Phase-II, there is a need to adapt and upgrade the safeguards instruments, respectively the Environmental and Social Monitoring Framework, Process Framework, Resettlement Policy Framework, and Pest Management Plan prepared and approved under MozBio-1 to be applicable in the current approach, due to the new Dynamics of the project MozBio-2.

The new approach of the Project focuses on the rural development compatible with conservation of specific landscapes through increased production and productivity to the agricultural value chain, livestock and forestry, focusing on small and commercial emerging farmers. Potentially small and medium-scale business support activities (agriculture, forestry, livestock, and restoration of degraded forests, among others) will be financed, these activities will focus on the use of modern technologies, many of them based on the use of synthetic fertilizers and pesticides (agrochemical) for the control of pests and diseases. The current document represents the Pest Management Plan to be implemented within the scope of the MozBio phase- II project.

Since the project aims to contribute to the improvement of productive systems that boost productivity through financing of agricultural, Livestock activity, the World Bank Operational Policy, OP 4. 09, Pest Management, was activated. OP. 4.09 aims to ensure that pest management activities focus on Integrated Pest Management (IPM), promoting cultural and biological control and reducing the use of synthetic pesticides as well as minimizing the risks to health and environment due to the use of pesticides. The pest management plan must help develop capacity to be implemented the IPM and regulate e monitor the Acquisition, distribution and use of pesticides.

2 DESCRIPTION OF THE MOZBIO PROJECT

The project will be implemented by the Ministry of Land, Environment and Rural Development (MITADER), through the National Fund for Sustainable Development (FNDS), in coordination with the National Administration of Conservation Areas (ANAC) and the Foundation for Conservation of Biodiversity (BIOFUND). Phase II of MozBio, will also count on the collaboration of different entities at local level, the District Services for Economic Activities (SDAE), District Services for Planning and Infrastructure (SDPI), including NGO's and other relevant entities to implement the specific activities of the Project in the target landscape areas.

The Project will contain the following components: (i) 1) Strengthening Capacity of National Conservation Institutions and Financial Sustainability of the CA system; 2) Improving Conservation Areas Management in target landscapes; and 3) Promoting conservation-compatible rural development and integrated landscape management in target landscapes. The project will have positive social and environmental benefits at local, national, and global levels. At the local level, the project will directly benefit local people living in the targeted landscapes (Elephant Coast landscape, Chimanimani Landscape, and Marromeu Complex Landscape), through the promotion of conservation-compatible livelihood activities.

During the implementation of the Component 3, subprojects related with agriculture, livestock and/or forestry there might be a need to manage pests and/or diseases, that if not controlled could be negatively detrimental to the productivity or human/animal health. It is known that the use of pesticides may potentially have negative consequences on the agro-ecosystem. The program will support the improvement of productive systems which consequently boost productivity, but these gains cannot be achieved without the improvement of synthetic fertilizers and pesticides, mainly insecticides, herbicides and fungicides for certain activities. Agrochemicals will be used in agricultural, livestock activities to control pests and diseases, increasing the risk of further pest problems as well may have negative health, environmental and economic implications and this represents environmental risks and of public health. Thus, the Integrated Pest Management Plan (IPMP) will support actions that lead to the adequacy and control of the use of synthetic fertilizers and pesticides, in case of need for their use, guiding them to adopt Integrated Pest Management (IPM) and the Integrated Production (IP). During the process of emerging commercial activities facing value chains, communities will also be motivated to migrate to increasingly less environmentally and socially impacting production systems associated with the IPM.

This report presents the Pest Management Plan (PMP) to manage potential pests and diseases problems that may develop during MozBio phase II implementation and help ensure that the use of all pesticides, insecticides, herbicides, chemical fertilizers and other chemicals associated with the Project will be handled properly and in accordance with World Bank Operational Policy 4.09 and Pest Management and the Mozambican legal requirements.

3 PROJECT TARGET AREAS

The MozBio- II PDO is to improve management of target conservation area landscapes and enhance the living conditions of communities in and around these conservation areas. In particulary the Component 3 of MozBio Project phase II, would include interventions within landscape's : (i) Elephant Coast landscape, including two CAs (Maputo Special Reserve (MSR), and Ponta do Ouro Partial Marine Reserve (PPMR), including Inhaca island), and immediately adjacent land areas in the Matutuine District (including private and community areas); (ii) Chimanimani Landscape, including the Chimanimani Reserve and its buffer zone, the three existing Forest Reserves (Moribane, Zomba e Maronga) and immediately adjacent land areas in the Sussundenga District; (iii) the Marromeu Complex Landscape, including the Marromeu Reserve, Hunting Areas 10, 11, and 14, and immediately adjacent land areas in Marromeu, Cheringoma, and Muanza Districts and the Zambezi estuary in the Zambezia Province.

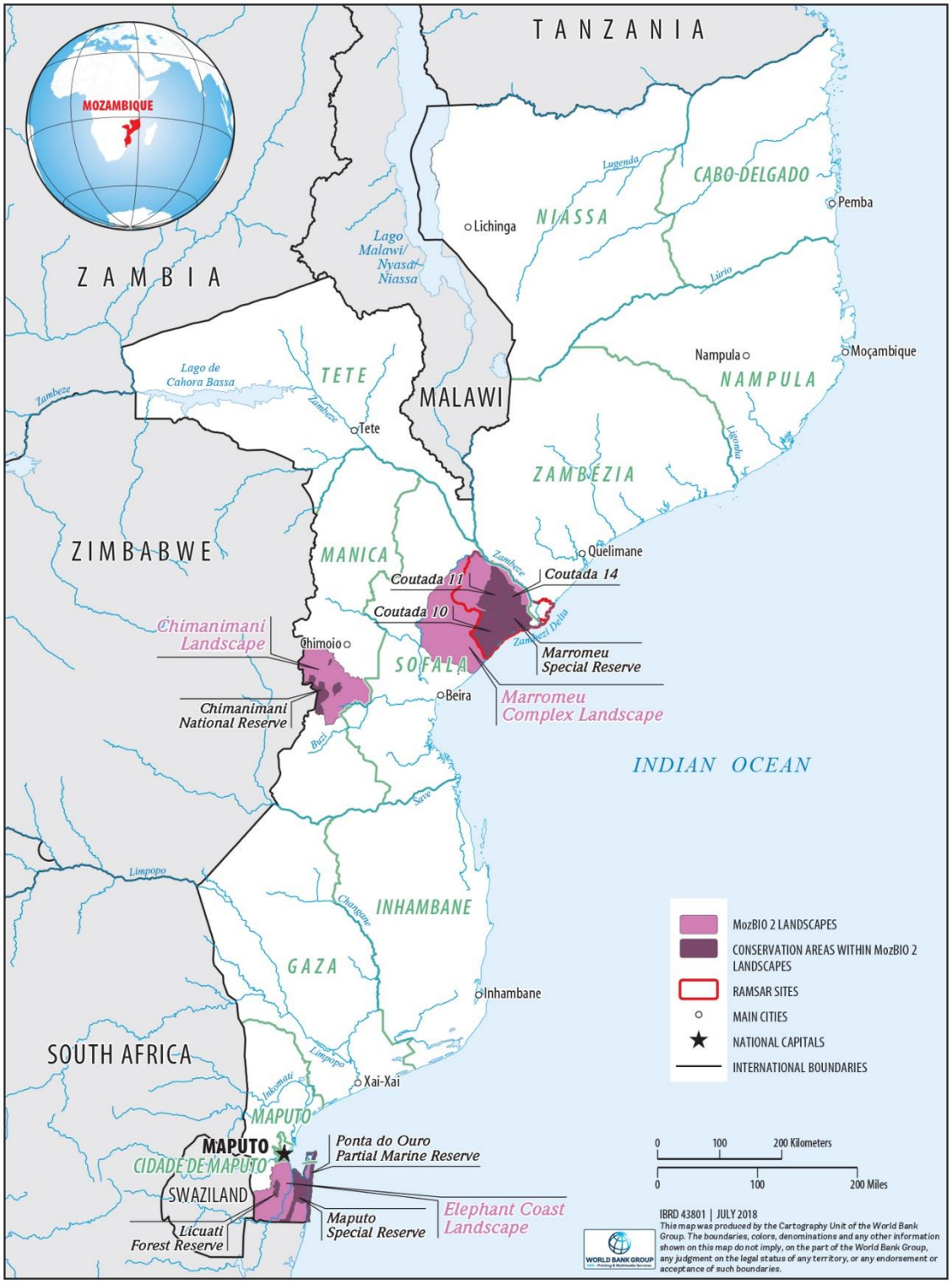


Figure 1. **MozBio project phase II: Landscape's**

4 POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK FOR IMPLEMENTING THE PMP

An effective Integrated Pest Management (IPM) will result from a good and creative combination of the Mozambique's policy and institutional framework and prevailing good practices with those of the World Bank. A review of these elements is done in this chapter.

4.1 Mozambique and International Legal and Institutional Framework

Mozambique promulgated legislation for the management of pesticides through Ministerial Diploma nº153/2002 and Decree nº 5/2009 of 1/6 to regulate Pest Management. Strategically, the Ministry of Agriculture and Food Security (MASA) has as one of its core functions, to control the pests and diseases in animal and plants (Mozambique is member of IRLCO-CSA). The phytosanitary Authority in the country (NPPO) is the Department of Plant Health of the National Directorate of Agriculture and Forestry (DINAS) at MASA and has as its mission: to guarantee the phytosanitary protection of the country, through the implementation of the Phytosanitary Inspection and Plant Quarantine Regulation (Decree nº 5/2009 of 1/6).

The Institutional capacity to manage pesticides, are represented at central, provincial and district levels. (i) at central level According the Diploma (nº153/2002) the Ministry of Agriculture and Food Security (MASA), through its Registration Unit, is the official agency responsible for the registration of pesticides and the issuing of permits for their use, after approval by the National Directorate of Health (DNS/MISAU), the National Directorate for Environmental Impact Assessment (DNAIA) and the National Institute for Agrarian Research – Department of Animal Science (IIAM/DCA); (ii) at provincial level, the control is under taken by the Provincial Directorates of Agriculture and Food Security (DPASA) And environmental Provincial Directorates (DPTADER); (iii) At district level, the use, handling and transport of pesticides is controlled by the SDAE, that works with a team of extension agents responsible for controlling and training the different beneficiaries, as well as entities that import synthetic fertilizers and pesticides (agrochemicals).

The Ministries of Agriculture and Food Security (MASA), Land, Environment and Rural Development (MITADER) and the Ministry of Health (MISAU): These are the institutions responsible for ensuring that the Regulation is translated into the set of actions that will guarantee that pesticides are managed in a way that does not pose a threat to human, plant and animal health and to the overall health of the environmental components.

The Ministry of Agriculture and Food Security (MASA) is the main institution responsible for pest management. It comprises the following national directorates that are relevant for pest management:

(i) National Directorate of Silviculture (DINAS – Direcção Nacional de Sivicultura), and livestock production, animal and plants sanitary protection;
(ii) National Directorate of Agrarian Extension (DNEA – Direcção Nacional de Extensão Agrária) to establishes, monitoring and evaluation of the director framework for training, communication and technical assistance and organization of producers;
(iii) Agricultural Research Institute of Mozambique (IIAM - Instituto de Investigação Agrária de Moçambique) - the main research institution in the agrarian sector in Mozambique, focused

on the improvement of crops production, seeds improvement, integrated pest management, capacity building and training.

The National Directorate of Veterinary (Veterinary Services), according Decree nº 26/2009 of August 17- Animal Health Regulations, has as one of its core functions, to control of animal pests and diseases, establishes norms for the epidemiological surveillance in Mozambique. Ministérial Diploma nº 9/2007 of January 31, Rates of Provision of Veterinary Services, defines the conditions, procedures, regime and type of counterparts for the veterinary assistance provided by the State. The Veterinary Services on his mission, ensure the permanent surveillance of domestic and wildlife animals in order to detect early changes in the health status of animals Animal diseases constitute a constraint on the development of livestock.

The Pesticides Management Regulation aims to ensure that all processes that involve working with or handling pesticides are executed without prejudice to public, animal and environmental health. This regulation is in in line with the Environmental Law that defines the environmental legal framework in Mozambique and its regulations. Follow the Table 1. Relevant Mozambican Law and Regulation and Table 2. Relevant international agreements, conventions and protocols.

In addition, a strong collaboration with private sector should be stablished to control the pesticides imported and in use in Mozambique, trough development of a national database from its importation, use and disposal.

Table 1. Relevant Mozambican Law and Regulation

Laws and regulations and brief description	Applicability to the project
Ministerial Diploma nº 153/2002 of 11 September 2002 (Pesticides Regulation). This is a joint diploma issued by the Ministries of Agriculture, Health, and Environment for the management and use of pesticides in Mozambique. It stipulates that the use of pesticides is subject to their prior product registration with the Ministry of Agriculture. The Ministry of Health establishes permissible levels of pesticide residue in food stuffs based on FAO guidelines. Pesticides must be clearly labelled and identified and be color-coded depending on their level of toxicity. The use, storage, handling, sale and removal or destruction of pesticides may be subject to environment licensing	
Diploma Ministerial nº. 9/2007 de 31 de January. Define the rates of Provision of Veterinary Services, defines the conditions, procedures, regime and type of counterparts for veterinary assistance provided by the State.	
Decree nº. 6/2009 of 31 March 2009 (Pesticides Management Regulation). The objective of the Regulation is to ensure that all processes that involve working with or handling pesticides are not performed in detriment of the public, animal and environmental health The Regulation applies to the registration, production, donation, trading, importation, exportation, packing, storage, transport, handling, use and elimination of pesticides and adjuvants, by individual or collective persons, for agricultural, livestock, forestry, public health protection, domestic and other purposes Among other aspects the regulation identifies the institutions involved in pesticide management, sets up bodies with responsibility of performing specific tasks in the area such as the (i) Technical Assessment Committee for Pesticides Registration; and the (ii) Technical Advisory Committee for Agrochemicals It also provides and updates regularly (annually) the list of pesticides products that can be used in Mozambique. These are classified according to their toxic potential (Article 9). Out of the 188 registered pesticides, 109 are class III; 67 class II and only 12 class I (being Class I the most toxic ones)1. The Regulation also stresses that The companies or entities employing people for pesticide storage, trading, transport, application and elimination shall ensure continuing and updated training of their staff, including rules for combating fires, intoxication, first-aid, spills and other hazards. The companies are entrusted with the responsibility of training their staff with the government entities in the MASA being are responsible for	It is applicable as many of its provisions are in line with the WB guidelines on pest management including integrated pest management

Laws and regulations and brief description	Applicability to the project
the preparation and administration of the courses it also elaborates on the need for information dissemination and establishes limitations for pesticide advertisement	
Decree nº 18/2004 Regulation on Environmental Quality and Effluents' Emissions amended by Decree No. 67/2010 (see below) The aim is to define environmental quality patterns for granting an effective control and management of pollutant concentration levels in environmental components. The annexed Regulation is composed of 26 articles and 6 annexes divided in six Chapters. It defines air quality standards and emission requirements, water classification according to the uses and related quality control requirements with special regards to potable water. Moreover, it rules on soil quality and noise emissions. The Annexes provide technical requirements and standards Decree nº. 67/2010 amending the Regulation on Environmental Quality and Effluents' Emissions amends articles 23 and 24 and Annexes I and V of the Regulation on Environmental Quality and Effluents' Emissions, related to taxes for special authorizations and new fines and sanctions for illegal activities. Annexes IA and IB deal new standards of air quality, atmosphere polluting agents and parameters for carcinogenic Inorganic and Organic agents. Annex V lists potentially harmful chemical substances	
Decree nº 26/2009 of August 17, Animal Health Regulations. Establishes norms for the epidemiological surveillance and control of animal diseases in Mozambique;	
Decree nº. 5/2009 of 1 June, Establishes the Plant Health Inspection and Plant Quarantine Regulation, establishes the legal framework on the Plant Health and Quarantine Inspection. Vegetable;	
Decree nº. 11/2013 of April 10, Regulation on Fertilizer Management, promotes and regulates the use of fertilizers for agricultural development without prejudice to public, environmental and soil health	

Table 2. Relevant international agreements, conventions and protocols.

International Agreements, Conventions and Protocols	Applicability to the project
FAO's International Code of Conduct on the Distribution and Use of Pesticides (CoC) - is the worldwide guidance document on pesticide management for all public and private entities engaged in, or associated with, the distribution and use of pesticides. The CoC provides a guiding framework for pesticides life cycle management to Governments, pesticide industry and other stakeholders involved in pest and pesticide management to prevent harm to pesticide users, the public and the environment. It includes Technical Guidelines that provides a framework to establish or strengthen national legislation, institutions, policies and strategies for pest and pesticide management.	These international agreements, conventions and protocols provide guidance on how to handle, store, apply, and dispose of pesticides. Moreover, provides list of certain hazardous chemicals and pesticides that cannot be safely manage or have been banned due to environmental and health problems.
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade - aims to provide an efficient method for exchanging information about industrial chemicals and pesticides that have been banned or severely restricted for health or environmental reasons by participating countries. It encourages environmentally sound management of these chemicals when their use is permitted and seeks to provide and share accurate information on their characteristics, potential dangers and safe handling and use. Annex III of the Convention lists the industrial chemicals, pesticides and severely hazardous pesticide formulations subject to the procedure.	
The Stockholm Convention on Persistent Organic Pollutants - is a global treaty to protect human health and the environment from persistent organic pollutants (POPs). POPs are chemicals that are persistent, bioaccumulative, subject to long-range environmental transport and that are toxic to humans and the environment. Governments have to take measures to eliminate or reduce the release of POPs into the environment. At its adoption, the Convention targeted 12 particularly toxic POPs for reduction and eventual elimination. Nine further POPs have been added to the Convention based on a consensus decision by the Parties.	
FAO's International Standards for Phytosanitary Measures (ISPM) - The intention of these series of document publications (1-25) is to harmonize phytosanitary measures for the purpose of facilitating international trade. ISPMs can cover a wide range of issues including; surveillance, pest risk analysis, establishment of pest free areas, export certification, phytosanitary certificates and pest reporting.	
The **Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal** aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes. It regulates the transboundary movements of hazardous and other wastes applying the Prior Informed Consent (PIC)	

International Agreements, Conventions and Protocols	Applicability to the project
procedure. The Convention furthermore obliges its Parties to ensure that hazardous and other wastes are managed and disposed of in an environmentally sound manner. Technical assistance, technical guidelines on the Environmentally Sound Management (ESM) of specific hazardous waste streams and further guidance material are provided as a support to developing countries and countries with economies in transition, to manage and dispose of hazardous wastes in an environmentally sound manner.	
International Labour Organization Chemicals Convention 1990, No. 170 - The Convention represents one of the most far-reaching international agreements in the area of chemicals management and specifically addresses the protection of workers from harmful effects of chemicals at the workplace. It applies to all branches of economic activity in which chemicals are used, covers all chemicals and provides specific measures in respect of hazardous chemicals. The Convention requires that classification systems be established and that all chemicals should be marked to indicate their identity. Hazardous chemicals should be labelled to provide essential information on their classification, their hazards and safety precautions to be observed.	
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa - prohibits the import into Africa of any hazardous, including radioactive, wastes, as well as products which have been banned, cancelled or withdrawn from registration for environmental or health reasons.	

Table 3. Institutions and responsibilities

Sectors/Government Departments	Responsibilities
Agriculture sector	
Silviculture (DINAS) and its respective units at the central and provincial (DPASA) and district (SDAE) levels that deal with plant and animal diseases The National Agrarian Research Institute (IIAM) National Directorate of Agrarian Extension Services (DINEA)	which manages the subunits that deal with related health issues and pesticides IIAM is the main research institution in the agrarian sector in Mozambique, focused on the improvement of crops production, seeds improvement, integrated pest management, capacity building and training DINEA is MASA's entity responsible for training, communication and technical assistance and organization of producers, mainly small and medium size farmers including the subsistence family sector
Health Sector	
MISAU is the central entity responsible for public health. It fulfils its role through one national directorate, the National Directorate of Public Health (DNSP), which has a series of units including the Department of Environmental Health (DSA)	DSA fits within the framework of MISAU's organizational structure. The DSA is part of the National Directorate of Public Health and falls under the Deputy National Director for the "Prevention and Control of Diseases". At provincial level, the DSA is a unit under the Department of Community Health within the DPS and at the district level, the activities are undertaken by the Community Health Unit that is part of the SDMAS
Environmental Sector	
MITADER is the central entity responsible for the health of the environmental components such as water, soil, air, flora and fauna. It exercises its role through two main units: AQUA (environmental quality agency), Directorate of Environmental DNAB, which is responsible for environmental licensing of activities through the Department of Environmental Licensing (DLA) as well as Department Environmental Education (DEA)	In its capacity as the overall manager of environmental aspects and related services MITADER is the main institution responsible for controlling the potential implication of pesticide use in the quality of the environmental components AQUA is the leading institution in environmental quality management by, among other, establishing environmental standards to be adhered to and defining ways and procedures to put them in place DNAB is responsible for the licensing of activities and well as for promoting environmental education

5 WORLD BANK OPERATIONAL POLICY ON PEST MANAGEMENT OP 4.09

The World Bank, through OP. 4.09, supports strategies that promote Integrated Pest Management (IPM) approaches, such as biologic control, cultural practices and the development and use of pest resistant or tolerant crop varieties. (Annex II. OP. 4.09 - Pest Management Plan).

The objective of the Policy on Pest Management (OP 4.09) is to minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, environmentally and social sound pest management. It aims to promote the use of biological control and reduce the use of synthetic chemical pesticides; and consolidate the legislative powers of the countries and their institutions to promote and ensure a safe pest management.

More specifically, this policy aims, among other objectives: (a) Determine which activities related to pest management in WB financed operations is based on the principles of integration and seek to reduce the use of synthetic chemical pesticides; (b) ensure that the dangers to health and environmental risks associated with pest management, especially the use of pesticides are minimized and can be managed effectively by the user.

This policy is used if it is foreseen the acquisition of pesticides or application equipment (both indirectly through the project, as indirectly through co-financing or counter-parties Governments that finance) (ii) the project can affect the Pest Management even though without obtaining pesticides. This includes projects which may (I) conduct extensive use of pesticides and the subsequent increase in risk to health and environment; (ii) maintains or expand current unsustainable Pest Management practices, not based on the principles of IPM, and/or significantly jeopardize health or the environment.

The procurement of any pesticide in a WB financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users. With respect to the classification of pesticides and their specific formulations, the WB refers to the World Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification. (Annex I. Registered Pesticides in Mozambique-June 2015). For the present Integrated Pest Management plan, National legislation, the international conventions that Mozambique adhered to and the World Bank Safeguard Policies apply. For the implementation of MozBio phase II, are considered lessons learned from MozBio phase I and the integrated pest management prepared on the scope of the Integrated Agriculture and Natural Resources Management Project, “Sustenta” and the Forest Investment Project, MozFIP also financed by the World Bank and under the aegis of the National Sustainable Development Fund.

6 GAP ANALYSIS: MOZAMBICAN LEGISLATION AND WB POLICIES

The comparison in Table 4 shows fundamental differences between the GOM laws and regulations and the WB policies and guidelines that has to do with the lack of a framework by the former to deal with Pest Management. The three regulations mentioned and particularly the two pertaining to the agricultural sector focus on operational matters in detriment of defining and regulating the overall context under which pesticides should be integrate, considered and possibly used. The country does not have any integrated pest management or any organic production strategy. Partial IPM related aspects are referred indirectly when encouragement for using other pest control methods (e.g. biological, physical, etc.) and other precautionary methods in dealing with pesticides are endorsed. However, IPM as such does not exist as a standalone policy and regulatory instrument. Under specific contexts, this situation also carries the potential to be an open door for farmers and other operators in the agro-chemicals value chain to embark on poorly thought and poorly controlled market, which could have unwanted consequences.

Conversely, IPM is central to the WB approach. IPM can be defined as a mix of farmer driven, ecologically based pest control practices that seek to reduce reliance on synthetic chemical pesticides. It involves (a) managing pests (keeping them below economically damaging levels) rather than seeking to eradicate them; (b) relying, to the extent possible, on non-chemical measures to keep pest populations low; and (c) selecting and applying pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment. The WB policy calls for assessment of the nature and degree of associated risks, taking into consideration the proposed use and the intended users for procurement of any pesticide in Bank-financed projects. Under the WB approach it is a requirement that any pesticides that will be used, will be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the World Bank. This will be applied in the project's life cycle.

As also shown by the Table 4, notwithstanding, the existing shortcomings in the national legislation, the instruments in place encompass a strong element of control over the whole cycle of pesticide use. Accordingly only pesticides registered with the then National Directorate of Agrarian Services (DNSA) now National Directorate of Agriculture and Silviculture (DNAS), under the current Ministry of Agriculture and Food Security (MASA), can be used in Mozambique. These include a list of pesticides products that are classified according to their toxic potential (Article 9). Out of the 188 registered pesticides, 109 are class III; 67 class II and only 12 class I (being Class I the most toxic ones). Composition and physical-chemical characteristics of the pesticides proposed for registration are to conform to the specifications from the World Health Organization (WHO) and the United Nations Food and Agricultural Organization (FAO) and should appear on the label. The regulation also requires proper packaging and handling, which meet the necessary requirements regarding occupational health and safety.

Table 4: Comparison between the GOM regulations and the WB guidelines

Issues	Mozambican legislation	WB policies and guidelines	Assessment and Recommended Measures to Bridge the Gaps
Project assessment and identification and determination of the need for a PMP or an IPM for a project	Neither the EIA Regulations nor the pest management instruments (Ministerial **Diploma 153/2002** (**Pesticides Regulation**), Decree 6/2009 (Pesticides Management Regulation) and **Decree n. 18/2004 Regulation on Environmental Quality and Effluents' Emissions**) make reference of the need to assess a project in general to identify and determine if it needs a PMP or an IPM	The combination of both World Bank OP 4.09 Pest Management and BP 4.01, Annex B - Application of EA to Projects Involving Pest Management make it mandatory for an agricultural (or health) project to be assessed to identify and/or determine the need for a PMP or an IPM	The two sets of legislation differ. In compliance with the WB guidelines the project has been assessed and the need for both PMP and IPM has been ascertained. The implications of this will continue throughout the subsequent phases of the project
The financing and use of pesticides is only done when their use is justified under an IPM approach	Although Mozambican regulations (Ministerial **Diploma 153/2002** (**Pesticides Regulation**), Decree 6/2009 (Pesticides Management Regulation)) repeatedly make reference to the value of using alternative ways of combating plant and animal diseases using more environmental friendly means they do not condition to financing and use of pesticide to an IPM that justifies pesticides	This is also a crucial aspect of both World Bank OP 4.09 Pest Management and BP 4.01, Annex B - Application of EA to Projects Involving Pest Management. IPM approach is central and the financing of pesticides is conditional their use being justified under such an approach	This is a fundamental framework definition in which the two sets of regulation differ. The formulation of the PMP for this project and the subsequent actions are an affirmation of the fact that the WB guidelines prevailed and will prevail
Contingency of procurement of any pesticide to an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users	Although Mozambican regulations (Ministerial **Diploma 153/2002** (**Pesticides Regulation**), Decree 6/2009 (Pesticides Management Regulation)) set forth a series of measures to take precautions in the procurement and use of pesticides in line with the proposed use and potential users it does not make the process necessarily contingent to an assessment	This is one of the central provisions of the World Bank OP 4.09 Pest Management, i.e. that procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users	There are significant differences in the general principles. The World Bank OP 4.09 Pest Management will be adhered to throughout the project life cycle.
Financed pesticides must be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to clearly defined acceptable standards	Both Mozambican regulations (Ministerial **Diploma 153/2002** (**Pesticides Regulation**), Decree 6/2009 (Pesticides Management Regulation)) and the latter in particular make it mandatory for any operation involving pesticides to strictly restrict to clearly defined acceptable pesticides standards. The list of acceptable pesticides exists and it in conformity with the WHO standards.	The Bank requires that any pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The classification of pesticides exists and is in line with the WHO standards	There are considerable similarities in the definition of standards and lists. In as far as the listing is concerned both sets of regulation can be used equally

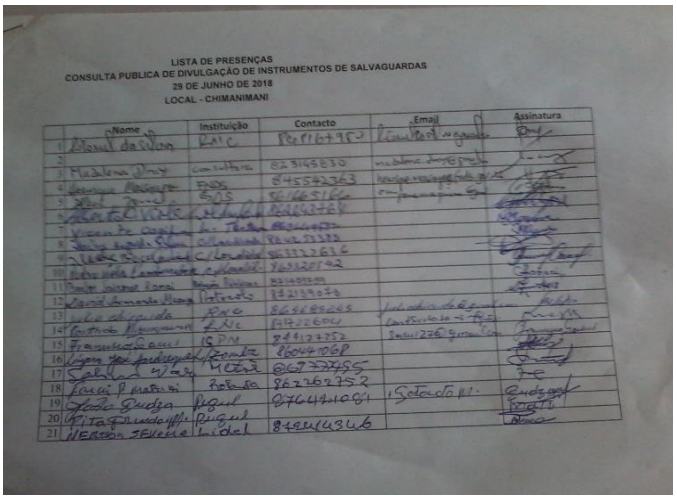
7 PMP PREPARATION AND CONSULTATION PROCESS

The PMP for MozBio Phase 2 building on the experience and lessons learned from MozBio Phase 1 as highlighted in Chapter 6. Furthermore, it is enriched by a participative and transparent consultation process as required by the Mozambican Legislation and World Bank requirements. In Mozambique, the necessity to consult with stakeholders for matters related to environmental and social assessments is embedded in national law: the Mozambican Constitution and Environment Law establish the rights of citizens to have information about and to participate in decision-making about activities which may affect them and the environment (Decree 54/2015 Environment Law). This document was therefore designed in compliance with national procedures and with World Bank Policies, OP/BP 17.50 Public Disclosure.

The document was produced on the basis of consultation with the Administrators and Conservation Area (CA) team members in all target CAs, along with a wide range of interviews carried out with various stakeholders. Interviews and on-going dialogue with MozBio staff at national level and others involved in the design of Mozbio2 were conducted throughout the working period. Public consultation meetings was carrying out at strategic places: Matutuine District (Elephant Coast Landscape), Sussundenga District (Chimanimani Landscape) and Marromeu District (Marromeu Complex Landscape). Along those consultation, 163 participants were recorded, include representatives of communities, civil society, government, private sector and ONG's.

The main objectives of the meetings was to discuss the lesson learned from MozBIO I implementation and the safeguard instruments, process and requirements to MozBIO II. The target issue from Pest Management Plan was to consider in the PMP diseases and pest in livestock. (Annex 3. Consultation Process for MozBio 2).

Important to refer that one issue considered at landscape of Marromeu complex, was about the very limited internal capacity and budget to ensure the good assistance, for pesticides management and one of the ways of pest and disease control used by the private sector is use resistant varieties, with characteristics of vigorous growth that allow them to compete with other weeds and the use of organic pesticides, however, these methods are not very effective, which requires the use of chemical treatments (fungicides, herbicides and pesticides).



LISTA DE PRESENÇAS
CONSULTA PUBLICA DE DIVULGAÇÃO DE INSTRUMENTOS DE SALVAGUARDAS
29 DE JUNHO DE 2018
LOCAL - CHIMANIMANI

	Nome	Instituição	Contacto	Email	Assinatura
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This PMP will consider a structure (safeguard team, government collaboration and Private sector) and budget to support all subproject preparation processes to ensure the involvement of people directly for improving integrated pest management.

8 PEST MANAGEMENT IN MOZBIO PHASE- I

In Mozambique, there are soil and climatic conditions that favour the occurrence of different types of pests and diseases in the different stages of development of the crop and animals in the agriculture and livestock activities. The high incidence of pests, affects the productive performance of the crops in about 40%, the management strategies are used to weaken or control the pests with the aim at reducing the damage without causing imbalance in the agroecosystem.

Component 4 of MozBio- phase I "Piloting Support to Sustainable Livehoods of Communities within and around Conservation" was characterized by the support community initiatives including assistance to small family farmers and small agriculture associations in the interior and buffer zones of the CA's. thus, the agricultural activity was of low use of pesticides and chemical fertilizers, in many cases these pesticides was used aligned by Mozambican legislation with support of local extension agents. One of the weakness of the MozBio phase I, the quantity of pesticide/agrochemical used was not measured.

8.1 Lesson Learned

During the implementation of MozBio phase I, the use of pesticides for pest control was minimal in agriculture and null in livestock, since there was no investment in large scale in agriculture and livestock activities. The treatment for risks and uncertainties caused obeyed the following: (i) the identification of possible risks (pests, diseases, climate facts) present in certain activities; (ii) identification of probable causes of each risk; (iii) mitigation proposal, giving priority to those with higher probability of occurrence and those with greatest impact.

8.1.1 Elephant Coast Landscape

At the level of the Maputo Special Reserve and Ponta D'Ouro Marine Partial Reserve, the agriculture activity was carried out on an area of 7hectares in the communities of Maphanga, Mhala, Ndelane, Mabuloco and Ticalala in the Administrative Post of Machangulo. The activity took a 2conservation agriculture approach was implemented through distribution of improved seeds and technical assistance to 142 families, totalizing around 3000 (three thousand) beneficiaries, from which more than 70% were women.

The main crops produced were corn, beans and peanuts, and the identified pests were corn borer, fall armyworm.

[2]

Conservation agriculture: which consisted of a set of practices (eg: soil cover, mulching, intercropping and crop rotation) that allowed man to make the soil with less influence on its composition, contributing to the increase of organic matter and biodiversity conservation.

Pest mitigation of pests includes demonstration fields for knowledge transfer about the application of pesticides and dissemination through the presentation of plays related to activities that are harmful for conservation, including pest management. Application of pesticides was not promotede, however some chemicals such as abamectin, deltamethrin, acetates and tinidoclotrithe, to combat amphibians, lizards and mites, respectively. The use of chemicals took into account an observation of nationally acceptable limits and verification of the final disposal of the packaging.

In general, the agriculture activity at REMPPO is practiced by the minority, being livestock the main activity. Because it is a conservation area with the most of the buffer zone being concessioned, the availability of land for agriculture is limited.

8.1.2 Chimanimani Landscape

In the context of MozBio phase I, 11 (eleven) communities of the buffer zone of Chimanimani reserve were supported for the agriculture, being Tsetesra, Mussapa, Goto-Goto, Phedza, Mahate, Nhahedzi, Mpunga, Zomba, Maronga, Macoca, Muoco respectively. Support was provided for the supply of cement and technical assistance. The main objective was to produce for subsistence and the surplus for the local market on a small scale, based on ecological principles such as crop rotation and biologic control through the use of a variety of resistant seeds.

The project has as target group, local associations of small farmers and benefited about 1000 (one thousand) individuals, from which 60 % are women. Agriculture activity was oriented for more commercial crops locally such as the inclusion of garlic and potato for trade, associated with the production of maze and beans for food security/subsistence. This activity was implemented in an area of about 4 hectares in two campaigns (2017/2018).

The approach of the agricultural activity was without the use of chemical fertilizers and the prevention of pests and diseases considered the establishment of 3 demonstration fields and implementation of post-harvest management system. The main pest verified was the fall armyworm, which although in small scale, has caused damages mainly in the maize crop. The existence of the irrigation project, PROIRRI, with the aim of increasing the agricultural production through irrigation systems in the central region of the country is a positive aspect that considers the synergies between the 2 (two) project agriculture (MozBio) production and availability of water resources (PROIRRI). However, the implementation of PROIRRI and MozBio 1, did not consider risks of contamination related to pests and diseases capable of propagating through water. Although no incident has been reported, it is considered a potential risk requiring attention.

Some success stories of MozBio -1 in this region consider increased production by about 40% without the use of chemical fertilizers. (See report on the main achievements of the MozBio 1 project in the Chimanimani National Reserve).

[3] Demonstration fields: Also referred as "machambas" are areas on an average of 0.5ha, used for testing sustainable agricultural techniques. Sowing, pest prevention activities among other technologies are tested. This approach aims to ensure that farmers living far from the demonstration fields can gain access to areas near their homes or farms where such technologies are being implemented.

6.2.3 Marromeu Complex Landscape

There also is increasing concern about untreated factory discharge into the Zambezi River and unregulated pesticide and nutrient runoff (non-point source pollution) from the sugar fields into the Zambezi floodplains (Technical Report: October 2010 General Management Plan for the Marromeu Complex: A Wetland of International Importance Draft submitted to Government of Mozambique).

Results of preliminary public consultations of the preparation MozBio phase II, involving key stakeholders such as management of the reserve, heads of hunting areas 11, and 14, community leaders, district services of economic activities (SDAE), district services of Planning and Infrastructure (SDPI), board of *Sena Sugar State*, it has been found that there are currently two types of agriculture practice in the landscape of Marromeu, each with different pest and disease control techniques; in contrast with the surrounding districts of Cheringoma and Muanza, the district of Marromeu is characterized by two sectors: (i) family sector - characterized for practicing shifting agriculture in very small plots or in the lands of *Sena Sugar State*, which are fallow. In this sector, the use of inorganic compounds to combat pests and diseases is very week-almost nill, this due to weak economic power associated with the lack of knowledge/information and access to improved production technologies linked to the use of synthetic fertilizers. They use traditional soil fertilization methods such as land fallow, incorporation into the soil of dead plants, manure or ash stubble.

The breeding of animals in the landscape of Marromeu, falls under the category of small livestock where the families are limited to poultry (chicken, ducks, pigeons, etc) and pigs, the raising of cattle and goats by the family sector, is not practiced due to the high prevalence of tsetse fly making this activity unsustainable. Thus, livestock activity by the family sector only has technical assistance from SDAE - Marromeu, very limited due to lack of internal capacity and budget to ensure the good assistance, distribution of quality inputs including pesticides management; (ii) commercial sector- more than 80% of land is under the management of Sena Sugar State, whose main activity is sugar-cane production under monoculture and irrigation through “pivots”, where the risk of propagation of pests and diseases is higher, and this crop can be attacked by more than 80 species of pests, and great variety of weeds. The main sugar cane pests are the stem borer, which attack the seedlings, causing death, and also perforate the older stems, causing longitudinal rot along the stem. Ants and termites, grasshoppers and crickets are other pests. As one of the ways of pest and disease control, the companies use resistant varieties, with characteristics of vigorous growth that allow them to compete with other weeds and the use of organic pesticides, however, these methods are not very effective, which requires the use of chemical treatments (fungicides, herbicides and pesticides). The main diseases of sugarcane are: cane coal, leaf scalding, mosaic vírus, red rot, and vectors of diseases (insects).

According to Rosetto and Santiago (2007) worldwide, sugarcane accounts for losses of approximately 20% only considering the attack of pests and diseases. These losses are due, in part, to the indiscriminate use of agrochemicals which favour the rapid evolution of these pests and the emergence of populations resistant to determined products.

Sena- Sugar State also dedicates to breeding of cattle, and the assistance is done by a team of provincial veterinary services of the city of Beira. In addition to the tsetse fly, the other common pests are the ticks - arthropods and ectoparasites responsible for transmitting diseases in animals. The most

common major diseases are: *Rickestigus* caused by the green tick-*Amblyoma Hebraeum*; *Anaplasmosis*, *Babesiosis* and T*heileriose* (Red-legged Ticks and Ringed Paws *Rhipicephalus sp*.) Anaplasmosis and Babesiosis (Blue Tick *Boophilus sp*.).

9 EVIRONMENTAL, OCCUPATIONAL AD PUBLIC HEALTH POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING

A particularly relevant project to MozBio phase II, is the "Sustenta" (Agriculture and Natural Resources Management) project, currently under implementation (2017-2021), which aims to "to integrate rural households into sustainable agriculture and forest-based value chains in the Project Area". "Sustenta" is currently implementing a matching grant scheme that will be replicated through MozBio 2. (See PAD- Mozambique conservation areas for biodiversity and development - phase 2. -P166802).

The landscape approach of MozBio-2 project, for the agriculture and livestock value chain will finance large and medium sized enterprises to respond to the demand and commercial competition, which consequently entails the increase of agricultural areas and shifting livestock activity to increase the number of animals looking at the market perspective. Associated to this fact, commercial agriculture is characterized by the practice of monoculture where the problem of pest control no longer locates in "small family farms" and is also an economic specifically for medium scale projects that will imply on increased control measures associated with the increase on the use of chemical products.

The strategy for implementation of suggested mitigation measures is to provide train farmers in the use of chemicals as well as in the use of integrated pest management approaches (IPM).

The objective of this section is to ensure that:

- Any intensification of agriculture and livestock practices does not result in any increase in the use of chemicals;
- The farmers have support and advice in pest and soil management for coping with their new pattern of agriculture and livestock; and
- The supply of food for the construction and operation work force is safe in terms of chemical minimum residue level and has been produced with the attention to human and environmental safety.

9.1 Risks of Implementation and Failures

The first stage of the risk assessment shall be carried out by means of the general characterization of the process for the removal of the pesticides used, the quantities used, the frequency, the places of use and the process for preparing the syrups. It is at this stage that the understanding of processes and/or factors that may be determining the exposure should be improved, involves a reflection on the magnitude of the change that constitutes the reason for concern and the basis of the study. The forms of storage, transport of pesticides and disposal of pesticide residues should be considered.

The assessment of risk exposure requires the establishment of the conceptual model that represents the sources of pesticides in the environment and the main routes of exposure for humans and ecosystems. In this second stage, it is fundamental to make a characterization of the exposure and

determination of the environmental exposure levels and identification of all the key components for performing the risk assessment.

The third stage of risk assessment aims to establish the magnitude of risks to man and the environment. This step is performed progressively at four levels based on exposure information, pesticide toxicity and pesticide effects to determine the likelihood of adverse effects on the environment and humans.

9.2 Environmental and Social Impacts

Like its predecessor, MozBio2 is a category B project since potential direct negative environmental and social impacts will be minor, site specific, reversible and easily manageable. Project environmental and social impacts will in part result from construction of civil works as well by chemical used in agriculture and livelihood activities, that could affect water, soil, air quality, human health which could be affected by abstractions and diversions or due to the discharge of fertilizers, nutrients, different chemicals to be used for pest management. Thus, the strategy to manage these impacts associated with pesticides, first pass through their pre-identification.

Table 5. Potential impact and mitigation measures.

Pesticide management issue	**Potential impact**	**Mitigation measure**	**Indicators of monitoring**
Excessive use of (out-of-dated) chemicals, disposal of containers in rivers and stream, use of non-authorized and/or non-labelled pesticides.	Decrease in water quality for consumption and irrigation Proliferation of aquatic Weeds Loss of biodiversity in particular of aquatic species	Application of Pesticides Regulation (type, labelling and quantity); Promote recycling of containers; Monitor aquatic biodiversity and weeds.	Number of farmers using pesticides properly (observing expiration dates and dosages); Number of aquatic weeds; Abundance (n/ha) of plant resource species (e.g. medicine, food); Patterns of water quality referred in the regulation (Decree 18/2004)
Excessive use of (out-of-dated) chemicals, use of non-authorized and/or non-labeled pesticides	Increase in soil toxicity	Regulatory application of pesticides (type, labelling and quantity); Promote the use of cultural and biological control measures	Patterns of soil quality referred in the regulation (Decree 18/2004); Number of farmers using biological and cultural measures.
Excessive use of (out-of-dated) chemicals, use of polluted water	Poor crop yield; Unacceptable levels of pesticide residues in harvested produce and in the food chain.	Regulatory application of pesticides (type, labelling and quantity); Promote the use of cultural and biological control measures	Productivity per crop; Quality of the product; Number of farmers using biological and cultural measures.
Use of empty pesticide's packages,	Poisoning of workers/farmers and	Promote the recycling of	Observed changes in the following areas:

Pesticide management issue	Potential impact	Mitigation measure	Indicators of monitoring
washed and disposed in rivers, consumption of polluted water, excessive use of chemicals	detrimental effects on human health Toxicity to fish	packages; Regulatory application of pesticides (type, labelling and quantity); Monitor aquatic biodiversity and fishing activity; Promote first aid training to farmers.	Number of farmers recycling containers; Number of packages washed and disposed in rivers; Patterns of water quality referred in the regulation (Decree 18/2004); Fishing yields; Number of farmers trained in first aid.
Application without Protective equipment	Increased number of accidents and injuries	Promote the use of protective equipment; Promote first aid training	Number of workers/farmers using protective equipment; Number of workers/farmers trained in first aid; Number of accidents/injuries per season.

Overall, pesticide misuse may also result in: (i) Elimination of the natural enemies of crop pests and consequent loss of natural pest control that keeps the populations of crop pests very low; and (ii) Development of pest resistance to pesticides, encouraging further increases in the use of chemical pesticides (vicious cycle).

To mitigate the impacts identified in Table 3 the overall approach of the Componente-3 of MozBio phase- II, should be to avoid or keep pesticide use at a minimum. Any necessary use should be intelligent and considered part of an IPM approach in line with OP 4.09. The exact IPM approach should be defined according to site conditions and capacity of the farmers to adopt and implement new techniques.

The following principles of IPM shall be considered:

- Grow a healthy crop. The focus is on cultural practices aimed at keeping the crop healthy. Selection of varieties that are resistant or tolerant to pests is an important aspect. Attention to soil, nutrient and water management is part of growing a healthy crop. Many IPM programs therefore adopt a holistic approach and consider a wider range of agro-ecological parameters related to crop production.

- Manage the agro-ecosystem in such a way that pests remain below economic damaging levels, rather than attempt to eradicate the pest. Prevention of pest build up and encouragement of natural mortality of the pest is the first line of defense to protect the crop. Non-chemical practices are used to make the field and the crop inhospitable to the insect pest species and hospitable to their natural enemies, and to prevent conditions favorable to the build-up of weeds and diseases.

- Decisions to apply external inputs as supplementary controls are made locally, are based on monitoring of pest incidence and are site-specific. External inputs may include predators or parasites (bio-control), labour to remove the pest manually, pest attracting lures, pest traps, or pesticides. The choice of external input varies for each situation. Pesticides are generally used if

economically viable non-chemical pest control inputs are not available or failed to control the pest. They are applied only when field monitoring shows that a pest population has reached a level that is likely to cause significant economic damage and the use of pesticides is cost-effective in terms of having a positive effect on net farm profits. Selection of products and application techniques should aim to minimize adverse effects on non-target species, people and the environment.

- The IPM approach shall include a wide variety of techniques that can be applied under IPM approaches, which applicability will depend on various factors, including: the crop, the cropping system, the pest problems, the climate, the agro-ecological conditions, etc. Some examples of such techniques (WB, 2006) are:

Cultural practices that can help prevent build-up of pests

- Crop rotation
- Inter-cropping,
- Field sanitation and seed bed sanitation,
- Use of pest-resistant crop varieties,
- Managing sowing, planting or harvesting dates
- Water/irrigation management,
- Soil and nutrient management (including mulching, zero/low tillage, fertilizer management)
- Practices to enhance the build-up of naturally existing predator populations
- Hand-picking of pests or hand-weeding
- Use of traps or trap crops
- Post-harvest loss prevention

Biological inputs

- Biological control through release of predators, parasites or pathogens
- Biological control through fish, ducks, geese, goats, etc.
- Release of sterile male insects
- Bio-pesticides
- Biological preparations (e.g. name extract)

Chemical inputs

- Chemicals that disrupt insect behaviour (e.g.: pheromones)
- Growth-regulators

Conventional pesticide - to be avoided or use at a minimum

In order to implement IPM approaches in the activities to be included in Component 3 it will be crucial to:

- Embed IPM approach during the subprojects design, taking into account other IPM experiences within the region;
- Implement participatory approaches in IPM within the target communities to learn, test, select and implement IPM options to reduce losses due to pests and diseases - special ;
- Establish a monitoring system that provides early warning on pest status, beneficial species, regular and migratory species;
- Collaborate with other IPM programmes in the target conservation areas and surroundings.
- Improve capacity building and training on IPM.

9.2.1 General rules of pest management

The methodology used for IPM should be oriented from the beginning using rigid and participatory techniques and rules with the participation of all intervenient that will manage the pesticides. The methodology used for IPM should be oriented from the beginning using rigid and participatory techniques, this will allow to develop an approach of use and management of Pesticide (IPM) guidelines for each pesticide.

Pesticide selection – Indicating the list of authorized pesticides per target pests, indicating its level of toxicity and hazardous, possible harmful effects and past experience using those pesticides for the pest and the crop.

Understanding the Pesticide Label – Explain all the information included in the label.

Pesticide Transport – Give indications on how to transport pesticides in order to avoid any leakages and avoiding the contact with persons or animals.

Mixing and Loading Pesticide – Explain the importance of ensure the proper dilution of the concentrated pesticide and the need to use protective clothing.

Pesticide Storage – Give indications on how to storage pesticides – site location (not allowed in flood areas), security (against illegal entries, as well as children and livestock), isolated from other houses, be well ventilated, waterproof roof, have a current inventory list of pesticide stock.

Container Disposal – Give indications on how to destroy used pesticide containers

Obsolete pesticides – Explain the risks associated with obsolete pesticides and procedures to be followed.

Calibration, Product Quantity and Pesticide Application – Explain the importance of application equipment calibration and how to do it.

Determining the Amount of Chemical to Use – Give explanations on methods to find out the amount of chemical to apply per hectare and its level of dilution

Important Cautions related to the Application of Pesticides – Give indications on important cautions for safe use of pesticide (see box bellow)

Toxicity, Human Protection and First Aid – Explain the possible effects of pesticide on human health, ways of pesticides entering in the body, importance of protective clothing & other protective equipment, basic first aid for pesticide exposure (with skin, mouth, eye or respiratory system).

Do NOT:

- Buy more pesticide than you'll need for a single season.
- Mix more pesticide than you'll need to treat the desired area.
- Apply sprays or dusts when leaves and small plants are continually moving because of the wind (this means a wind speed of 4 m/second).
- Apply pesticides during the hottest part of the day.
- Apply pesticides if you think it will rain within 12 hours.
- Eat, drink, smoke, or chew tobacco while applying pesticide.
- Carry tobacco, food or drinks with you while spraying.
- Get into the path of any spray drift, or let others get in its path.
- Try to blow out a plugged nozzle with your mouth.
- Keep working if anyone shows signs of pesticide poisoning (start first aid immediately).

At the present stage of the MozBio Project it is not yet defined in detail the subprojects to be developed to support livelihoods. It could comprise a wide range of types as agriculture, livestock, forests or fisheries and several types of crops/species.

In case of selection of subproject with potential to pest development, a specific Pest Management Plan shall be prepared, based on the principles defined in this PMP. In case of an agriculture and livestock subproject the Pest Management Plan must be included on the safeguard instruments prepared for the approval of the activity, it may be EMPs or Good Practices Manual, depending of the categorization of the activity. Like in MozBio phase- I, the Good Practices Manual should be prepared by the project safeguard officer and EMP's should be prepared by a consultant to be hired to develop the Category "B" Environmental and Social Study with assistance of the safeguard officer. None of the project should be initialized without these documents approved.

The document shall include:

Description of the Subproject – identification its location, area, cropping system, the climate, the agro-ecological conditions, technologies to be used, water source, the potential pest problems (key pests for each target crop).

Legal and Institutional Framework – including at the district and Administrative level

Identification of alternatives for pest management – Identification of current management of the identified key pests in the region and existent IPM experiences– in consultation with agricultural authorities, NGOs, extensionists and farmers, including the identification of farmers' indigenous IPM tactics. Identification of the pesticides authorized in Mozambique (Annex- II), for the identified key specie. Identification of alternatives techniques on consultation with research institutions as IIAM or even international institutions that usually supports MASA as well World Bank Environmental and Social Polices approved for the project.

Definition of a strategy to manage the pest – identifying measures to be implemented along the crop cycle since the project preparation stage, to site preparation and planting, including cultural practices that can help prevent build-up of pests, listed in section 7 of this report. Select an appropriate blend of IPM tools.

Awareness and training to promote IPM and the safe use of pesticide – for extension agents, farmers and local communities; it shall include strategies to communicate with local communities, farmers, including the preparation of specific materials with photos/figures or even videos.

Monitoring and Evaluation – define a monitoring plan to ensure regular fields monitor and the preparation of quarterly evaluation reports.

This structure and contents would be similar in case of other type of subproject with potential pest occurrence.

11 GRIEVANCE REDRESS MECHANISM

Mozbio2 will rely on the common Grievance and Redress Mechanism that has been established for all projects included in the World Bank's Integrated Landscape Management Portfolio in Mozambique – called the "Dialogue and Grievance Mechanism (MDR)". A manual of procedures and a communication strategy were prepared and an IT platform was designed to register and monitor the reported cases. This mechanism has been discussed with key stakeholders, including local communities, and has been tested in the Maputo Special Reserve to validate its procedures. The MDR is in the process of being implemented and will be operationalized in all Project areas either as part of Mozbio1 or at the inception of Mozbio2. This can be seen in the outline below:

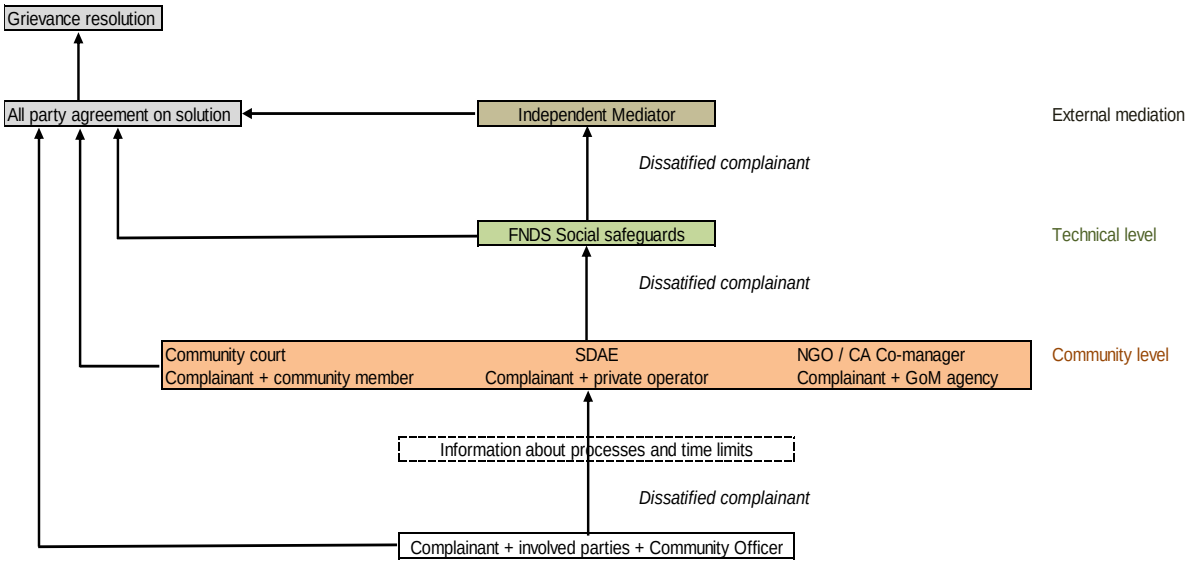

Figure 2. Grievance resolution process outline according to the MDR.

Complaints are made directly to first level recipients at community level through locally identified and trusted communication channels. These local receptors will be site specific and identified via the stakeholder analyses that will constitute part of the Project's communication strategies. Should community level interfaces require technical support from FNDS Social Safeguards Specialists or decisions from FNDS management these may be sought as a second level recourse. Finally, should a case not be resolvable internally it may be referred by FNDS (in agreement with the complainant) to an independent mediator for resolution.

Complaints should, as far as possible, be resolved in a friendly manner and at local level in accordance with the regulations and criteria of the Project Implementation Manual. If it is necessary to consider significant additional compensation, complex corrective measures or sanctions, it should be in line with the Project's operational rules, national legal framework, and World Bank policies (particularly social and environmental safeguards).

Decisions on resolution and communication to the complainant must be made in a timely fashion at all levels. Should affected people not be satisfied by the informal process of the MDR, or because the nature of the complaint requires higher level appeal, national legislation provides for making complaints in various sectors at the highest levels of Government such as National Directors and Ministers.

In addition, should either party be dissatisfied, the affected party may bring the complaint to court, where it will be treated in accordance with Mozambican law. In principle, a community may take a Company to court for failing to comply with the terms of an environmental management plan. All citizens have the right to submit complaints to the Public Prosecutor's Office, which is responsible for ensuring the correct application of the law, particularly in the development of territorial management instruments and their implementation.

FNDS will ensure that a "Complaints Register" is maintained at landscape level. In all cases where complaints are made about the implementation of Project activities, FNDS is obliged to investigate the complaint and resolve it internally by applying the Resettlement Policy Framework and MDR manual in use in the Project and returning the response within a period of less than 15 days.

MDR management is the responsibility of MITADER / FNDS which should ensure implementation with support from partners and the Government at provincial and local level.

LMU specialists, Community Officers, CA Community Officers and DPTADER community managers are the focal points of the MDR and responsible for receiving, processing, investigating and monitoring the complaint resolution process. For complaints that cannot be settled informally, safeguards officers and community officials will be responsible for channelling them to other decision-making bodies (as defined in Step 4 of the MDR Manual Procedure) and keep complainants informed.

FNDS is responsible for monitoring through the MDR system housed in the Safeguards Information System (SIS) of the measurement, reporting and verification (MRV) REDD+ platform to monitor complaints. Project monitoring and evaluation systems should include indicators to measure the effectiveness of monitoring and resolution of complaints and incorporate them into the Project Results Framework.

At community level, the co-management committees will be the main forums involved in participatory monitoring. All community management structures linked to local authorities and the CA Management Council should listen to, verify and respond to grievances as entitlements are understood and taken up or as they change over time.

Should the scale of compensation have required the creation of CCs, and the District Resettlement Commission is involved, then these, the LMU and CA Management will be responsible for coordinating their members for monitoring and supervising RP / CP preparation and implementation. Technical teams will regularly monitor status of vulnerable groups through consultation, and where necessary follow-up work with communities and individuals will identify activities and sources of income that can improve their well-being.

Finally, communities and individuals affected by the Project may submit complaints for rapid review to the World Bank Grievance Redress Service (GRS). For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. Project affected communities and individuals may also submit a complaint to the World Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

12 INSTITUTIONAL ARRANGEMENT

To allow for the management of impacts associated with agricultural and livestock activities of MozBio Phase 2, the use of pesticides must be monitored. Any necessary use must be intelligently done and in line with OP 4.09 and the national legal framework. The exact IPM approach should be defined in accordance with the conditions of the landscape area, the capacity of the local bodies to adopt and implement new techniques aligned with the approved Pest Management Plan for the implementation of MozBio- 2.

FNDS is the institution responsible for the implementation of MozBio 2. FNDS has a safeguards team consisting of: 1 (one) coordinator, 2 (two) environmental specialists and 1 (one) social specialist at central level and technical assistants at landscape levels, respectively, 2 (two) in the elephant's coast landscape and 2 (two) in Chimanimani landscape. There is a plan of hiring 2 (two) safeguard technical assistant at the level of Marromeu complex landscape. FNDS's Safeguards team will be responsible for ensuring compliance with the PMP and safeguards through the instruments produced under MozBio II, in collaboration with other entities at local level. Particularly for the implementation of the Pest Management Plan, the safeguards team relies on the collaboration of District Services for Economic Activities, through its network of extension agents responsible for the technical assistance of the local farmers.

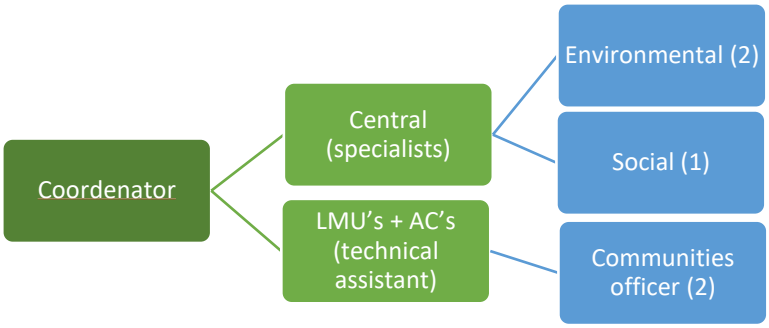

Figure 3. Safeguard team for MozBio phase II

It should be mentioned that FNDS has a specialist on knowledge transfer responsible for the design and implementation of the training packages and a network of extension agents, responsible for assisting the beneficiaries of the agricultural value chain under the Integrated Agriculture and Natural Resources Landscape Project (Sustenta) being implemented in the landscapes of Nampula and Zambezia and financed by the World Bank. This structure must be extended to other landscapes through continued training and technical assistance programs.

The safeguards team will be responsible for ensuring the implementation of activities planned under the IPM, through supervision in the preparation of specific pest management plans for each landscape approved subproject by liaising with the relevant Landscape Management Units and relevant institutions at local level.

In the framework of the integrated landscape management portfolio, with projects (MOZFIP and SUSTENTA) the integrated landscape management platforms were implemented.

The platforms, in turn, convene stakeholders around relevant issues in the landscape and help foster cooperation across projects, activities, and actors. The Conservation Law mandates the establishment of CA Management Councils, which have a similar goal of the multi-stakeholder platforms and will be supported by this project.

13 CAPACITY BUILDING, TRAINING AND AWARENESS-RAISING CAMPAIGNS

Implementation of MozBio phase II project will provide technical assistance to agriculture and livestock value chain through extension workers at landscape level. The success or failure of implementation of Integrated Pest Management will depend on the prior training of the technical staff (extension agents) of the target landscape institutions. The trainings/capacity building must be divided into two models (i) Training of landscape trainers – all technical staff from the relevant institutions and LMU's technical team should be trained, these trainings should be delivered by FNDS's safeguards team and value chain and knowledge transfer specialists. (ii) Trainings/capacity building of producers – once the training of trainers has been completed, training of landscape producers will be undertaken by Landscape Teams and Landscape Institutions (SDPI, SDAE, etc) with follow-up from the Safeguards Team (FNDS). After being trained, the landscape technical staff will act as instructors in their landscapes.

FNDS's safeguard team will coordinate and oversee the involvement of local communities in the IPM, oversee awareness campaigns for local communities related to human health and environmental impacts of pesticides, and the training of pesticide users.

The materials to be emphasized in the training of technical staff include, but are not limited to: pesticide management, sanitary certification of plant and animal products, adequate use of agrochemicals, integrated pest management integrated production and organic production, adequate application of pesticides, protection equipment, transport and storage of pesticides, health and safety of users at work, according to the needs and specificities of each approved project. The success of implementation of IMP will depend on the training of beneficiaries, which must know and dominate all the stages and procedures of the IMP.

There should also be training on the safe use of pesticides, which should include the following topics: Pesticide selection, Pestiide labeling, Pesticide transport, Pesticide mixing and loading, Pesticide storage, Disposal of pesticide packaging, Obsolete pesticides, calibration of the product, quantity and application of pesticides, Determination of the amount of chemical to be used, Important precautions related to the application of pesticides, toxicity, Human protection and First Aid.

SDAE's extension agents, DPTADER technical staff, MAIP technical staff, SDPI technical staff, amongst other relevant institutions, the potential beneficiaries of the target landscape, should be actively involved in the preparation, design, implementation, execution and monitoring of IPMR. The LMU's provincial teams should monitor the implementation of these specific individual Plans for each project, giving all the needed technical support to the involved producers/beneficiaries.

Experiences of the SUSTENTA and MozBio phase I projects being implemented show that the language and frequency of trainings are a crucial factor in the transfer of knowledge. This is one of the activities under responsibility of the knowledge transfer specialist and to ensure the adequate language to the different target groups with special attention to local extension agents and commercial agriculture farmers.

14 PMP IMPLEMENTATION BUDGET

The costs of implementing the PMP are related to the preparation of Specific Pest Management Plans, capacity building, training and awareness-raising campaigns, as in the following Table 6.

Table 6. PMP implementation budget.

	Cost (US$)	Subcomponent
Safeguard Team		
Safeguard specialist - central level	$ 170,500.00	C1.3 Strengthening FNDS (DT.3-A1)
Social safeguard- (LMU's Marromeu)	$ 162,100.00	C3.1 MARROMEU Landscape (DT8-A1)
Social safeguard (LMU's Chimanimani)	$ 162,100.00	C3.2 CHIMANIMANI Landscape (DT9-A1)
Social Safeguard (LMU Maputo)	$ 162,100.00	C3.3 MAPUTO Landscape (DT10-A1)
Safeguards operation cost		
Capacity Building	$ 20,000.00	C1.3 Strengthening FNDS (DT3. 4)
Monitoring	$ 30,000.00	C1.3 Strengthening FNDS (DT3. 4)
PMP		
PMP Marromeu	$ 5,000.00	C3.1 MARROMEU Landscape (DT 8-C3)
PMP Chimanimani	$ 5,000.00	C3.2 CHIMANIMANI Landscape (DT9-D2)
PMP Elephant Coast	$ 5,000.00	C3.3 MAPUTO Landscape (DT10-C2)
PF		
Grievance Redress Mechanism	$ 30,000.00	C1.3 Strengthening FNDS (DT3. 4)
TOTAL	**$ 1,041,900.00**	

The overall budget for implementation of the PMP is estimated at US$ 1,041,900.00, this includes salaries of staff as well as the operation costs related to capacity building and monitoring of beneficiaries and subprojects for implementing the PMP (and other environmental safeguards instruments). Moreover, the budget includes the associated grievance redress mechanism that will be developed under the Process Framework but will also addresses Pest Management related grievances.

ANNEXES

ANNEX I: REGISTERED PESTICIDES IN MOZAMBIQUE-JUNE 2015

LISTA DOS PESTICIDAS REGISTADOS EM MOÇAMBIQUE.pdf

ANNEX II: OP. 4.09 PEST MANAGEMENT

OP.4.09 _PEST MANAGEMENT .pdf

ANNEX III: CONSULTATION REPORT

Consultation ProcessMozBio II.pd

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