REPUBLIC OF MOZAMBIQUE

MINISTRY FOR COORDINATION OF ENVIRONMENTAL AFFAIRS

(NIP Implementing Agency)

UNEP

GEF

International Partners

National Implementation Plan for the Stockholm Convention on POPs (NIP)

MAIN DOCUMENT

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PREFACE

Persistent Organic Pollutants (Pops) present unique challenge as they persist in the environment, bioaccumulation in fat tissues of living organisms and pose risks of adverse effects to human health and the environment.

The Stockholm Convention on POPs entered into force in May 2004 and Mozambique

ratified it on 30 April 2004. The objective of the Convention is to protect human health and the environment from persistent organic pollutants starting with an initial list of 12 chemicals namely, Aldrin, Dieldrin, DDT, Endrin, Chlordane, Hexachlorobenzene, Mirex, Toxaphene, Heptachlor, Polychlorinated Biphenyls (PCBs), Polychlorinated-*para*-dibenzodioxins (PCDD) and Polychlorinated dibenzofurans (PCDF).

Article 7 of the Stockholm Convention obliges each Party to develop and implement a plan for the implementation of its obligations under the Convention. The National Implementation Plan (NIP) for Mozambique elaborates current situation on POPs and states commitments and actions that it intends to undertake in the management and control of POPs for duration of 15 years starting from 2006.

The NIP has identified national challenges in management of POPs such as inadequate policy and regulatory regime; weak institutional capacity in terms of human resources and technical infrastructure; lack of facilities for sound disposal of wastes consisting of, containing or contaminated with POPs; very limited financial and technical resources for remediation of contaminated sites; lack of POPs release monitoring schemes; inadequate application of Best Environmental Practices (BEPs) and Best Available Techniques (BATs) for reduction of unintentional releases of POPs; and low awareness by the general public.

The focus of the NIP is in line with the National Strategy for Growth and Reduction of Poverty (NSGRP) of 2004 and the Mozambique's Development Vision 2025, both of which call for improvement of quality of life and social wellbeing. The NSGRP is a guiding policy framework for Mozambique in its quest for sustainable development. The Millennium Development Goals (MDGs) serves as the guiding targets for the NSGRP on reducing poverty, diseases and environmental degradation. The implementation of the NIP will therefore contribute to the national efforts of combating poverty and improve environmental quality.

Of recent, there have been many emerging global environmental concerns which demand joint efforts in reducing impacts to human health. POPs and other toxic chemicals pose challenges in protecting human health and the environment. This NIP is meant to be dynamic so as to accommodate new interventions to the emerging global environmental concerns which require similar approaches to deal with. This necessitates promoting synergies among related Conventions and international processes on

chemicals management so as to realize multiple benefits such as maximizing use of resources, sharing of knowledge and experiences and integrated capacity building.

In view of the above, the Government is determined to implement the NIP and has already incorporated provisions of POPs management in the Environmental Management Act of 2004 and shall make every effort to allocate funds and encourage participation of stakeholders in addressing the challenges posed by Pops. Cognizant of the fact that environment is the common heritage for present and future generations; the Government welcomes support of the relevant stakeholders in our struggle to eliminate Pops and other toxic substances.

Elaborated by .

Eng, Joseph Gungunhana STOCKHOLM CONVETION FOCAL

The NIP Drafting Coordinator. Eng Maqueto Langa ,FELICIO FERNANDO AND ADMINISTRATORS

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The successful compilation of the National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants (POPs) is a reflection of handwork, co-operation and support by many individuals and institutions that deserve a vote of thanks. The Project was coordinated by the National Director of Environmental Evaluation, who served as the National Project Coordinator.

We would wish to express our gratitude to the team of local experts, who were involved at different stages in the course of developing the NIP, for their invaluable time and input. We would like to recognize the individuals and institutions who made part of the National Steering Committee and of the Task-Force for the preparation of the *Enabling Activities for the Development for NIP* - Ministries of Health, Industry and Trade, Energy, Planning and Development, Labour and Agriculture; Livaningo (NGO), and Consultants and Technical staff from companies such as EDM, ABB-Tecnel and HCB. We as well acknowledge the role of **Mr Joseph Gungunhana Ing. M.Sc. National Focal Point** and **Deputy National Director Mr. Felicio Fernando** for SC and NIP-POPs Project Coordinators in the process of NIP preparation.

We are grateful to the Global Environment Facility (GEF) and UNEP for the financial and technical support on the Enabling Activities on NIP Development, such as Training Seminars and Action Plan Development Workshops which were of basic importance for the NIP development process. UNITAR/UNEP provided also skills on inventory of POPs, particularly the Polychlorinated Biphenyls (PCBs), Dioxins and Furans. FAO and the Government of Japan deserves also a word of thanks, as they have provided financial support for the inventory of obsolete pesticides which consist partly of POPs of big concern in Mozambique.

Further, our gratitude is also extended to the United Nations Institute for Training and Research (UNITAR) for conducting training in Management of POPs and Action Plan development and for reviewing the National Profile.

We are specifically indebted to thank **Mr Maqueto Langa MBA and Joseph Gungunhana** (**National Focal Point**] who coordinated the team for the National Profile to Assess the Infrastructure for Chemicals Management in the Country, and finally compiled the present NIP document, based on the reports of the different phases of the NIP process as established in the UNEP guidelines

Last but not least we are thankful to all stakeholders, who in one way or the other, contributed in this very important process of developing the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants.

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ABBREVIATIONS

POPs	Persistent Organic Pollutants
UNCED	United Nations Conference on Environment and Development
MICOA	Ministry for Coordination of Environmental Affairs
MINAG	Ministry of Agriculture
NGO	Non Governmental Organizations
EDM	Electricity Supplier of Mozambique
MAE	Multilateral Environmental Agreements
CBO	Community Based Organizations
MITRA	Ministry of Labor
MISAU	Ministry of Health
KAP	Knowledge, Attitude and Practices
MST	Ministry of Science and Technology

EXECUTIVE SUMMARY

POPs and their effects

Persistent Organic Pollutants (POPs) are highly toxic chemicals of anthropogenic origin causing an array of adverse health effects, notably death, birth defects among humans and animals, cancer and tumors at multiple sites, neuro behavioral impairment including learning disorders; immune system changes; reproductive deficits of exposed individuals as well as their offspring; and diseases such as endometriosis, increased incidence of diabetes and others. Persistent Organic Pollutants are produced intentionally and used as pesticides or consumed in industrial processes; and some of them are generated unintentionally as by-products of various industrial or combustion processes. At present, twelve chemicals have been proved to exhibit POPs characteristics. They are composed of intentionally produced pesticides (i.e. Aldrin, Dieldrin, DDT, Endrin, Chlordane, Hexachlorobenzene, Mirex, Toxaphene and Heptachlor) and industrial chemicals, which are Polychlorinated Biphenyls (PCBs) and Hexachlorobenzene. The second category is the unintentionally produced emissions of certain industrial and combustion processes i.e. the Polychlorinated dibenzo-para- dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF).

Purpose of NIP

The National Implementation Plan (NIP) for the Stockholm Convention is an output of the project titled “Enabling Activities to facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the United Republic of Mozambique. The Global Environmental Facility (GEF) financed the Project and the United Nations Environmental Program (UNEP) was the Implementing Agency providing technical guidance and facilitating administrative matters between GEF and the Government of Mozambique. The NIP document elaborates the current situation on POPs and states the country’s commitments and actions that it intends to undertake in respect of the management and control of POPs for duration of 15 years commencing in 2006. The objectives are:

i) To demonstrate the commitment of Mozambique Government to the objectives of the Stockholm Convention and to achieving compliance with the obligations assumed as a Party to it;

ii) To present the information base and associated analysis supporting the development and implementation of effective Action Plans and Strategies to achieve reduction and elimination of POPs with associated improvement of environmental quality and human health;

iii) To provide basis for monitoring the country's progress in addressing the POPs issue, and specifically the effectiveness of the actions it has committed to in reducing or eliminating POPs use and release to the environment;

iv) To facilitate public awareness, education and participation in respect of the POPs issue and overall improvement in environmental and public health protection;

v) To provide the operational and institutional framework for attraction of international assistance such as might be provided under the Stockholm Convention's permanent financial mechanism for actions on POPs; and

vi) To promote synergies with other related Conventions and international processes on chemicals management.

NIP Development Process

The development of the NIP involved four main phases, namely: (I) establishment of coordination mechanism and process planning (II) establishment of POPs inventories and assessment of national infrastructure and capacity; (III) priority assessment and objective setting and (IV) formulation of the NIP and its endorsement by stakeholders (ongoing).

Phase I - planning and organization - involved appointment of the National Project

Coordinator (NPC), procurement of office equipment, establishment of the National Coordinating Committee (NCC) and organization of an inception workshop to promote awareness and build consensus on the project workplan by key stakeholders held in 56. Members of the NCC were drawn from sectors of Environment, Customs, Health, Communication and Transport, Agriculture, Industry, Energy and Minerals, and Local Government and Private sector and NGOs.

Phase II - inventory of POPs - involved identification and quantification of POPs releases, assessment of legal and institutional framework for management of POPs, assessment of POPs management practices, monitoring capacity and experience on POPs, identification of POPs contaminated sites and identification of public information, awareness and education tools and mechanisms. This resulted into country reports that were reviewed in a national consultative workshop held in 2004, inventory of PCB and contaminated equipment was undertaken in the whole country. Before, through a FAO Project implemented by MINAG in conjunction with MICOA and funded by the Japan Government, obselete pesticides were assessed and the outcomes taken into account in the inventory of POPs under the NIP development process.

Phase III - priority assessment and objective setting - involved identification of measures as well as formulation of national objectives and priorities (short, medium and long-term) to addresse gaps and deficiencies that were identified from the inventory of POPs and the NPAICM. Prioritization of measures was based on the following criteria in line with Article 6, 10 and 11 of the Stockholm Convention: (1) Environmental health impacts; (2) Institutional capacity; (3) Economic and social benefits; (4) Perception by different stakeholders; (5) Affordability and availability. As the validation of the Country POPs inventories and assessment reports were not very satisfactory enough it is important that a workshop for that purpose be held, which can be done in conjunction with the national review of the NIP Document. This need to be budgeted for in the following phases of the NIP preparation.

Phase IV - formulation of NIP and its endorsement - involved among others drafting of the NIP in accordance with the UNEP Guidelines on NIP Development (2002) and based on the partial reports as stated before, prepared by local experts from government departments and agencies, academic and research institutions, NGO and

private sector. The Draft NIP Document will be reviewed and endorsed in a National Consultative Meeting to be organized by MICOA sometime before August 2006. The National Coordinating Committee will than approve the Final NIP Document still before end of Year 2006. Coverage.

It is important to note that during all the above said phases, training of the experts in inventory of POPs and workshops on Action Plan development were conducted by international and regional experts from UNEP and UNITAR. In result, many stakeholders became aware of the Stockholm Convention and were sensitized to incorporate measures that reduce releases of POPs in the ongoing initiatives. However, awareness creation needs to be continued in the following phases of the NIP execution.

Assessment of POPs issue in Mozambique

The inventory of POPs undertaken in 2004 revealed that there are about 750 metric tones of obsolete stocks of POP Pesticides (including Aldrin, Dieldrin, and Toxaphene) and 350 metric tonnes of obsolete stocks of DDT stored in various areas in the country. These stocks will be cleared under the FAO/Japan ongoing Project to dispose and remove obsolete pesticides. At present the DDT and other POP pesticides are no longer registered for any use. There is no production of POP Pesticides in the country any more. The inventory revealed that DDT, which was mainly imported, has been used in the country for some years up to 1998 for both agriculture and public health,

The survey of electrical equipment that use fluids containing Polychlorinated biphenyls (PCBs) in 2004 showed that there are at least 79 devices containing 240 571 metric tones of oil suspected to contain Polychlorinated Biphenyls.

The inventory identified part of the sources and did not completely quantify releases of Polychlorinated dibenzo-para- dioxins and Polychlorinated dibenzofurans in the country, and no gTEQ/annum are known from emissions and residues. There is no capacity or experience for monitoring of releases of PCDD/PCDF. There is limited awareness on effects of PCDD and PCDF. Neither the Best Available Techniques (BAT) nor the Best Environmental Practices (BEP) is being applied for the control of PCDD and PCDF releases. Some of the sources of PCDD/PCDF were not quantified due to lack of baseline information. These include releases from crematorium, fires at waste disposal

sites and accidental fires in factories and vehicles. In addition, national emission factors for quantification of PCDD/PCDF releases are lacking; these need to be determined in order to improve inventory of PCDD and PCDF releases in Mozambique.

The inventory undertaken does not indicate the sites possibly contaminated with PCBs, nor the storage sites contaminated with DDT, Aldrin and Toxaphene and other obsolete pesticides. At present, under the above said FAO/Japan Project, most of the obsolete pesticides have been collected from the difirent sites throughout the Country and stored in Matola. Magnitude of contamination by POPs in some sites is alarming and needs urgent remedial measures, despite the ongoing project to collect all the pesticides and export them to Europe.

There are several gaps with regard to POPs management in the country. These include: inadequate policies and legislation to govern POPs management, monitoring, search for suitable alternatives, liability for POPs waste disposal and remediation of sites contaminated with POPs, public information dissemination, education and awareness.

There are no guidelines to guide POPs waste management and remediation of POPs contaminated sites.

There is weak enforcement of the existing legislation relevant to POPs management. In addition, there is inadequate capacity and experience for tracking human and environmental effects caused by POPs and their alternatives; management of such effects is not known yet. Few institutions have laboratory facilities and trained personnel that can facilitate monitoring of POPs and their alternatives, although these need strengthening in terms of specialized training and upgrading of equipment.

Other handicaps include: limited researches on alternatives of intentionally produced POPs, poor documentation system of POPs information both in the private and government institutions and lack of awareness at all levels. Also there is lack of planned information dissemination strategy to inform the public on POPs issues; weak mechanism to facilitate coordination and reporting on POPs issues; and the national environmental standards have limited coverage for monitoring of POPs releases.

Overview of national priorities, implications and impacts of addressing them

The Government intends to take appropriate measures to ensure implementation of the national priorities on POPs as specified in the Action Plans. The main priority issues are grouped in four major areas namely, strengthening legal and institutional framework for managing POPs and chemical pollutants; establishing monitoring scheme of POPs and other chemical pollutants; enhancing transfer of appropriate technology for control of POPs releases; and improving public information, awareness and education. The specific priorities vary for the different Action Plans. These cover disposal of POPs wastes, capacity building in terms of human resource and technical infrastructure, remediation of contaminated sites, establishment of POPs monitoring schemes, strengthening policy and regulatory regime and awareness raising. Some of the identified top priorities for four groups of POPs chemicals are as shown in the Table ES-2 below.

Table ES-2: Topo priorities for POPs in Mozambique

POPs chemical Category	Priorities
POP Pesticides	• Establishing environmentally sound technologies to manage POPs and PIC Pesticides wastes • Developing mechanisms for promoting proper management of stockpiles of PIC and POP Pesticides wastes and contaminated sites
PCBs	• Developing facilities for disposal of PCBs • Establishing clean up and remediation schemes for PCB contaminated sites
DDT	• Developing mechanisms for promoting management of stockpiles of DDT wastes • Strengthening capacity in DDT management in terms of manpower and infrastructure
PCDD/PCDF	• Establishing coordination mechanism pertaining to the PCDD/PCDF management • Institute mechanism for PCDD/PCDF management

It is anticipated that successful implementation of the identified priorities would reduce or eliminate altogether some of the Pops chemicals and wastes containing Pops. The Government intends to eliminate all Pops chemicals as effective alternatives become available countrywide. Illegal trade may interfere with Government intention to eliminate use of the POP Pesticides. Hence, support is needed to strengthen institutional capacity for monitoring imports of POP Pesticides as well as development of waste disposal facilities. Through the ongoing FAO Obsolete Pesticides Project it is expected to set up mechanisms to control accumulation of pesticide wastes in future.

Testing and laboratory analysis of oils suspected to contain PCBs would need to be performed to confirm presence of PCBs in the identified equipment. Adequate external resource would need to be secured for disposal of PCB oils and contaminated equipment.
Elimination of PCBs is given highest priority in the respective Action Plan due to economic implications.

Eliminating DDT is a major challenge as the country intends to reintroduce DDT to fight against malaria. Malaria is a critical concern in sub-Saharan Africa, a region that accounts for more than 90% of the world's malaria deaths. In Mozambique, with about

10 million cases every year and 1 million. deaths yearly, out of which over 50% are children under five years of age, malaria remains the number one killer disease in the country. It is estimated that over 90% of Mozambicans are at risk of the disease. Most of the districts have been identified to be malaria endemic areas. Over 65% of the country population lives in these areas. Due to resurgence of malaria in these areas the Government intends (or have done so) to reintroduce DDT for public health purposes, particularly against malaria vectors during epidemics. Its use will be restricted for indoor application in accordance with WHO Guidelines. In this regard, further support is needed for training on DDT use; research on alternatives and dissemination of available alternatives; and strengthening of institutional capacity for monitoring DDT imports, use and disposal.

Elimination of releases of PCDD/PCDF highly depends on: transfer of appropriate technologies; adoption of BATs and BEPs; strengthening relevant laws and their enforcement; increased public awareness in dangers of PCDD/PCDF; setting standards and appropriate monitoring protocols; and strengthening monitoring capacity. PCDD/PCDF being a new area external support and experience is needed to support the country in implementation of its Action Plan on PCDD/PCDF.

Mozambique is a Party to several Multilateral Environmental Agreements (MEAs) that address international chemicals management including the Bamako Basel and Rotterdam Conventions. Mozambique has been actively involved in the negotiation for establishment of the Strategic Approach for International Chemicals Management (SAICM). It is also actively involved in IFCS work. Since there is a broadening gap between the on-going initiatives on chemicals management and worsening global environmental situation, the NIP shall consider synergies between Stockholm Convention and other related environmental agreements at sub-regional, regional and international levels. Thus the NIP provides a sound base for sustainable management of chemicals in the country. It addresses many cross-cutting concerns for this purpose, in particular capacity building in pollution prevention and control, monitoring of health risks and research on feasible alternatives to Pops chemicals; and the need for advancement in technologies and practices that are of less impacts to the environment and human health.

Implementation timetable and targeted milestones

The timeframe of the NIP is 15 years commencing in 2006. It covers short, medium and the long-term actions. More measures may be incorporated during implementation as the country gains more experience in addressing concerns of Pops and hence necessitating the review of the Action Plans. The targeted milestones for each specific issue are as shown in the table below:

Table ES-1: Implementation Framework

Issues		Time	Target Milestones
1	Institutional and Regulatory Strengthening Measures	2006-2012	• Strengthened POPs coordination on management of POPs and other chemical pollutants by 2009 • Adequate policies, legislation and institutional capacity for effective NIP implementation on POPs management by 2012
2	POP Pesticides	2006-2016	• Increased use of substitutes and other alternative approaches to POP and PIC pesticides by 2012 • Safe disposal of POP pesticides and other pesticides waste operationalized by 2016
3	PCBs	2006-2012	• Improved PCB database by 2010 • Safe disposal of fluids and equipment containing or contaminated with PCBs operationalized by 2010 • Safe disposal of fluids and waste containing PCBs and equipment contaminated with PCBs by 2010
4	DDT	2006-2016	• Strengthened management and control of DDT by 2011 • Increased use of effective substitutes and other alternative approaches to DDT use in disease vector control by 2011 • Safe disposal of DDT waste operationalized by 2016

5	PCDD/PCDF	2006-2015	• Established and strengthened Poison Centers by 2011 • Improved PCDD/PCDF database by 2012 involving development of national emission factors and periodic inventory modeling • Adopted BATs and BEPs in major sources of PCDD/PCDF by 2015
6	Contaminated Sites	2006-2015	• Established awareness creation programs on management of contaminated sites by 2009 • Improved database of contaminated sites by 2011 • Clean up and remediate sites contaminated by POPs operationalized by 2015
7	Information Exchange	2006-2013	• Enhanced capacity in information generation, storage, management, accessibility and dissemination by 2013
8	Public information, education and awareness	2006-2009	• Established effective database on POPs by 2007 • Established and strengthened information centers by 2007
9	Monitoring	2006-2013	• Training, educational and awareness programmes on POPs operational by 2009 • Improved research on effects of POPs and their alternatives by 2009
10	Reporting	2006+	• Strengthened monitoring capacity by 2012 • Enhanced inter-institutional reporting capacity by 2008 • Timely reporting according to the Convention obligations by 2007 • Updated NIP and its constituent Action Plans every 3 years commencing in 2009

Overall financial requirements

The estimated cost for the implementation of NIP is **USD 6,961,900.00 over** a period of 7 years from 2007 to 2013. Funds will be secured from internal and external sources. Out of the total amount, it is expected that the Government contribution will be around 10.%.

Government commitment

The Government is determined to eliminate the intentionally produced POPs as soon as practicable by implementing the NIP. Already the Environmental Management Act of 2004 provides for management of POPs in line with the requirement of the Stockholm Convention, to which Mozambique is a Party since 30 April 2004. It is the intention of the Government to undertake review of the relevant policies and legislation for effective implementation of the Stockholm Convention and the related conventions and international processes on chemicals management. This will facilitate strengthening of capacity of institutions that deal with POPs including the establishment of mechanisms for coordination, reporting and monitoring of POPs and the review and updating of the NIP. Also the Government realises the importance of generating and dissemination of public information and creation of public awareness at all levels to tackle concerns of POPs in a comprehensive way. In doing so, the Government within its limited capacity, shall make deliberate efforts to implement its obligations under the Stockholm Convention and hence eliminate POPs as scheduled. Mozambique is seeking cooperation of the international community in its endeavors to achieve the NIP objectives. The Division of Environment of the Vice President's Office, among others, is responsible for coordination and monitoring of NIP implementation. It shall continue to perform its coordination role on POPs management. Mozambique is also a Party to other sister Conventions, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the Rotterdam Convention on the Prior Informed Consent on Certain Hazardous Chemicals and Pesticides in International Trade. In this regard, Mozambique is working towards strengthening collaboration with other related international and local programmes and projects as a way of complementing NIP initiatives.

Qualification or conditionality

Successful implementation of the NIP is subject to availability of financial and technical resources from both government budget allocations and external sources to support activities identified in the Action Plans. Moreover, strengthening of local skilled human resource base in POPs issues is important. The situation calls for further support from international community. It is assumed that there will be continuous political stability for the entire period of NIP implementation.

Mozambique being a SADC Member State is committed to phase out PCBs by 2010 as agreed in the sub region.

In addition, the country is implementing a Malaria Programme, which intends among other objectives, to reintroduce DDT for malaria control in endemic areas for emergency situation In line with WHO Guidelines.

1. INTRODUCTION

1.1. The Stockholm Convention

The Stockholm Convention on persistent organic pollutants of May 22, 2001 binds its Parties to the elimination of production and use, or to the limited use of selected substances. Lists of selected intentionally produced substances are found in Annexes A and B of the Convention. Annex C lists unintentionally produced substances released during technological processes able to escape into the atmosphere as pollutants. Briefly the scope of the Stockholm Convention can be summarized in the Table below:

Table 1.1. Summary of the Stockholm Convetion on POPs

Stockholm Convention Annex A	
Elimination Part I	Give the list of chemicals for which specific exception in production and use can be considered. These are: Aldrin No. CAS: 309-00-2 Chlordane No. CAS: 57-74-9 Dieldrin No. CAS: 60-57-1 Endrin No. CAS: 72-20-8

	Heptachlor No. CAS: 76-44-8 Hexachlorobenzene No. CAS: 118-74-1 Mirex No. CAS: 2385-85-5 Toxaphene No. CAS: 8001-35-2 Polychlorinated biphenyls (PCB)
Elimination Part II	Consider the Polychlorinated Biphenyls Elimination process in the following terms: Each part shall: • Accept the provision[1] for eliminating the use of polychlorinated biphenyls in devices (for example in transformers, condensers or other equipment containing liquid stores) by 2025; • Support the provision for lowering the danger and risk during use of polychlorinated biphenyls; • Make provisions for the environmentally sound waste management of waste fluids and devices contaminated by polychlorinated biphenyls with a PCB content higher than 0,005 % as soon as possible, but not later than 2028; • Work out a report every five years on the advances in the elimination of polychlorinated biphenyls and organize a conference of parties.
Stockholm Convention Annex B	
Limitation Part I Dedicates the DDT CAS 50-29-3	Considers acceptable purpose or specific exception on production and use of these chemical.
Restriction Part I Dedicates the DDT CAS 50-29-3	Describes the restrictions and impositions on the use and handling this chemical in terms of registration, special use, information to WHO and safety.

Stockholm Convention Annex C

This Annex relates to the following persistent organic pollutants, which originate in, and are unintentionally released from anthropogenic sources, being industrial or of other kinds:

- Polychlorinated dibenzo-p-dioxins and dibenzofuranes (PCDD/PCDF)
- Hexachlorobenzene (HCB) (no. CAS: 118-74-1)
- Polychlorinated biphenyls (PCB)

The typical industrial sources are:

- Cement kilns firing hazardous waste
- Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching
- Waste incinerators including co-incinerators of municipal, hazardous or medical wastes or sewage wastes
- Some thermal processes in metallurgy

Other typical sources are:

- Open burning of waste, including burning of landfill sites;
- Thermal processes in the metallurgical industry not mentioned in Part II;
- Residential combustion sources;
- Fossil fuel-fired utility and industrial boilers;
- Firing installations for wood and other biomass fuels;
- Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil;
- Crematoria;
- Motor vehicles, particularly those burning leaded gasoline;
- Destruction of animal carcasses;
- Textile and leather dyeing (by chloranil) and finishing (with alkaline extraction);
- Shredder plants for the treatment of end of life vehicles;
- Smouldering of copper cables;
- Waste oil refineries.

1.2. Enabling Activities

1.2.1. The Motivation of the NIP on POPs

Persistent Organic Pollutants (POPs) are highly toxic chemicals of anthropogenic origin

causing an array of adverse effects, notably death, disease and birth defects among humans and animals. POPs have been associated with cancers and tumors at multiple sites; neuro behavioral impairment including learning disorders; immune system changes; reproductive deficits of exposed individuals as well as their offspring; and disease such as endometriosis, increased incidence of diabetes and others.

Persistent Organic Pollutants are produced intentionally, used as pesticides or consumed in industrial processes, some are generated unintentionally as by-products of various industrial or combustion processes. At present there are twelve chemicals that have been proved to exhibit POPs characteristics. They are composed of intentionally produced pesticides (i.e. Aldrin, Dieldrin, DDT, Endrin, Chlordane, Hexachlorobenzene, Mirex, Toxaphene and Heptachlor) and industrial chemicals, which are Polychlorinated Biphenyls and Hexachlorobenzene. The second category is the unintentionally produced emissions of certain industrial and combustion processes i.e. the Polychlorinated para dibenzodioxins (PCDD) and Polychlorinated dibenzofurans (PCDF).

Having realized the threats of the POPs the global community agreed to take appropriate measures to reduce and ultimately eliminate the initial 12 chemicals that have been found to be the most dangerous to health and the environment. The Stockholm Convention was adopted in May 2001 for this purpose. This Convention contains strong provisions to reduce and eliminate releases of POPs to the environment. Among other things, the Convention intends to eliminate the production, use of POPs chemicals, that have been intentionally produced; to identify and remove of Polychlorinated biphenyls (PCBs) from use; to restrict DDT use to disease vector control in accordance to WHO guidelines; to minimize and where possible, ultimately eliminate those POPs formed as unintentional by-products and to eliminate releases of POPs from stockpiles and wastes. The Convention also calls for ceasing the production and use of new pesticides and industrial chemicals that have characteristic of POPs. The Convention establishes a register of specific exemptions for permitted production and use of POP Pesticides as well as acceptable use of DDT. It also provides the framework to expand the scientific monitoring of POPs levels in the environment.

Mozambique being a signatory to the Stockholm Convention on POPs (2001) was eligible for financial support from GEF through UNIDO for the development of the National Implementation Plan (NIP) through the Project known as “Enabling Activities to facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants”. Article 7 of the Stockholm Convention requires each Party to develop an Action Plan on POPs. The development of NIP will facilitate Mozambique to meet obligations

under the Stockholm Convention. The Convention entered into force in May 2004. Mozambique became a Party to the Convention in April 2004 and is expected to have submitted her NIP to the Conference of the Parties of the Convention by August 2006.

1.2.2. Purpose of the National Implementation Plan (NIP)

The National Implementation Plan (NIP) for Mozambique elaborates current situation on POPs and states commitments and actions that it intends to undertake in the management and control of POPs for duration of 15 years starting from 2006, in the context of Stockholm Convention. Article 7 of the Convention encourages Parties to integrate their NIP into their national sustainable development plans where appropriate. Therefore, the Plan presents the strategic measures, mechanisms and detailed activities that must be developed and implemented to make the elimination of POPs a reality.

The NIP is intended to achieve the following objectives:

a) To demonstrate commitment of the government to the objectives of the Stockholm Convention and to achieving compliance with the obligations assumed as a Party to it;

b) To provide a national policy instrument and framework within which POPs issue is to be addressed as part of national policies on chemicals management, environmental protection, public health and sustainable development;

c) To present an information base and associated analysis supporting the development and implementation of effective Action Plans and Strategies to achieve reduction and elimination of POPs with associated improvement of environmental quality and human health;

d) To provide an operational and institutional framework for eligibility for financial assistance that might be provided under the Stockholm Convention's permanent financial mechanism for actions on POPs;

e) To provide basis for monitoring the country's progress in addressing the POPs issue, and specifically the effectiveness of the actions it had committed to in reducing or eliminating POPs use and release to the environment;

f) To facilitate public awareness, education and participation in respect of the POPs issue and overall improvement in environmental and public health protection;

g) To facilitate on-going efforts of dealing with broader environmental issues such as pollution and hazardous wastes control and overall pollutant releases and the development and strengthening of national sustainable development strategies;

h) To facilitate country's overall efforts in coordinating national approaches to other chemical related Regional and International Agreements and international processes on chemicals management; specifically, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; and the Strategic Action for International Chemicals Management.

1.2.3. Context

The National Directorate of Environmental management in the MICOA was the National Focal Point to the Stockholm Convention, through the Head of environmental quality the on Department, Mr joseph gungunhana[1] and was the National Lead Agency in the preparation of the NIP. For drafting the NIP final document was hired as national consultant, who compiled it based on the partial reports prepared by different experts and technicians from relevant sector ministries, government agencies, NGOs and academic and research institutions. It is expected that the National Steering Committee established in the Enabling Activities Project Document lead with MR. Felicio Fernando the review of the NIP document and monitor its future implementation. It will also be crucial that the consultant charged with the preparation of the NIP Document be involved in the whole process of review and execution, including the participation in the conference of the parts. The composition and terms of reference of the NCC have to be revised to incorporate new key-players and responsibilities as specified in the Action Plans in order to tap their wealth of knowledge and experiences during NIP execution phase.

The legal and institutional basis for effective implementation of the NIP has also be revised by the NSC and MICOA in order for providing decisive policy, opportunity for linkage and synergy to other relevant programmes and policy initiatives within MICOA and

[1] Is now the DNAIA Deputy Director effective from January 2005

within other ministries and local authorities. This of course, has to be conducted within the framework of the National Environmental Law (1997) and other legal provisions already in place and should also take into account the existing sectoral mandates of environmental authority on environmental management functions of cross cutting nature.

1.2.4. Preparation and Endorsement

The development of NIP involved four main phases:

I. Establishment of a coordination mechanism and process organization;
II. Establishment of POPs inventory and national infrastructure capacity;
III. Priority assessment and objective setting; and
IV. Formulation of the NIP and its endorsement.

The process of developing NIP has involved many stakeholders including those shown in Annex 1. During inventory of POPs stakeholders had an opportunity to provide baseline information through questionnaire and targeted visits. Throughout the process, stakeholders played a key role of reviewing project reports through workshops. Four national stakeholders' workshops were organized namely, the launching of the Project, review of the inventory reports, validation of POPs priorities and review of the NIP. The workshops drew participants from government departments and agencies, academic and research institutions, private sector, NGOs and media.

The stakeholder endorsement of the NIP is not yet done, although this document was done as a result of the several meetings on the preparation of Action Plans and the content was broadly discussed and outlined. It is expected that sometime this year, before the conference of the Parts next August, a workshop to approve the present NIP document by the stakeholders will be held in order for getting their reaction on the Draft NIP:

- indicating their acceptance and giving comments to improve the NIP document;
- updating the NIP document to incorporate stakeholders views;
- getting approval of the National Steering Committee and the higher authorities in the Office of the Minister of MICOA.

1.2.5. Assistance Received

1.2.5.1. International Level

Mozambique being a signatory to the Stockholm Convention was able to access financial and technical support from the Global Environment Facility (GEF) through the United Nations Environmental Program (UNEP) to assist in the development of National Implementation Plans (NIP), covering the phases I to III of the Process in the total amount of US $ 481,900. The formulating phase has still to be covered, though the hired consultant to draft the NIP Document advanced the job. It thus expected that the Financier of the Project pay for this job soon received the Draft NIP Document, including the costs related with the workshop preparation, amounting the total of USD 387,465 .00 GEF/UNEP provided also technical support for the development of the enabling activities project proposal. It is also expected GEF/UNEPP through UNITAR to assist in reviewing the NIP Document, including farther stages to come.

1.2.5.2. National Level

The Government provided basically in kind contribution in terms of personnel, office space, utilities and communication services totaling to about USD 94.840.00. from the Ministry of Agriculture, Ministry for Coordination of Environmental Affairs, Ministry of Industry and Trade, Ministry of High Education, Science and Technology, Ministry of Health, Ministry of Energy and Mineral Resources and National Institute of Quality. The private sector also contributed in the same manner, namely the Electricity Supply Company (EDM), ABB-Tecnel. Industrial Association of Mozambique, National Cleaner Production Center and Livaningo were NGOs who also participated in the same way. Eduardo Mondane University's experts were also instrumental with its contribution.

2. COUNTRY PROFILE

2.1. Geography and Population

The Republic of Mozambique lies on the eastern coast of Southern Africa between parallels 10° 27' and 26° 52' south latitude and between meridians 30° 12' and 40° 51' of west latitude and covers an area of approximately 800 000 square kilometers, out of which 13 000 are made of interior waters and the rest is firm land.

Mozambique has 4,330 km of land borders; to the north Tanzania, the west by Malawi, Zambia, Zimbabwe, and the South African province of Mpuma langa. To the south Mozambique borders Swaziland and the South African province of KwaZulu Natal. All of Mozambique's neighboring countries are members of the Commonwealth. Mozambique' Indian Ocean coastline stretches over 2,515km. The country is divided into a coastal lowland plateau of 200-600 meters in the center and south of the country, rising to 1,000 in the Northeast. All of Mozambique's 25 major river systems flow into the Indian Ocean. The largest and most historically significant is the Zambezi, whose 820km Mozambican section is navigable for approximately 460km.

The size of the population is approximately 18 million, more than 70% of which are in rural areas, and with approximately 60% living along the coastal strip. Women represent more than 52% of the population. More than 45% of the population is below 15 years old, while 2.5% are more than 64 years' old. The economically active population (15-65 years) is about 52%. The population growth rate is estimate to be 1.9%, fertility rate of 5 births/woman, the birth rate is 45/1000, life expectance of 41 years. The literacy rate is around 45%. The majority of literate people have only the basic education. Unemployment reaches the number of 30% of economically active population, being more sever among the females.

The official language is Portuguese, and there are about 30 native languages. The main ethnic groups are:

- *Emakwas*, which is the major group account for 2/3 of the population and covering four center-northern provinces, namely Zambezia, Nampula, Cabo Delgado and Niassa;
- *Sena, Nyunguwe and Ndaus*, they occupy the central region, in the provinces of Tete, Manica and Sofala;
- *Tsongas, Bitongas and Chopes,* they cover the Southern region, in the provinces of Gaza, Inhambane and Maputo.

Mozambique has a democratic elected government headed by an elected executive President. The Country is divided in 10 Provinces as shown in the Mapa below. The local government consists of villages and districts administrations and city municipal councils.

Figure 2.1. Map of Mozambique

2.2. Industrial and Agricultural Sectors

Overview of The Industrial and Agricultural Sectors

Mozambique is one of the least developed countries in the world. Although agriculture occupies about 80% of population, it contributes with only 20 % of the GDP. Agriculture is supplemented with manufacturing, mining, trade, tourism, construction and services.

The agriculture family sector produces mainly for subsistence and internal trade. The cash crops grown in different parts of the country serves mainly for export. The main cash crops are tea, cotton, tobacco, maize, and sugar cane and in recent times flowers and other high value crops.

The industrial sector, despite its small contribution to GDP, supplies important consumer goods both to the domestic and international markets. The main manufacturing products are textiles, foodstuffs, beverages, leather and non-metallic products.

Table 2.1 gives the relative contributions of industrial manufacturing, mining, service and agricultural sectors to the GDP.

Table 2.1 An Overview of the Industrial and Agricultural Sectors

Sectors	Contribution of the GDP(%)	Number of employees	Major products in each sector
Industrial/ manufacturing	22.5	50 027	Food, beverages, non-metallic mineral products, and textiles
Mining and extraction	0.2	2 190	Gold, tantalum, quarrying
Agriculture	20.2	7 581 600	Tea, maize, beans, flower, cotton, tobacco, and tea
Service	55.1	168 000	Transport, tourism, communications, insurance.

Source: Annual statistics, INE

Structure of the Manufacturing/Agricultural Sector

The structure of the manufacturing/agricultural sector is shown in Table 1C. However, data on the structure of the agricultural sector, according to the classification indicated in the table, are not available.

Table 2.2 Structure of the Manufacturing/Agricultural Sector

Sector	Micro farms/ facilities[1] (%)	Small farms/ facilities[2] (%)	Medium farms facilities[3] (%)	Big farms/ facilities[4] (%)
Industrial/Manufacturing	62	22	8	8
Agricultural Sector	65	28	4	3
TOTAL	65	28	4	3

Source: INE. Legend 1: 1 to 15 employees; 2: 16 to 100 employees; 3: 101-250 and 4: more than 250.

Breakdown of Agricultural Production

In Mozambique, there is substantial use of agrochemicals in large-scale farms. In addition to that, the cultivation of commercial crops, such as cotton, tobacco, sisal and high value crops, by the agriculture companies is done through extension service schemes, by which the companies supply chemicals (and other inputs to the family sector, and then have exclusive rights to buy the harvests).

The Table 2.3 lists the various crops that are harvested in the different regions of Mozambique, using chemical fertilizers and pesticides. This give us an indication of the extent of use of agrochemicals in the commercial agriculture in Mozambique, which may cause pollution of the environment in case of their misuse or poor disposal.

The Northern Region of Mozambique grows more of cotton, cashew nuts, coconut, sunflower and cereals. The Central region contributes more with citrus, sugar cane, tea and tobacco. The Southern region cultivates mainly cashew nut, sugar cane and citrus.

Table 2.3 Breakdown Of Commercial Crops Which Consume Agrochemicals

Crop	Unit	2000	2001	2002	2003	2004(Plan)
Cotton	Ton	35,000	71,048	79,713	54,144	80,000
Cashew nut	Ton	52,578	52,089	50,177	63,818	4000
Sugar Cane	Ton	397,276	675,623	1,835,269	1,940,799	2,442,711
Citrus	Ton	13,548	9,240	8,586	30,000	32,000
Tea	Ton	10,466	9,029	12,000	12,690	13,000
Tobacco	Ton	9,470	16,284	22,000	37,051	45,567
Coconut	Ton	44,001	64,000	45,740	47,600	51,000
Sunflower	Ton	685	7,005	4,149	6,400	8,000
Cereals	Ton	1,471	1,686	1,768	1,811	1,926

Source: MADER

Breakdown of Industrial Production

The industrial production is concentrated in Maputo with 50%, followed by Beira and Nampula. The large agro-industry is basically dominated by the sugar cane cultivation and transformation, which has received large investments and impetus during the last years.

The available official data on the industrial production is found in the INE books, but they are presented in monetary units, rather than in tons, which would be more meaningful for the purpose of this document. Looking at the said books it can be found that

- the food processing industry accounts for 33% of the total industrial production;
- the chemical products and metals, 25% of the total production; and
- the light industry , 20%.

In general terms, although from 1997 the industrial activities have been increasing, the industrial development is still very insipient, apart the mega-projects, such as the aluminum smelting (MOZAL) and the Natural Gas (SASOL). The main manufacturing sectors are:

- Agro-industry
- Food & Beverage Industry

- Metallurgical Industry
- Electronic (cable production)
- Chemical Industry
- Textile
- Civil Construction Materials.

In the table below is given a summary breakdown of the sectoral industrial production.

Table 2.4 Breakdown of Industrial Production by Sector (billions of MZM)

Sectors	Major Products	Gross Value of Production	Number of Persons Engaged
Manufacturing Industry	Cashew nut, edible oil, cereals, meats, rice, wheat, beer, refrigerants, cotton fiber, tobacco, sugar, wood, soap, tires, cement.	14,408	33,460
Mineral Industry	Marble, Bauxite, Bentonite, Graphite, Gold	269	570
Utilities	Water, electricity	1,410	3,612
Civil Construction	Construction	8,723	11,711

Source: Table built based on the National Statistics Institute (INE) Reports

Major Emissions by the Industrial sector

Major emissions from the industrial sector are shown in Table 1F but complete data on electric generation and dry-cleaning are not available. Major emissions indicated in the table are not properly inventoried and further assessment needs to be done in the future.

Table 2.5 Major Emissions by the Industrial Sector

ISIC	Description	Major emission types

Code		
31	Food Products and Beverage	- Food preservatives - Cleansing chemicals, e.g. NaOH, detergents - Air pollution from dust and combustion of fuel
32	Textile, Clothing, Tanning and Leather Goods	- Waste waters from scouring, mercerizing, bleaching, and dyeing process of textiles, containing NaOH, peroxides, aluminium compounds & dyestuffs - Wastewater from tanning of skin & hides containing chrome, sulphides, ammonium salts, chlorides, etc. - Solid waste from dehairing, fleshing & trimming of hides & skin.
33	Wood and Wood Products, Furniture	- Sawdust - Wood preservatives - Paints - Varnishes
34	Paper and Paper Products, Printing	- Cleaning waste waters containing printing chemicals, lead in granule form Trimmed papers and Inorganic chemical waste
35	Chemical, Rubber and Plastic Products	- Solid waste of scorched rubber, scraps of rubber & PVC plastics, dust - Organic and inorganic waste waters
36	Non-metallic mineral products	- Dust & particulate matter causing air pollution, air pollution from the combustion of fuels
37	Manufacturing of basic iron and steel tools	- Scrap metal, air pollution from combustion of fuels.
38	Fabrication of machinery and equipment	- Inorganic waste water, scrap metals
39	Other manufacturing industries	- Scrap metals, cigarette making & packing paper, wastes
	Mining and extraction	- Dust, inorganic waste waters, cyanide
	Electric generation	-
	Dry cleaning in A.A	- Detergents, laundry soap and solvents

Concluding Remarks

As has shown above, Mozambique is predominately a young country, with a lot of unemployment. Agriculture occupies the majority of the population but its contribution to the GDP is very limited. The environmental problems, which could be raised from agriculture activities are related with the use of agrochemicals in commercial crops, whose extent and impact is difficulty to estimate as there is a tremendous lack of data and information. The environmental problems caused by chemicals' use or production in the industry is also difficulty to estimates due to lack of data. Therefore, the data collection in order to establish a reliable database on chemicals production/importation, use and disposal is of utmost priority for the following phase of implementation plan of Stockholm Convention.

2.3. Environmental Overview

2.3. Environmental Overview

Both the National Environmental Policy (1997) and the Environmental Law (2002) have identified as major and priority environmental problems in the country the following: land degradation; lack of accessible, good quality water for both urban and rural inhabitants; environmental pollution; loss of wildlife habitats and biodiversity; deterioration of aquatic systems; and deforestation.

Land Degradation

Land degradation mainly results from the removal of woody vegetation especially when the rate of removal is higher than the rate of regeneration. A number of factors contribute to land degradation in the Country. These include, among others, inappropriate cultivation techniques; a growing population; growing energy requirements; over stocking; and insecure land tenure. In the densely populated highland areas, the average farm size has decreased. In some areas, stocking rates have risen well beyond the carrying capacity of the rangelands. Closed dense forests cover only 18% of Mozambique. The remainder of forests comprise mainly of miombo woodlands and large areas of thorn-bush.

Land degradation is reducing the productivity of soils in many parts of Mozambique. Soil loss measurements done in Mozambique over period of time have shown rates of …….

tons/ha/year average.

Lack of Accessible, Good Quality Water for both Urban and Rural Inhabitants

Available information on the incidence of water-borne, water-related and water-washed diseases indicate that these are mostly prevalent where people use contaminated water or have little water for daily use. Such diseases account for over half of the diseases affecting the population since more than 80% of Mozambique's population is living in rural areas.

During the last years, water services provision in urban and rural areas have been increasing, though the coverage is still poor, despite the great effort the Government is making. However, inefficient water uses, such as low efficiencies of many irrigation schemes (estimated at 12% to 22%); and leakages from domestic water supplies estimated at 55% of the water that is produced contribute to reduction in water availability. The government is encouraging private investment in the water sector.

Environmental Pollution

The rapid growth of urban areas in Mozambique (about 8 % per annum) has put tremendous pressure on existing services and amenities. As a result, in urban areas there are many sources of pollution as compared to rural areas. Water pollution is the most widely spread form of environmental pollution in urban and rural areas in the country; it is caused by agricultural, mining, industrial and transport activities. Apparently, indiscriminate solid waste and liquid waste disposal contributes significantly to water, air and soil pollution.

a) Urban Environmental Problems

Solid waste: Pollution arising from inadequate solid waste management particularly in urban areas is exacerbated by dominance of unplanned settlements which accommodate 70-80% of the urban population, the lack of waste separation between hazardous and non-hazardous wastes from industrial, domestic and hospital wastes; and lack of proper disposal facilities. It is estimated that over … Ton of solid wastes are generated per day in the country, but only about ……% are being collected. The uncollected waste finds its way into stormwater drains, or dumped in pits in the backyards, burned or is left openly to decompose. Where communities have resorted to dispose the uncollected wastes in unauthorized sites, such areas have become breeding sites for mosquitoes, vermin and other insects. The local

authorities are generally under-equipped to deal with his problem. There is minimal recycling of recyclable wastes such as metals, paper and plastics. The situation is posing health risks particularly to urban inhabitants who live in unplanned settlements. **Sewage:** In most urban areas, few households are served with central sewerage system while bigger part of the population rely on-site sewerage disposal systems. Due to low coverage of sewerage systems, overflows of untreated sewage are a common sight on streets in most towns in the country. It is estimated that 65% of the urban population in Mozambique depends on pit latrines as their excreta disposal facility, however 70% of these facilities used by most urban poor are substandard and offensive. In Maputo, for instance, sewers serve only 15% of the area and, of this, 90% is discharged untreated into coastal waters. Only the remaining 10% receives basic treatment in oxidation ponds. Current data show that 40% of diseases most common in Mozambique are feacal related.

Air pollution: Air pollution in towns and the countryside is a growing risk to human health. Source of air pollution in the country are static and mobile sources. Static sources of air pollution include the manufacturing or production processes of industries such as cement factories and thermal power stations, chemical industries and paper industries. Many manufacturing industries lack air pollution control equipment. The problem is aggravated by old technology in most industries, which tend to consume much input resources of raw materials, energy and water, and consequently emit large quantities of waste. Improper disposal sites emit various gaseous pollutants and may have spontaneous fires. Mobile sources of air pollution include motorized transport that uses either gasoline or diesel of which emissions may contain lead, sulphur and hydrocarbons. Motorized transport is anticipated to become a major pollution problem particularly in urban areas due to inefficient motor vehicles particularly the second-hand vehicles which not only pose mechanical problems but also environmental problems. Most of these vehicles are poorly maintained due to limited financial capacity by most owners to ensure regular maintenance and high performance.

b) Rural Environmental Problems

Nutrient loading: Due to increased input of nutrients into the water bodies from agricultural run-off in rural areas and the industrial and municipal discharge from urban areas, exotic waterweeds such as the water hyacinth have invaded many water bodies in the country. The plant has serious deleterious effects on freshwater fishing as it blocks the entry of light to the water underneath and reduces oxygen,

temperature and pH; all have negative impact to fish. However, there are no studies at least in the main water courses and lakes in the country, to determine exactly the extension of this problem.

Agrochemicals: The obselet pesticides inventory carried out by the Minstry of Agriculture in collaboration with the Ministry for Environment conducted in 2003 revealed that the magnitude of contamination of some storage sites is alarming and needs urgent remedial measures. As stated before, there is big quantity of obsolete stocks of obsolete or unknown pesticides that are stored in various areas of intensive cash crops agricultural activities as well as in the sales warehouses and in different places. In some areas the pesticides have seeped into the ground and in case of powdered pesticides, dispersed by wind to surrounding areas. Some of these sites are heavily contaminated to the extent that less plants (flora), insects and other microorganisms (fauna) can be observed. One of these sites is in Zambezia, whose source of contamination is obsolete stockpiles of pesticides mainly DDT. Initial studies conducted at the site suggest significant pollution levels in soil and groundwater. This situation accentuates significant health and environmental risks.

Loss of Wildlife Habitats and Biodiversity

Mozambique has one of the broadest ranges of natural resources in the world, including marine ecosystems, fresh water, savannah, forests, and lakes. Because of the civil war ended in 1992, a considerable number of wildlife was destroyed or disturbed through hunting and burning activities and the national reserves were abandoned. Today, illegal or irrational wood exploration and hunting and commercial agriculture pose great environmental problems. The consequences have been devastating: massive habitat loss through soil erosion, plummeting population numbers of indigenous large mammals and the extinction of many species.

Human activities are directly responsible for current alarming rates of biodiversity loss as a result of habitat loss, fragmentation and degradation; invasive species; over-exploitation of wild living resources; pollution of atmosphere, water and soil; and global climate change.

Deterioration of Aquatic Systems

There is concern over deterioration of aquatic resources in Mozambique because of increased human activities that degrade the marine and freshwater ecosystems. Some of the anthropogenic threats to aquatic resources include pollution from industrial, domestic and

agricultural effluents; destructive fishing by use of dynamite, beach-seining and fish poisoning; trophy collection-coral and shell collection; unregulated tourism for example around some coastal areas; over-exploitation of aquatic resources; introduction of exotic species; erosion and siltation due to overgrazing and deforestation; loss of habitats due to development activities, like construction of dams, mineral and aggregate mining, irrigation etc.. The contaminants, which pose the greatest threat to the aquatic environment, are sewage, nutrients, synthetic organic compounds, sediments, solid waste and waste oils.

Deforestation

Removal of woody vegetation, trees or shrubs in Mozambique is increasingly becoming a major threat to the environment. Although there are no reliable estimates on the rate of deforestation, the Ministry of Agriculture estimates to be 250,000 to 450,000 ha per annum.

The main causes of deforestation are uncontrolled cutting of wood, mainly for cooking, sale, drying fish, tobacco curing, burning bricks and also for building poles, small scale mining and bush fires. Other factors contributing to deforestation include cutting tree branches to provide fodder to livestock and to make fences for the herds, clearing for cultivation, clearing driveway marauding animals and grain-eating birds, clearing to expand grazing areas and clearing to control tse tse fly. . It is estimated that about 68.5% of the deforestation in Mozambique is due to fuelwood harvests, directly or indirectly, with about 31.50% of the deforestation being the result of agricultural land clearing. Cutting down trees to grow cahs crop such as tobacco and cotton is also a major source of deforestation

2.4. Major Environmental Problems in Mozambique

The Table 2.4 below presents the summary of the environmental problems areas which result from the general environmental context above described in 2.3.

Table 2.4 Description of Problem Areas

Nature of problem	*City/Region*	Brief description of problem	Chemical(s)/ pollutant(s)
Air pollution	National	Uncontrolled emission of dust, toxic gases and hazardous chemical effluents from industrial processes, from vehicles and open air incineration of solid wastes	Dust particles, carbon dioxide, carbon monoxide, heavy metals, polyaromatic hydrocarbons

Pollution of inland waterways	National	Uncontrolled dumping of untreated industrial effluent and domestic waste from urban centers	Dyes, heavy metals, phosphates, nitrates, pesticides
Contamination of drinking water	National	Percolation of chemical pollutants into water distribution networks, insufficient removal of heavy metals in treatment plants, inadequate treatment facilities	Phosphates, heavy metals, pesticide residues, nitrates
Soil contamination	Local	Uncontrolled disposal of industrial and municipal solid and liquid wastes	Heavy metals, dyes, crude oil, pesticide residues
Storage and disposal of obsolete chemicals	National	Uncontrolled storage and disposal of industrial and agricultural chemicals and clinical solid and liquid wastes	POPs, industrial chemicals, obsolete pharmaceuticals
Groundwater pollution	National	Infiltration of contaminated water	Nitrates, phosphates, pesticide residues, metallic and inorganic salt
Chemical residue in food	National	Misuse of pesticide and food contamination	Heavy metals, pesticide residue
Hazardous waste treatment / disposal	National	Lack of proper disposal facilities and awareness	PCBs, heavy metals, industrial waste, medical waste, radioactive waste, pesticides.
Occupational health: in agriculture	National	Lack of safety equipment, lack of awareness	Fungicide, insecticide, herbicide
Occupational health: industry	Local	Lack of knowledge of proper storage, use and disposal, lack of awareness	Acids, ammonia, alkalis, chlorine, acetylene
Public health	National	Contamination of drinking water and food	DDT, clinical wastes
Chemical accidents: industry	Local	Lack of guidance in appropriate use and safety equipment	Acids, ammonia, alkalis, chlorine, acetylene
Unknown chemical imports	National	Poor laboratory capability to determine quality and act on it	Industrial chemicals, pesticides, hazardous wastes
Chemical poisoning / suicides	Local	Poor storage and handling of chemicals hence easy access	Pesticides, hypochlorous acid
Persistent organic pollutants (POPS)	National	Inadequate regulation and control of restricted chemicals	All POPs

Chemical accidents: Transport	National	Poor road infrastructure and traffic regulation	Petroleum fuel, pesticides, acids/alkyls

2.4. Institutional and Legal Framework for Environmental Management

Profile of the Government and Legislative Path-Way

Mozambique has three main political power namely the Legislative, the Executive and the Judiciary Powers. The Highest Executive is the President, who is the Leader of the Republic of Mozambique, the Head of State, the Head of Government and the Commander-in-Chief of the Armed Forces. The Prime Minister coordinates the Cabinet Ministers, has authority over the control, supervision and execution of the day-to-day functions and affairs of the Government and also performs any other matter that the President directs.

Local Government Authorities exist for the purpose of consolidating and giving more power to the people to competently participate in the planning and implementation of development programmes within their respective areas. Local Government Authorities are mandated to play two main functions of administration, law and order; and economic and development planning in their respective areas of jurisdiction. Local Government Authorities are classified into two main categories - the City Municipal Councils and District Administrations. In one way or another, all this institutions deals with the environmental matters at their respective level, reason why MICOA is charged, by definition, with the coordinating role.

The area of Environment in the Government is guided by MICOA which has the mandate to control, manage and prevent the damage of the environment. It is within this power frame that the legal and regulation provisions pertaining environmental are prepared and taken into law. At provincial levels responds on behalf of MICOA the Provincial Director for Environmental Affairs.

The normal path way for the legal provisions on the environment starts with MICOA who draft the legal acts, discuss them with other Ministries and the stakeholders and then submit to the Cabinet for approval, after which it is sent to the Parliament for adoption.

The Guiding Philosophies and Principles

The following are the general philosophies and principles which are embedded in the Constitution of the Republic of Mozambique and reflected in the Environmental Management Law (2002):

i) Environment is the common heritage of present and future generations;

ii) Right to clean and healthy environment, including the right for access by any citizen to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes;

iii) Stake and duty to safeguard and enhance the environment and to inform the relevant authority of any activity and phenomenon that may affect the environment significantly;

iv) Adverse effects to health and environment shall be prevented and minimized through long term integrated planning and coordination, integration and cooperation of efforts, which consider the entire environment as a whole entity;

v) The precautionary principle which requires that where there is risk of serious irreversible adverse effects occurring, a lack of scientific certainty shall not prevent or impair the taking of precautionary measures to protect the environment;

vi) The polluter pays principle, which requires that any person causing adverse effect on the environment shall be required to pay in full social and environmental costs of avoiding, mitigating, and or remedying those adverse effects;

vii) Right to the involvement of the people in the development of plans and processes for the management of the environment;

viii) Right to environmental information; which enables citizens to make informed personal choices and encourages improved performance by industry and government;

ix) Right to justice which gives individual and public interest groups the opportunity to protect their rights to participation and to unrest decisions that do not take their interest into account;

x) The generation of waste shall be minimized wherever practicable, and that for proper management of waste, it shall, in order of priority, be reused, recycled, recovered and disposed of safely in a manner that avoids creating adverse effects;

xi) Non renewable natural resources shall be used prudently, taking into account the consequences for the present and the future generations; and

xii) Renewable natural resources and ecosystems shall be used in a manner that is

sustainable and does not prejudice their viability and integrity.

Environmental Policy and Legislative Overview

Mozambique adopted the National Environmental Policy (NEP) in 1997. Since environmental management involves a multisectorial as well as multidimensional issues, this Policy is a framework document, which gives direction on elements to be considered in order to mainstream environmental matters into sectoral policies. The importance of environmental management for sustainable development has been clearly stipulated in the NEP.

The Policy provides framework for environmental management issues for various sectors in order to achieve sustainable development. The objectives of the Policy include:

i) to ensure sustainability, security, and equitable use of resources to meet the basic needs of the present population without compromising those of the future generation, without degrading the environment or risking health or safety.

ii) It also focuses on preventing degradation of land, water, vegetation and air, which are crucial elements for life. The policy advocates for development and application of environmentally friendly pests control methods without specific reference to POPs.

iii) The policy underscores the need for promotion and application of environmentally friendly technologies such as recycling, reuse and safe waste disposal.

Since environmental pollution does not recognize national boundaries, the environmental policy emphasizes the importance of international cooperation with regard to environmental issues. In that spirit therefore, Mozambique participates and implements relevant bilateral, sub-regional, regional and international treaties and programs that are related to environmental protection such as the control of toxic substances. These include the Bamako, Basel, Rotterdam and Stockholm Conventions.

In 2002, the Parliament of the Republic of Mozambique enacted the Environmental Management Act (Ref….) The Act provides the legal and institutional framework for sustainable management of environment. It also provides principles for environmental management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; and basis for implementation of international instruments on environment. Moreover MICOA provides mechanisms for implementation of the National Environmental

Policy and it establishes the National Environmental Fund. Talking of POPs Management, the Law empowers the Minister of MICOA, in conjunction with the Minister of Agriculture, to promulgate regulations covering among others compliance with international obligations; promotion of alternatives to POPs; disposal of obsolete stocks of POPs; and regulation of imports and exports of POPs chemicals. Unfortunately, the present legal framework on POPs and other toxic chemicals does not cover all the issues, such as compensation, clean-up and emergency response to spills and accidents as well as the national, city, municipal, town and village contingency plans. Therefore there is a need to draft or review a specific legal command on POPs for Mozambique. Not only POPs are in this situation but also other chemicals.

Environmental Regulatory Framework

The Constitutions of the Republic of Mozambique have no express provision on environmental rights, but they have clauses for the protection of natural resources and the right for one to enjoy a safe environment. According to the Constitution, every person is obliged to safeguard and protect the natural resources of the Republic of Mozambique, State properties and jointly owned by the people, as well as to respect another persons' property". The provision on the protection of the natural resources can logically be extended to cover the environment.

In Mozambique, there are many pieces of legislation dealing with different aspects relating to the utilization and management of natural resources, and controlled by the respective governmental area. Most of such legislation put great emphasis on regulating access to and control of the use of natural resources, such as land, minerals, water, forestry and wildlife. The sectoral legislation empowers Ministers to enact regulations, which elaborates specific provisions of the sectoral laws and sets enforcement mechanisms. Both statutory laws and customary laws are accepted and govern access and the use of natural resources in Mozambique, specially the land.

In terms of Environmental Management provisions, further to the Environmental Policy and Law, it also important to notice that there some regulatory instruments are already in place, such as the Environmental Quality Standards and Regulations, the Guide for EIA process, the Registration of Pesticides Regulation (implemented together with MINAG).

Taking the chance of NIP it would be a good idea to revise all the legislative package pertaining the environmental management, though with the emphasis on the chemical

management. During the exercise carried out under the NIP process one thing comes clear, that some legal provisions on the Environment need revision, particularly the Environmental Management Policy so that it effectively promotes the reduction and eventual elimination of discharges/emissions of toxic chemicals such as PCBs, PCDD and PCDF from industrial by the following actions:

- The government will carry out sensitization on environmental awareness in its broader application;
- The government will forge deliberate and mandatory devices to reactivate legal mechanisms to enable involved institutions to be more effective in matters of environmental management;
- An appropriate motivational mechanism will be provided within the Investment Promotion Act geared to cater for promotion of investments which contain anti-pollution programmes;
- Environmental Impact Assessment (EIA) and appropriate mitigation measures will be enforced for all projects at implementation stage; and
- The government will promote the continuous application, of an integrated preventive environmental strategy to industrial processes, products and services which will include propagating efficient use of raw materials and energy, elimination of toxic or dangerous materials, as well as reduction of emissions and wastes at source. In this regard, the government will develop the capacity within its institutional machinery and support other initiatives designed to enhance application of cleaner production concept as an important complement to end-of-pipe pollution control.

Mozambique has an Energy Sector Policy, but does not expressively tackle the issue of PCDD and PCDF. The policy objectives are to ensure availability of reliable and affordable energy supplies and their use in a rational and sustainable manner in order to support national development goals. The policy therefore aims to establish an efficient energy production, procurement, transportation, distribution and end-use systems in an environmentally sound manner. The policy statements regarding environment, health and safety are: promoting environmental impact assessment as a requirement for all energy programmes and projects; promoting energy efficiency and conservation as a means towards cleaner production and pollution control; promoting development of alternative energy sources including renewable energies and wood fuel end-use efficient technologies to protect woodlands; promoting disaster prevention, response plans, and

introducing standards for exploration, production, conversion, transportation, distribution, storage and fuel end-use. Therefore NIP process can also be a chance to recommend to the Ministry of Energy the incorporation of an Amendment in the Policy to take into consideration the issues of POPs.

The Ministry of Health has also in place some policies and actions towards the use and substitution of DDT for malaria vector control. The alternatives being promoted include physical, chemical and biological controls. The Ministry of Health has also some guidelines on Environmental Health and Sanitation. Again these guidelines need to be harmonized not only internally but also in line with cross-cutting issues and initiatives.

The responsibility of regulation of the Pesticides introduction and use lies with the Ministry of Agriculture in coordination with MICOA. To tackle the problems arising from the use of pesticides, an advisory committee was created incorporating members of both said Ministries and other relevant stakeholders. In order for preventing the environmental and public health problems associated with the use of pesticides, specially those obsolete ones, a Ministerial Decree was enacted in 1992 for control of pesticides in the country. The Decree provides the necessary rules and guidelines for registration, packaging, labeling, storage and disposal of pesticides. The enforcement of the Decree is the responsibility of the Ministry of Agriculture and it charges the Pesticide Advisory Committee to facilitate its implementation. Responsibilities of the Advisory Committee consist of preparing a list that would expedite registration by collecting and evaluating data relating to pesticides recognized to be efficacious through domestic research, past use or otherwise. It is also among its responsibilities to consider pesticides submitted for registration and advises the Minister as to compliance with the requirements specified in the Decree. The Minister of Agriculture appoints the Chairman of the Committee. Members of the Committee are all representatives of government institutions that have close relations with the management of pesticides.

In relation to the industrial and consumer chemicals, there are some completely outdated legislation for the management and control of the production, import, transport, export, storage, dealing and disposal of industrial and consumer chemicals in the country. These legislation provides for the registration, restrictions, prohibition and inspection of chemicals. Furthermore it has provisions for safe handling, chemical wastes, accidents; management of spills and contaminated sites and decommissioning of plants. However they are to old that they cannot cope properly with the present

situation, specially with the international convections and agreements Mozambique is part of or has rectified them already.

There are some regulations pertaining the forest management under the control of the Ministry of Agriculture, which some how deals with emissions of PCDD and PCDF from the wild fire and illicit felling of trees.

It is also important to note that there is a multisectorial consultative committee, the so called National Council for Sustainable Development (CNDS). Its duties include providing technical advice on the overall protection and management of the environmental in line with the sustainable development. It is also charged with the functions of providing overall guidance and overseeing implementation and review of policy and legal issues and endorsement of national documents. The CNDS members are derived from government ministries/institutions, academic institutions, NGOs, and the private sector.

2.5. Assessment of the POPs issues in Mozambique

2.5.1. Current POPs Management Aspects

The two main legal and regulating instruments on the environment, namely the Environmental Policy and the Environmental Law, somehow cover the aspects of chemicals management in Mozambique, but have no specific provisions for POPs management, as stipulated in the Stockholm Convention.

In 2005 a National Profile to assess the National Infrastructure for Managing Chemicals (NP) was prepared with the aim of having an authoritative national reference document on state of affairs regarding chemical management in the country. It highlights strengths and weakness of chemical management. Among other strengths findings of the NP, it was noted that personnel handling management of chemicals might need additional specialized training. In addition, it was found that the research and development institutions and Universities have relatively better technical infrastructure in terms of expertise and analytical equipment for management of chemicals, though still with some critical handicaps. The Profile identified the following weaknesses: the infrastructure for transporting, handling, storing, formulating and applying chemicals is not adequate; the existence of threat of adverse effects of chemical exposure to human health and the environment; low awareness on chemical hazards; lack of government policy on management of chemicals; the existence of several fragmented legal instruments to manage various aspects of environmental management/pollution cannot assist the efforts of managing chemicals without a proper enforcement regime. The profile further acknowledged the weak mechanisms for inter-ministerial co-ordination and co-ordination with international organizations both in practice and procedures. The preparation of NP involved various stakeholders including government, academic, research and development and nongovernmental institutions under the coordination of the Ministry for Coordination of Environmental Affairs.

2.5.2. Assessment of POPs - Pesticides

Inventory of obsolete pesticides was conducted under the coordination of MINAG and technical and financial support of FAO and Japan respectively, as during early phases of NIP process these chemicals were found to be among the most critical in terms of volumes and the health and environmental risk they pose.

The study concluded that in almost all visited sites there was a very low awareness of the potential adverse effects of POPs. In addition there was weakness in legislation and other regulatory mechanisms, which could limit the handling and disposal of potentially hazardous chemicals. This study was a baseline inventory that identified possible sources of POPs and therefore called for a comprehensive survey.

Obsolete Pesticides Phase II - Removal

The Government of Japan with FAO and other major partners japanes. supports the programme under the coordination of MICOA and MINAG. The overall objectives of the project is to dispose of about 364 metric tons of obsolete pesticides and veterinary drugs stocks at priority sites, which were identified during the 2004 inventory and to support priority actions to prevent the future accumulation of new stocks of obsolete pesticides. The project will contribute to the improved general health of populations living in close proximity to the existing pesticide waste storage sites. The project will address the following specific objectives:

i) To ensure safe and environmentally sound elimination of obsolete pesticide stocks heavily contaminated soils, buried pesticides and contaminated containers/equipment stored in Mozambique;

ii) To prevent future accumulation of new stocks of obsolete pesticides through improved pesticides management, storage, distribution, adoption of international regulations e. g. FAO Code of Conduct (2002), the promotion of the correct use of pesticides by adoption of agriculture systems such as IPM and the use of alternatives to chemical pesticides; and

iii) To develop national capacity in pesticides and chemicals management at national and grassroots level in Mozambique.

The project is scheduled to commence in January 2006. ???? Has it started by now ????

National Practices for Introduction of New Pesticides

At present Pesticides including POP Pesticides are controlled by the Plant Protection Department of MINAG, and there is no updated Legal provision stipulating requirements for registration, manufacturing/ formulation, importation, sale, use, transportation and

disposal of pesticides wastes and their empty containers. However, the Ministry of Agriculture has put in place, in coordination with MICOA, a procedure mechanism to deal with all aspects of import, use, handling and disposal of pesticides in Mozambique. A more shaped legal document is needed to address the issue holistically.

The procedures for a new registration include; submission to the Registrar of Pesticides, technical data/information and a written declaration from the country of origin that a pesticide has or has not been banned or restricted in the country of origin. The pesticide is then tested in a field for its effectiveness to the intended pests. The field results of efficacy of pesticides are then submitted to various technical entities for scrutiny and assessment before decision to approve or reject the registration application is made. Registered chemicals are gusseted. The power to implement the legislation has been vested to the Ministry of Agriculture, while coordinated actions shall be taken with MICOA, Ministry of Health and other stakeholders.

According to the procedures for the importation of pesticides require the importers in Mozambique to apply and state the type, quantity and intended use of pesticides to be imported. The applications for import permits are processed only for registered pesticides importers and registrants. In addition the Registrar of Pesticides issues pesticides import permits for the registered and approved pesticides only. As a further control measures, on arrival, pesticides are inspected at the point of entry for conformity to labeling requirements, dates of production/expiry, thereafter samples are taken for analysis for quality verification before been cleared at the port.

Furthermore the importers are required by law to keep records of the type and quantities and report the same on a periodic basis to the Registrar of Pesticides. Inspectors in the Inspectorate Services enforce compliance to the legislation requirements. Currently the POP Pesticides have been cancelled from the list of registered and approved pesticides in Mozambique. However, the cancellation of POP Pesticides were either due to voluntary withdraw by registrants due to market shrinkage or non-compliance to registration requirements including non-payments of registration fees as required by law. Mozambique is a Party to both Rotterdam and Stockholm Conventions, which also facilitates in the decision making during registration and banning processes of pesticides.

Assessment of competency of pesticide handlers and sellers is done as well as their

premises and facilities used for keeping and handling pesticides. They are required to posses the necessary specialized knowledge before being certified in order to minimize risks to public health and the natural environment.

Training and Awareness on Obsolete Pesticides

The relevant training activities is that only the head of Pollution Control and Prevention Department of MICOA has participated in the international meetings and workshop on chemical safety.

Overall Remarks

Possible alternatives to POP Pesticides are possible in the country but a detailed study on availability, effectiveness, safety, social and economical aspects need to be conducted.

2.5.2. Assessment of POPs - PCBs

Country Activities towards PCBs

In Mozambique, Polychlorinated Biphenyls (PCBs) are mainly associated with the use of transformer's oil containing these chemicals as additive, in electrical equipment. These products pose a risk for the environment and human health due to its high toxicitity potential and high persistence in the environment. However they have been used for more than 50 years in the world, due to the dielectric properties they give to the oil in transformers and capacitors, hydraulics system and ink/paint solvents production. Mozambique is not a producer, then the all quantity of transformer oil containing PCBs was imported.

Inventory of PCBs

The only one inventory on PCBs in Mozambique was carried out by MICOA, with the technical and financial support of UNEP/GEF from June to November 2004, focusing

mainly the electricity production facilities[2] throughout the Country. The objectives of this study were (i) to characterize and locate the transformers with PCBs' oil containing; (ii) quantify the oil and (iii) evaluating the environmental potential risk related to PCBs. The inventory involved field and desk works using methodology and guidelines from UNEP.

During the survey it was found that some of the PCBs' oil containing transformers are licking because of poor maintenance, posing great risk of environmental contamination of water, underground water, soils and food. The survey also identified some workers of Electrical Company suspected to suffer from cancer due to exposure to PCBs in transformer oils.

Most of the listed transformers were imported from Europe, with few exception of some imported from South Africa. The transformers capacity varies according to the projected power generation capacity for the different uses. In some cases, were not possible to know the manufactures of the transformers or even the type of oil contained, specifically for the years 50, 60 and 70.

In summary the findings of the Inventory were:

(a) The presence of PCBs in old electrical installations owned both privately and by the Mozambique Electrical Supply Company (EDM);
(b) Workers handling transformers oils were not properly cautioned and instructed by the company which installed the transformers;
(c) Poor storage of defective or scrap transformers causing leakages of oils on the ground;
(d) Most of the workers dealing with transformer oils were not aware of adverse health effects of PCBs. They handled the oil without protective gears;
(e) There are alternatives to PCBs in the country i.e. Mineral oil and SF6, but almost not used.
(f) Malpractices i.e, misuse of transformer oils;
(g) Burning of electrical equipment containing PCBs may be potential sources for PCDD and PCDF.

[2] Belonging to the Mozambique Electricity Supply Co. and to Hydropower plants around the country

Training and Environmental Awareness on PCBs

In terms of capacity building to deal with PCBs in Mozambique, with the support of UNEP, there were undertaken the following training courses:

- Management PCB's
- Dioxins and Furans management capacity; and
- PCB's Environmental Management and Socio-economic Analysis.

These target groups for the training were technicians working with the transformers in the electricity producing and distributing companies and people from MICOA and other relevant institutions. These training courses allowed the inventory team to be able to carry out the job properly.

In Mozambique there is little awareness on the PCBs risks, particularly within the exposed workers or even within the management of companies containing devices with PCBs products. There is almost no information on the public health and environmental problems caused by this class of POPs. Therefore it is critical that the Ministry for Environmental lead activities to increase awareness on PCBs and other POPs, as well and also to take policy and legal measures to mitigate the problem, which are not in place as at the present.

Presently EDM is developing the electricity network deployment through the rural areas using mostly transformers with PCBs' oils, though that they are considering the use of non PCBs oil containing transformers technology. This shows some how the lack of awareness and knowledge on PCBs as stated above.

Overall remarks on PCBs in Mozambique

The main outcome of the activities carried out in the Country about PCBs is the increase of the awareness and knowledge among the management and personnel from companies and other relevant stakeholders. However, more has to be done on this regard and also in phasing out the PCBs containing equipments and technologies, and under the NIP it should thoroughly be addressed this problem.

Continuing information production on the PCBs shall also be one of the priorities of NIP in relation to PCBs, as one to been able to control the risk and the implementation of the measures taken or recommended.

2.5.4. Assessment of the industrial related POPs

Introduction of New Chemicals

(i) There is no updated Legal provision to control industrial chemicals, PCBs and DDT included, for the control of production, importation, exportation, transportation, storage and dealing in chemicals. It need to be formulated and take into account the Stockholm Convetion and other treaties on chemical safety Mozambique has subscribed or rectified.

The few and outdated legislation dealing with chemical management lacks coordination and poses conflicting functions and situations and lack of adequate enforcement procedure. Furthermore there are no co-coordinated action plans or enforcement programs of the legislation. There is therefore a need of harmonization of the existing pieces of legislation dealing with chemical management.

2.5.5. Requirements for Exemption

At the present, the issue of exemption is not yet well discussed and concluded whether to establish or not exemptions. Consultation with the private sector and other stakeholders need to be carried out and then the requirements for exemptions be well established.

2.5.6. Existing Monitoring Programs

Mozambique not only needs a specific law on POPs, but also a laboratory capacity to analyze the presence of POPs in the environment and human or in the food chain. Eduardo Mondlane University, the Ministry of Agriculture and the Ministry of Health posse laboratories with some capacity which can be used to analyze POPs, particularly

the pesticides, but their analytical equipment are extremely obsolete and not adequate for accurate analysis of POPs in water, air or soil. The personnel need also specific training on this kind of laboratory analysis. Above all, a national plan on POPs has to be in place, which could establish a planned and coordinated action towards the monitoring of POPs nationwide, and can put pressure for control of emission of POPs by industrial, agricultural and other anthropogenic activities in Mozambique.

In terms of capacity building to monitor the POPs in Mozambique, the only activities carried out were basically the training of one or another person from MICOA and workshops dedicated to identification, inventory and risk estimate. Therefore a lot is needed to establish an effective capacity to monitor the environmental and health impacts of POPs, which should be provided for in the NIP programs. However, it is important to note that the Ministry of Agriculture and the Ministry for Environmental Affairs have undertaken an inventory of obsolete pesticides, which can be instrumental in planning the needed capacity to monitor POPs in Mozambique

The capacity building for POPs monitoring should contemplate first the assessment of the existing laboratory, in order to determine the existing capabilities and thereof establish the needs and the best strategy to follow for the said capacity building.

Two preliminary studies on the releases of Dioxins and Furans were undertaken by MICOA, but little have come out of them as it was extremely difficulty to collect data from the industry sources, although it is believed that the industrial emissions are very low. It was identified that the main source of these chemicals are emissions from burning waste and biomass for several purposes.

Again, the NIP should incorporate the capacity to inventory and produce data on the release of these chemicals into the ambient air, to evaluate the risk to environment and public health and consequent preventive and monitoring measures to reduce exposure to and impact of these chemicals.

In conclusion we can say that there is not a monitoring program in place in Mozambique to control POPs releases and the problems that should be addressed to establish it can be the following:

- Few data on POPs available, and the one existing are fragmented and scattered among different institutions namely MISAU, MINAG and MICOA;
- The Ministry of Industry and Trade has no infrastructure, neither to collect data nor to analyze POPs industrial emissions or even a program pursuing that objective;
- There is no coordination and exchange of information among the said institutions;
- There is almost no laboratory capacity to analyze POPs, particularly those of main concern such as PCBs, dioxins, furans, unintentionally produced POPs, although some capacity exist for pesticides.

The coordination between MICOA as the focal point of the SC and others such as the Ministry of Energy, Ministry of Industry and the Ministry of Agriculture needs to be well established for the purpose of monitoring the emissions of POPs.

2.5.7. Economic Assessment

Mozambique is basically an agricultural country, where more that 80% of the population leaves out of agriculture. Cash crops, such as cotton and tobacco are other main economic activities with great impact on the economy, as they are export products (apart of fishery products). The industry in Mozambique still shows very little activities since the recovery from the recent bed times[3] and the actual international context and globalized markets do not favor an industrial boom in Mozambique, which could produce a considerable amount of POPs. Also, Mozambique does not produce any of the products listed in the SC. The needs on pesticides and other products containing POPs are met through importation, which is done with very weak control[4], being necessary to regulate its importation and use.

As has been indicated above, other source of POPs in Mozambique are transformers and other equipments working with PCBs' containing oils.

[3] For many years, Mozambique suffered civil war which destroyed the national industrial tissue and together with centrally planned economy did not allow the industry to flourish. Industry privatization adopted in result of economical re-structuring and democracy from 1992 did not produce positive changes in the industry.

[4] Exception should be made for pesticides, for which there is already in place a controlling system for importation and use.

Therefore the economical impact of POPs in Mozambique should be analyzed in terms of socio-economic costs resulting from agricultural activities with high pesticides consumption and from electricity production and distribution.

During NIP preparation MICOA contracted a consultant who attempted to undertake an economic evaluation of POPs related environmental and health impacts, based on the cost-benefit analysis of mitigating and management options. The study presented some figures reflecting cost-benefit comparisons of some POPs management options, as summarized below:

Table 2.6 Summary of cost-benefit analysis of POPs management options

Options for POPs Management	Units	Net Cost-Benefit Balance
Regulatory Control	USD	7,100,000.00
Economic Instruments	USD	12,315,000.00
Incineration	USD/Ton	30.74
PCBs Awareness Raising	USD	1,305,000.00
Steam Sterilization	USD	>1,305,000.00

Any economic assessment of environmental management and mitigation options is normally based on availability of data on environmental monitoring, epidemiology, population and its time and spatial dimensions, in order for establishing and quantifying direct doze-response and other relationships between individual POPs and measurable environmental and health effects. All these are lacking in Mozambique, as the said report also some how indicate these difficulties and constraint. On the other hand, the Mozambique market does not appreciate the value of environmentally friendly production, use and disposal of POPs, translating them on current prices so that to the benefits can be well weighted. Furthermore the externality cost is not also in place. Therefore the attempt made to calculate the cost-benefit of the management options on POPs above presented is very doubtful, and need to be revised in the following steps of NIP implementation.

Perhaps it could be better to use of *benefit transfer approach* to estimate the cost-benefits of the various alternative options in addressing the POPs related problems, based on the inventory already done.

2.5.8. Impacts of POPs on Human health and the Environment

According to the obsolete pesticides inventory and the registrations at the MINAG, it was found that most of the pesticides used in Mozambique in the past were organochlorinated pesticides (OCPs), which include all the pesticides listed in the POPs Convention. These pesticides represent a big health and environmental risk due to their high toxicity, persistence and bioaccumulation potential. In the 1999s their use was banned in Mozambique, but their intensive use in the past, persistence in the environment and the related health risks still make of them a health and environmental issue. However, the workshop held on 9-10th December 2004 to set priorities and objectives for NIP, concluded without solid fundamentals that the impacts of POPs on the environment and health are not yet alarming, but need some attention. In the same meeting it was also agreed that the soil contamination is due to the use of agro-pesticides, while air contaminiation is associated with inadequate combustion of different materials, including wastes. The negative impact of POPs on flora and fauna is completely unknown. Derived from these findings it be come clear that studies and investigation of POPs impact on the health and environment need to be carried out.

The prohibition of use of OCP and in same case the bankrupting of commercial agriculture in the past make a lot of stockpiles of pesticides which over time became obsoletes posing a great public health and environmental risk in many areas of the Countries. On the other hand pesticides over times contaminated and accumulated in soil and crops. Presently is well known that some OCPs can persist in the soil for 10-20 years and more. If we take analysis of soil and plants we most probably find traces of DDT and other OCPs in Mozambique.

Poor enforcement of specific rules and working instructions related to pesticides storage, transportation, preparation, use, etc., as well as insufficient awareness of the population on the health risks associated with pesticides, leaded to multiple violations of the regulations on handling toxic substances, including uncontrolled pesticide use on the

individual farms. This led to occupational health problems for many people directly involved in pesticides handling. This also contributed to the pesticides entering the environment and circulating in the food chains. It would be advisable if Mozambique could investigate the food chain suspected of being contaminated by pesticide residuals, such as crops, fruits, canned staff, dairy products and meat, in order to determine the level and frequency of contamination and its relation to human exposure to OCPs and others. Some relevant samples for analysis could be the breast milk of women and body fluids of people living in villages where significant amounts of these pesticides were applied. The toxic effects of OCPs on exposed people included reproductive dysfunctions and other functional disturbances in women, as well as increased frequency of masculine sterility, the incidence of both being related to the level of pesticides use. These are the main factors that must be verified in such a proposed study.

Epidemiological studies must also be done to reveal the correlation, if any, between the level of OCPs use in previous years and the morbidity through chronic hepatitis and liver cirrhosis in the investigated areas of Mozambique. This study may indicate us the . level of correlation between the general level of pesticides use and infant mortality, immune system disruptions, as well as physical and mental retardation cases, in the areas of concern. Extension of the health related problems in number of affected people and areas, will also be other result of an epidemiologic study on POPs. The study is relevant not only because of the past application of pesticides, but even now there are probably people using on individual bases.

2.5.9. Social Assessment and Activities of NGOs.

MICOA as the coordinating institution for SC implementation in the country has involved most relevant NGOs with interest on the POPs issues. They were invited to participate in workshops for actions planning and in training courses held locally as well. The selected NGOs were: Livaning (an environmental advocacy organization), public and private enterprises, University (EMU), international consultants and advisors, who helped in addressing a variety of social factors that would be critical to NIP implementation success.

Affected local communities were left out.

Some awareness activities on POPs were also undertaken by MICOA directed to the members of Parliament.

International there is the so-called RSA (Rapid Social Assessment) methodology which could be used to find more stakeholders on NGOs sector. Throughout the NIP cycle the RSA process must be an instrumental tool to secure involvement and ownership of the stakeholders in the implementation.

It seems that the POPs problems are not on the top of the national agenda, due to severe financial constraints, limited and inconsistent knowledge and commitment of the political elite, and due to inadequate understanding of the interrelationships between POPs pollution and public health and poverty elimination, as it has to do with achieving national sustainable development, including assuring sustainable food production, reliable quality water supply, sanitation and waste management, and fostering public health. Few stakeholders are aware of POPs-related problems seriously concerned with various negative environmental and health impacts, and see POPs mitigation and elimination as a priority.

The majority of consulted stakeholders, while appreciating the seriousness of potential problems, do not place comprehensive POPs mitigation and management among the daily life priorities. Awareness on PCB/dioxin/furan-related environmental and health problems is almost non-existent and does not come even close to the top of public or private priorities. Poor POPs awareness and ignorance of various groups, like farmers, enterprise employees, children, or students is related to: lack of institutionalized communication channels, ineffectiveness of existing information environmental dissemination, communication and education.

Training initiatives under the NIP implementation shall be considered to cover also NGOs who do not seem to have enough awareness of the role they can play on addressing POPs issues. May be that is why only Livaningo has been the only social organization attending fairly the events on POPs undertaken up to now in Mozambique.

3.1. STRATEGY

3.1. Policy Statement

The Government, particularly MICOA and MINAG, is very concerned about POPs and other chemicals which could have entered into water, soil, food chain upon which all living beings, including humans, depend for their existence. However the awareness on POPs danger is not yet generalized over all the affected and interested parts, such as enterprises commercializing or using, NGOs and the general public. It is then a challenge for NIP implementation.

Therefore Mozambique needs to develop a National Policy on POPs and other chemicals, under the NIP execution process. This policy should provide for a national chemical safety management system to be created, which will apply precautionary, prevention and polluter pays approach in identifying chemicals pressures and impacts, in assessing remediation options and in implementing cost-effective measures to prevent environmental degradation and negative societal, particularly health, impacts. The policy on POPs can also be an opportunity for the review of the overall National Environmental Policy.

In fact, by signing the Stockholm Convention, Mozambique Government is obviously considering the POPs and other chemicals of concern highlighted in the Convention, as country priority for the time being, and should serve as a triggering mechanism for the modernization of the current national chemicals management system towards an environmentally sound management of toxic, persistent, harmful and bio-accumulative substances in all spheres of human society. Minimization and final elimination of POPs related pressures and impacts to the natural and human environment shall be an integral part of national environmental policy. It is considered that environmentally sound management of chemicals, if being adequately set up and functioning, is an important element contributing to the well-being of the country, society sustainable development and poverty alleviation. Adequate solving of POPs pesticides problems, as well as sound management of other prohibited and unused agricultural chemicals, is considered to be helpful for the promotion of Mozambique ecologically clean agricultural products. That is why the December 9-10th Workshop has identified specific regulations on POPs as a national priorities.

The policy should also recognize the need to apply a precautionary, prevention and polluter pays approach in identifying POPs and implementing cost-effective measures to prevent environmental degradation and negative societal, particularly health, impacts.

Finally the Policy should set goals to minimize the POPs related problems in accordance with the criteria and priorities set on the above said Workshop.

3.2. Country Strategy[5]

The Country strategy for establishing a nation-wide chemical safety management system and solving of POPs priority problems is based on the policy statement and encompasses the aspects and objectives in the following areas:

- Policy,
- Legislation
- Management
- Financial Resources and Mechanisms
- Human Resources
- Strategic Approach and Objectives
  - Strategic formulation
  - Strategic objectives
- Chemicals Management Structure
- Information Exchange
- Public awareness, information and education

Policy

- Obligations under the Stockholm Convention are only a subset of broader international obligations of Mozambique, which may be defined as “environmentally sound and integrated management of chemicals”. The links and

[5] The Country Strategy to address the POPs issue in Mozambique below represents the own view of the drafter of this document, hence it needs to be broadly discussed during the revision of the document and then adopted in the final version.

operational platform between the Stockholm Convention, the Basel Convention and other relevant international conventions should be established.

- The national environmental and sectoral policies, strategies and programs should be modernized and must reflect POPs priority elements, as well as other dangerous and toxic substances management issues. The flexibility mechanisms shall be built-in to allow timely and efficient adjustment and updating when warranted. The policies, strategies and programs shall provide prioritization of action, based on cost-benefit analysis and potential threat of POPs to human health, welfare and the environment.

Legislation

- Existing regulatory gaps have to be filled-in and legislation has to be amended to ensure cross-sectoral and media consistency and timely transposition of international obligations. The legislation shall address some specific POPs issues, which are not currently covered by existing legal and regulatory framework, both at the national and sectoral levels. Particularly it should be established regulations of great concern for Mozambique on: **PCBs, Dioxins an Furans, DDT, all POPs and industrial chemicals in general.**

- Implementation regulations, procedures, standards and guidelines shall be drafted in an integrated manner, clarifying monitoring, reporting, control, implementation and enforcement responsibility of the respective ministries and agencies, and creating a unified and integrated computerized system of tracking regulated POPs, dangerous and toxic substances and other chemicals through their life cycle.

- The revision of the environmental standards related to the management of hazardous chemicals will focus not only on numerical values, but on a broad reform encompassing the principles and the legal basis for standards setting. The provision and stipulations from legal and regulatory acts should be also transferred to the practical and operational guides, as well as presented for the general public in simple and understandable mode.

- The number of regulated polluting substances should be limited to these: with the highest threat to human health, regulated under applicable international obligations, and that can be effectively monitored with the limited technical capacity and human resources available.

- An integrated environmental permitting should be developed, consistent with the applicable international requirements. Provisions for BAT and BEP, regarding POPs sources (new and existing) should be clearly addressed in legislation.

Management

- To support activities of implementation of the Stockholm Convention and of other international conventions in that field, the MICOA should consider the possibility of creating a Center for Chemicals Management (CCM) to coordinate and manage Mozambican international obligations under the Basel, Stockholm, and other conventions, thus attracting the investments and technologies for the implementation of the international treaties and for the NIP, and gaining synergies, as well as improving and increasing efficiency, cost-effectiveness, transparency, accountability and cross-fertilization.

- POPs-related obligations of various ministries and agencies require focusing, fine-tuning of authority and responsibilities, as well as better coordination and proactive cooperation - the MICOA shall be assigned lead responsibility and given relevant powers to ensure enforcement.

- A possibility of creating a centralized computerized system - a unified databank (integrating information and data from various registers, lists, sectoral monitoring systems of different hierarchy), based on upgraded centralized monitoring and laboratory capabilities and complemented by focused training of selected staff, should be explored.

- Coordination, compatibility and integration of monitoring, laboratory and control capabilities shall be enhanced, in order to improve POPs cycle information and

data management and facilitate more effective and efficient national programming, planning and decision-making.

- Environmental audits should include POPs concerns and should be used more extensively and consistently to review performance, collect data and develop mitigated plans for various economic entities, as well as identify and assign environmental liabilities.

- Improve the Customs Authority's system for POPs import, export and transit tracking and reporting, monitoring, control and enforcement, including computerized and integrated information and data management and sharing, particularly regarding labeling and compliance with licenses' and permits' stipulations on quantities and consistency of brand names/chemical compositions.

Financial Resources and Mechanisms

- Explore opportunities for POPs-related investments and technical assistance, as well as for utilization of existing projects financed by international and bilateral financial institutions in various sectors, like agriculture, energy, and transport. Implementation of joint nationally and internationally supported efforts is a strategic pathway for solving POPs and other chemicals issues in Mozambique.

- Plan a phased increase in public environmental expenditures parallel to overall economic recovery, or, at least, ensure timely release and efficient execution of budgetary allocations for priority POPs issues. It is important to establish sustainable co-financing and contributing platforms between national, regional and local sources, government and private ones, national and international financial flows.

- Provide incentives to increase the share of local public and private sector financing in the management of local, enterprise and site-specific POPs and other priority chemicals related environmental problems.

- Streamline environment-related taxation and improve collection, expand economic incentives, increase fines for POPs and other chemicals pollution, as well as for non-compliance to reflect the scarcity of natural resources and significance of environmental and health impacts; these should be timely indexed to reflect inflation rates.

- It is important that the Government of Mozambique increases its contribution, through the national budget to support implementation of Stockholm Convention related activities.

Human Resources

- Strengthen and improve chemicals safety skill-mix of the MICOA, MINAG, MISAU, MIC, MINT, UEM and Customs with well trained environmental professionals, including senior managers, technical and media experts, economists and lawyers, through a comprehensive capacity building program.

- Ensure integrated development of country resources at various levels (national, regional, local), including all players (governmental agencies, public authorities, private sector, general public) in decision making, sharing of responsibilities, training and educational programs.

- Increase the role of local public authorities, providing managerial skills and financial authority for POPs and other harmful chemicals combating efforts.

- Seek negotiating bilateral (twinning) agreements with the respective environmental agencies for technology, know-how transfer and training.

Strategic Approach towards Stockholm Convention

- Acknowledging that meeting the Stockholm Convention requirements is an important step towards ensuring the overall national chemical safety, the strategic approaches of Mozambique in this field can be formulated as follows:

- Step by step approach, followed by good planning and definitive agreements between stakeholders, beneficiaries and financial agencies is a prerequisite for the implementation of Stockholm Convention requirements. The NIP is a basis for relevant actions and negotiations with international financial institutes.

- Specific implementation actions included in the NIP should be focused on eliminating/reducing the priority health and environmental threats posed by POPs chemicals, by means of affordable and cost-efficient measures.

- The NIP should provide flexibility for implementation mechanisms and operational plans, and implementation agencies should have a sort of maneuvering, in order to reach established national goals timely and efficiently, but strictly considering the principles of safe and environmentally sound measures.

- The NIP should be periodically evaluated by means of established criteria and indicators, analyzed by stakeholders and revised if appropriated.

Strategic Objectives towards Stockholm Convention

Mozambique has identified, as strategic objectives pertaining the fulfillment of the requirements of the Stockholm Convention, the following:

In relation to Reduction of POPs Releases from Intentional Production and Use (Article 3)

- Prohibit production and use (except PCBs in equipment) and eliminate import and export of POPs chemicals listed in Annexes A and B, by the amending of legislation with clearly formulated provisions according to Stockholm Convention requirements until 2007.

- Establish a schedule for the elimination of the use of PCBs in equipment, according to Stockholm Convention priorities (Annex A, part II, a) after a clear

assessment of PCBs content in equipment. Final elimination is scheduled by 2025.

- Implement step by step measures for reduction of exposure and risk from use of PCB-containing equipment, according to the priorities stipulated by the Stockholm Convention (Annex A, Part II, b) after assessment of PCBs content in equipment.

- Prohibit recovery for reuse in other equipment of PCB-containing liquids, according to the Stockholm Convention requirements (Annex A, Part II, d) by amendments of legislation until 2010, and establish environmentally sound waste management of liquids and equipments contaminated by PCBs not later than 2028.

- Evaluate national options for specific exemptions according to the Stockholm convention requirements until 2005.

- Establish a mechanism for assessment of new pesticides and industrial chemicals (in accordance with POPs criteria) by 2008.

In relation to Registering of Specific Exemptions (Article 4)

- Follow up all requirements stipulated in the Stockholm Convention, since the moment when the Register will be officially established.

In relation to the Reduction or Elimination of Releases from Unintentional Production (Article 5).

- Further investigation of sources and current management options regarding releases of chemicals listed in Annex C in order to prepare relevant Action Plan by 2006.

- Identify BAT and BEP for particular industry and sources by 2010 and introduce BAT and BEP for new sources since 2010, including integrated pest control systems.

- Promote measures to achieve releases reduction since 2006.

In relation to Reduction or Elimination of Releases from Stockpiles and Wastes (Article 6)

- Finalize collection of prohibited pesticides at district deposits during 2006-2008

- Finalize the strategy for the identification of stockpiles consisting or containing chemicals listed in Annexes A and B and products containing POPs listed in Annexes A, B and C by 2008.

- Manage obsolete pesticides stockpiles and wastes in an environmentally sound manner following international standards and guidelines, according to the following scheme: (100% of POPs pesticides contained stockpiles and wastes since 2007, 25% of other stockpiles containing obsolete pesticides since 2008, 50% - since 2009, 75 % - since 2010, and 100% - since 2011).

- To establish a schedule for the managing of PCB-containing stockpiles and wastes in an environmentally sound manner, starting since the completion of the identification process, but not later than 2009.

- To establish a schedule for the managing of products containing POPs listed in Annexes A, B and C, starting since the completion of the identification process, but not later than 2009.

- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in the Annex A (except PCBs) by legal provision since 2007.

- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of PCBs by legal provision since 2008.

- Prohibit recovery, recycling, reclamation, direct reuse and alternative use of POPs listed in Annex C by legal provision since 2008.

- Identify BAT, such as incineration, for safe destroying of obsolete POPs containing stocks.

In relation to Listing of Chemicals in Annexes A, B and C (Article 8)

- Monitor POPs candidates use and impacts and utilize internationally accepted experience and findings.

- Strengthen national capacity for chemical risk assessment and risk management by promotion of international cooperation and technical assistance.

Information Exchange (Article 9)

- Develop Communication Strategy and establish information exchange links to be implemented by MICOA.

In relation to Public Information, Awareness and Education (Article 10).

- Facilitate and promote awareness and understanding of POPs information to the public, decision makers and other effected groups, basing on the Communication Strategy.

In relation to Research, Development and Monitoring (Article 11)

- Research and development strategy will have to be targeted and phased, showing a high degree of flexibility, in order to be easily adapted as new data will be gathered.

- Develop environmental and health oriented monitoring strategies and start step by step implementation since 2006, beginning with the priority areas, zones and concerns.

- Undertake a study of the national laboratory capabilities to address the relevant issues on POPs and other chemicals and therefore establish the necessary laboratory infrastructure and capacity.

In relation to Technical Assistance (Article 12)

- Promote extensive and POPs specific Technical Assistance Program by accelerating the negotiation process with the international community, and involve potential international financial sources and technology transfer options.

In relation to Financial Sources and Mechanisms (Article 13)

- Promote POPs related Investment Program by accelerating the negotiation process with the international community, and involve potential international financial sources.

Chemicals Management Structure

Presently there is no a centralized body to register and control the importation, production, use and disposal of industrial chemicals, in order to safeguard the environment and public health from the negative impacts of these products. Therefore it would be extremely necessary that a Mozambican Center for Chemical Management (MCCM) be established, as an inter-sectoral body to oversee the control of chemicals in the country. This institution should be formed from representative of all the relevant ministries and have extensive and enough power to execute with no restrictions all policies and regulations to be set on chemicals. The MCCM will also have the responsibility of drafting and seeking for due approval of the said policies and regulations.

Information Exchange

In Appendixes API it is set all the strategy and methodology to be pursued in relation to information exchange. The document highlights as important facts to be considered the following:

- There is a lack of information on POPs within the public and industry;

- Documents pertaining POPs and even all others on Stockholm Conventions should be translated into Portuguese to allow better understanding for most agents and stakeholders;

- There is not yet a comprehensive inventory on POPs;

- There are limited financial resources within MICOA to build up an effective information system and exchange on POPs.

Public awareness, information and education

The issues of environmental awareness are reflected in the Appendix API, where can be found as specific objectives the following:

- Change perception (knowledge), behavior (attitude) and practices (mechanisms/actions) of the workers and managers of facilities generating POPs;

- Empower public (communities, media, schools, NGOs, universities) to acknowledge the hazards and risks of POPs and advocate for POPs reduction measures;

- Empower legislators to recognize the importance of Stockholm Convention, and Industry and Government to address the issues of POPs;

. ACTION PLAN

The goal of the NIP is to ensure compliance with the national obligations under the Stockholm Convention and o reduce risks to human health, the environment and national development from past, current and future exposure to POPs. The NIP seeks to encourage, facilitate and support, to the possible extent, national and local authorities

in their efforts to collect and properly dispose POPs, as well as to remediate or to contain sources of POPs pollution.

Mozambique has developed this NIP and intends to use the full range of tools to prevent, reduce and eliminate releases and stockpiles of all SC listed POPs. These tools include international, regulatory, programmatic, voluntary, remedial, compliance monitoring
and assistance, enforcement, and research tools. MICOA and MINAG will continuously analyze POPs pollutant sources and reduction options as bases for categorizing pollutants, activities, and sectors to maximize efficiencies in achieving reductions. MICOA will coordinate integration and sequence actions within and across national action plans, and will seek to leverage these actions on international and industry-sector bases.

4.1. Priority Settings

For the determination of NIP priorities, it was realized a workshop for where it were invited all the relevant stakeholders. Attendants of the workshop were from Government Departments (MICOA, MISAU, MESCT, MIREME, MIC, INNOQ, Customs), Private Sector (EDM, ABB-Tecnel), NGOs (Livaningo, AIMO, CNPTML) and Independent consultants.

The workshop has defined the following criteria for selection of priorities (i) Environmental health impact, (ii) Institutional capacity, (iii) Economic and social benefits, (iv) Perception by different stakeholders and (v) Affordability and Availability. It was expected that the discussions should have to come out with the priorities areas scored and ranked based on these criteria and its meaning for the national reality. Instead the workshop gave justifications of selecting these criteria and not others, as bellow indicated.

Environmental health impacts.

This criterion was used to evaluate the magnitude of the impact of POPs on the human health and the environment. During the discussion in the workshop, it was found that the impacts of POPs on the environment and health are not yet alarming, but need some attention. Water and soil impacts are related to the use of pesticides in agriculture, while health and air impacts are mainly associated with the inadequate

combustion of different materials, including wastes. The impacts on fauna and flora are not known.

Institutional capacity

The national-wide assessment shows that there is weak institutional capacity to deal with POPs related issues. There is no single harmonized system to monitor the use of POPs in the country. In addition, the human resources capacity is still very low. The research capacity of the country in this field is also weak with no adequate laboratory facilities to enable specialized analysis. The current legislation does not specifically address this subject.

Economic and social benefits

Mozambique does not produce any of the substances addressed by the Stockholm Convention. Its domestic needs are met by imports, particularly of pesticides and PCBs in the agriculture and electricity sectors, respectfully. According to the preliminary national inventory of Dioxins and Furans, the release of these POPs by the industrial sector is very low. However, uncontrolled open fires represent an important source of Dioxins and Furans. This means that any measure aimed at implementing the Convention has to take into consideration this reality.

As the Mozambican economy depends mainly on agriculture, it is expected that some pesticides will continue to be imported for use in this sector. In this case an IPM has to be developed to reduce the impact of pesticides in the future.

The electricity sector, mostly represented producing and distributing companies (EDM - Electricidade de Mozambique and HCB - Hydroelectric de Cahora Bassa) and maintenance companies (Effaced, ABB-Tecnel Lda, etc.), is starting to take some voluntary initiatives to implement some recommendations of the Stockholm Convention on POPs.

Perception by different stakeholders

The intention of defining this criterion was to assess the level of understanding of the problem by stakeholders, workers, institutions, the private sector and the general public. The perception of the international community was also considered. Discussions and char of experiences during the workshop showed that the perception still need to be promoted and disseminated among all the players in the POPs problem.

Affordability and availability

The aim of this criterion was to assess the country's capacity to adjust to the necessary adaptation in terms of technology, infrastructure, human resources and funding.

Analyzing the comments made on judging each criteria during the said Workshop it can be derivate[6] the main areas of priority for POPs management presented in the Table 4.1 below.

Table 4.1. Priority Areas for NIP

Priority Area		Actions needed according to the SC Requirements
1	Manage pesticides - import, handling and disposal, in a safe, efficient and environmentally sound manner.	• Consolidate the ongoing project for the transfer of obsolete pesticides collected and packed in the previous phase in order to ensure safe and environmentally sound elimination of obsolete pesticide stocks heavily contaminated soils, buried pesticides and contaminated containers/equipment stored in Mozambique • To prevent future accumulation of new stocks of obsolete pesticides through improved pesticides management, storage, distribution, adoption of international regulations e. g. FAO Code of Conduct (2002), the promotion of the correct use of pesticides by adoption of agriculture systems such as IPM and the use of alternatives to chemical • To clearly delimitate responsibilities of all stakeholders

[6] The Workshop on setting priorities for NIP was not well oriented in order to draw the priorities out of the gradation of the criteria selected, rather only choose the criteria and justified the choice. It was expected to go further by assessing the SC requirement against the criteria selected. Therefore the priorities here set need to be revised in the final NIP Document.

		for enforcement of legal requirements; • To involve rural communities in managing pesticide stockpiles; • To propose low-cost urgent measures for reduction of releases at the existing stockpiles and to re-assess and improve national capacities for safe collection, transportation and storage of obsolete pesticides and implement re-packaging and centralization followed by its safe disposal.
2	Manage all POPs chemicals under Stockholm Convention, particularly the PCBs, towards its elimination and consequently health and environmental risk reduction related to these chemicals.	• To revise the identification survey of PCBs in the equipment of producers and distributors of electricity, and of other any chemicals waste under the Convention; • To put in place a plan for collection, transportation and storage of oils containing PCBs once created conditions for its substitution or when removed from demobilized equipment.
	Develop strategy for remediation of the contaminated sites and prevention of further environmental contamination by POPs and all chemicals under Stockholm Convention.	• To improve legal and regulatory framework for management of all POPs, supported by the development and introduction of management guidelines and practices; • To strengthen national capacities for environmental monitoring and research of POPs content in the natural surroundings (soil, water, living organisms); • To develop guidelines for contaminated site identification, including rapid assessment of sites, environmental risk identification, sampling and analytical methodologies; • To assess feasibility, local acceptability and affordability of remediation options.
4	Promote and undertake public information, awareness, and education.	• To ensure public information, develop specific education and awareness programs, set up mechanisms for public participation, maintain training efforts, involve industry and users and establish adequate information dissemination mechanisms.
5	Promote/undertake research, development and monitoring Programmes toward POPs.	• To prepare realistic and needs oriented research, development and monitoring programs, • To improve institutional framework and technical capacity for monitoring the POPs and monitor priority sources/major releases. • To monitor release reduction as an indicator of NIP

		implementation.

Therefore, NIP has to focus on short-term and urgent measures indicated in the table above, while other Stockholm Convention requirements will be considered in a medium- and longer-term perspective.

Given the financial constraints, favorable environmental living conditions in the country should be achieved by implementing actions that will bring maximum social, economic and environmental benefits for the given levels of expenditures. Considering this criterion, the NIP gives the highest priority to measures that mitigate the direct negative impacts on environmental health and human well-being. The NIP has to focus primarily on the most affordable, low-cost activities, associated with actions for creation of sustainability and public involvement.

Severe economic and financial constraints limit the country's capability to achieve the expected level of POPs release reduction. Therefore, one of the country's first priorities is commitment of sufficient international financial resources, specifically for technical assistance and for resolving urgent problems posing significant threats to public health and the environment. Thus, an important focus of developing a policy framework should be finding new means and schemes for resource mobilization and the financing of environmental expenditures, as well as addressing to other barriers for NIP implementation (lack of incentives for resource saving and environmental improvements, related to macroeconomic difficulties, weak environmental regulations and enforcement, the insufficient technical capacity of public institutions, efficiency in information sharing and disclosure, and public outreach).

The intention of this NIP is to make the whole of the MICOA's efforts on POPs pollutants of a matter of nation wide concern, thereby it will derive from coordination among national and sectoral entities, and through the significant involvement of stakeholders and through creation of institutional structure capable of sustaining such an approach.

Proposed Actions

The NIP foresees a number of measures to be undertaken in the short-term, presented in the table ofg Annex 6-1. The proposed actions are grouped in 5 categories, as follows:

(1) **Legal, Regulatory and Institutional Activities**

These actions are targeted at amending the current legislation specifically related to the Stockholm Convention and incorporating provisions for establishing a broader chemical safety approach in the country. They also include drafting specific regulatory acts and supporting operational guidelines and practical handbooks. An important element is the creation of adequate institutional arrangements for the coordination of POPs related activities country-wide and the dissemination of experience gained for overall chemical safety aspects.

(2) **Capacity Building**

This category includes actions related to the training of professionals and decision makers, improvement of POPs inventories, increasing the capabilities for hot-spots identification, reporting, monitoring and control, research and development. All these need to be well identified during next stages of NIP document revision.

(3) **On-ground Remediation and Preventive Measures**

The remediation includes the repackaging and centralization of obsolete pesticides from the local storage facilities, the identification of the most appropriated solution for their final elimination, low-cost measures to minimize impacts from abandoned storage facilities, collecting old DDT stocks from the rural households, and remediation measures at the pesticide dumps around the country and eventual stockpiles of outof-use capacitors and other electrical equipment containing PCBs.

The prevention includes the introduction of new technology options for converting industrial technologies producing POPs emissions, the use of non-PCBs containing oils in electrical devices, the adoption of effective incinerators, and
the introduction of integrated pest control systems.

(4) **Public Awareness, Training and Education**

The measures responding to the most urgent needs refer to raising public awareness and ensure proper communication on POPs-related issues, and incorporation of POPs issues in educational programmes carried out by MICOA and other cooperating entities.

(5) **Exchange of information**

This Action envisage to establish an information network for the exchange of information on POPs in particulary and on the Stockholm Convention in general, among involved institutions, such as MICOA, MINAG, NGOs, Private Sector, Academia, etc.

Of course all the above set actions can only be materialized if funds are available, therefore, MICOA should undertake to mobilize enough financial resources to enable the implementation of the priorities identified above.

5. IMPLEMENTATION, EVALUATION AND UPDATING

The NIP is an operational document providing a framework for the implementation of the Stockholm Convention in Mozambique. The current NIP is only a first step in meeting the obligations arising from the Stockholm Convention and is oriented mainly to the short-term current POPs priorities, covering a five-year implementation period. The NIP implementation is based on the following platforms:

- The NIP has been developed through an extensive stakeholder consultation process and passed all national co-ordination procedures. Involving all stakeholders in NIP implementation is one of the pre-conditions for obtaining the expected results. Clear sharing of responsibilities and tasks is a key element of the NIP implementation, and this will call for a close inter-ministerial and inter-sectoral coordination and cooperation.

- The overall operational coordination of NIP implementation will be the responsibility of the MICOA. The supervision and evaluation of the NIP implementation will be effected by the National Steering Committee for Stockholme Convention (NSC), which will decide on its revision or updating, if necessary. The Committee will ensure an effective and efficient inter-ministerial coordination and cooperation and will promote the incorporation of the NIP requirements into other national strategies, policies and plans. It is recommended the creation, under NIP, of the Mozambique Center for Chemicals Management (MCCM), thus bringing various related international Conventions' focal points under one umbrella and making easy the implementation of measures related to all chemicals management in the country. The MCCM will act as the executive body of the NSC to deal with day-to-day activities in this field and coordinate and manage Mozambique international obligations under the Basel, Stockholm, and potentially other Conventions and Kyoto Protocol, thus gaining synergies and improving and increasing efficiency, cost-effectiveness, transparency, accountability and cross-cutting action and fertilization.

- The NIP will complement on-going national activities in this area, specifically activities conducted by the MICOA and MINAG for the collecting and safe storage and transfer of obsolete pesticides and on PCBs detailed inventory and safe handling, use and storage. It will build synergy with other developmental projects, such as improvement of pest management for crops, Energy projects, etc.. The NIP might also be linked with one or another World Bank-supported projects , particularly in supporting development of Customs capabilities related to monitor POPs import/export, transportation, identification and reporting activities.

- Some of NIP actions will be very costly. Adequate support from national and international sources is therefore a crucial pre-condition for successful NIP implementation, for both technical assistance and investments.

For the implementation of its NIP, Mozambique seeks technical assistance in the following areas:

- Improvement, increasing coherence and harmonization of national and international POPs-related legal framework, and designing of innovative financial mechanisms (e.g. "debt-for-nature-swaps," HIPC[7], etc.);

- Support for implementing the NIP, evaluating and reporting on the NIP and related conventions and Protocols progress;

- Establishment of a national information system, a database of comprehensive, accurate and regularly updated aggregated information on POPs, and other chemicals and increasing capacity of MICOA (or of MCCM if set-up) for data management and presentation.

- Strengthening environmental and health monitoring, including analytical and reporting capabilities.

- Support to the energy sector in PCBs identification in power equipment and further PCBs elimination measures.

- Training of professional staff.

- Support in identification, management and remediation of contaminated sites.

- Feasibility studies for planned on-ground measures.

- Designing and implementing public training and awareness programs, based on the "community- right-to-know and participate".

Mozambique shall also seek the financial support for implementation of on-ground remediation measures for:

- Precaution and rehabilitation measures for dumping sites of pesticides, PCBs and other chemicals under the SC;

- Elimination of obsolete pesticides;

- Elimination of PCB oils, PCB-contaminated equipment (e.g. capacitors) and wastes;

- Contaminated sites remediation

[7] World Bank-IMF Heavily Indebted Poor Countries Debt Initiative (Mozambique is also eligible to benefit under HIPIC).

- Identification, evaluation and dissemination and Introduction of new environmental friendly technologies in replace of the actual posing POPs related problems.

Progress evaluation is an important component of the NIP. It will allow for assessing whether and to what extent the NIP objectives are being met and what are the NIP components in need of updating. Performance evaluation will be done in a transparent way, through a participatory process, involving all stakeholders. Their results will be made available to the general public.

The NIP has to include a set of evaluation criteria allowing the assessment of the implementation progress, efficiency and problems. The evaluation criteria have to be agreed upon in the following step of NIP Document revision to be done. The NSC[8] with close watch of MICOA will be responsible for collecting relevant information, evaluating the performance indicators, assessing the implementation needs, progress and troubles.

The MICOA will periodically report on its findings to the Conference of Parties and perhaps to the National Commission on Sustainable Development. Reporting procedures should be developed and all involved parties should be trained accordingly.

Ministries and other state bodies will be responsible for NIP monitoring and evaluation within
their sectors. The results shall be part of the decision-making process. Local authorities will have monitoring and evaluation responsibilities in the areas of their jurisdiction. The implementation units of the individual projects will be responsible for their monitoring and for reporting.

The goal of evaluation indicators is to assess how NIP activities effect the direction of change in environmental quality and to measure the magnitude of that change. While most NIP indicators will allow quantitative evaluation of the implementation process and impacts of various activities, many indicators will seek to measure qualitative aspects,

[8] Not sure whether is MICOA taking the executive action or has to be the NSC. Is this committee set up and functional? May be is needed a restructuring of the Stockholm Convention Management, though MICOA will always remain the official focal point of this and similar Conventions or Protocols.

e.g., monitoring of the evolution of public attitudes towards Pops problems being addressed through opinion polls and surveys. Furthermore, as the NIP seek to address many institutional issues, which are as much about quality as they are about quantity, both numerical indicators and qualitative assessment will be employed. The range of verifiable indicators of the NIP implementation may be drawn and discussed during the next phase of NIP Document revision.

The NIP can not be a rigid document and will be subject to revisions and updating on regular basis, e.g. every 5 years. Obviously, this will be linked to the performance evaluation process. The main responsibility for NIP performance evaluation and updating lies with the MICOA and NSC.

APPENDIXES

APPI: Projects Portfolio of the National Implementation Plan (NIP) for the Stockholm Convention in Mozambique, and Respective Budgets.

APPII: National Profile on the Capabilities for Chemical Management