REPUBLIC OF MALAWI

NATIONAL IMPLEMENTATION PLAN (NIP) FOR THE MANAGEMENT OF PERSISTENT ORGANIC POLLUTANTS

MINISTRY OF MINES, NATURAL RESOURCES AND ENVIRONMENT

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Acronyms

ADD	Agriculture Development Division
ADI	Acceptable Daily Intake
ADMARC	Agricultural Development Marketing Corporation
ARET	Agriculture Research and Extension Trust
BAT	Best Available Techniques
BEP	Best Environmental Practices
bw	Body weight
C	Carbon
CBNRM	Community Based Natural Resources Management
CBO	Community Based Organizations
CSMWG	Contaminated Sites Management Working Group
DDE	Dichlorodiphenyldichloethylene
DDT	Dichlorodiphenyltrichloroethane
DP	Dusting Powder
EAD	Environmental Affairs Department
EC	Emulsifiable Concentrates
EIA	Environmental Impact Assessment
EMA	Environment Management Act
EPA	Extension Planning Area
ESCOM	Electricity Supply Commission of Malawi
FAO	Food and Agriculture Organisation
FRIM	Forestry Research Institute of Malawi
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GMT	Ground Mounted Transformer
GR	Granules
IDS	Information Data Sheets
LD	Lethal Dose
LOAEL	Lowest observed adverse effect level
MBS	Malawi Bureau of Standards
MEA	Multilateral Environmental Agreements
MoAIFS	Ministry of Agriculture, Irrigation and Food Security
MoNREA	Ministry of Mines, Natural Resources and Environment
MRA	Malawi Revenue Authority
MZUNI	Mzuzu University
NEC	National Economic Council
NOAEL	No observed adverse effect level
NSO	National Statistics Office
OC	Organochlorine
OHSWA	Occupational Health, Safety and Welfare Act
OP	Organophosphates
PCB	Pesticides Control Board
PCBs	Polychlorinated Biphenyls

PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PIESA	Power Institute of East and Southern Africa
PMT	Pole Mounted Transformer
POPs	Persistent Organic Pollutants
PP	Plant Protection
PTS	Persistent Toxic Substances
PPE	Personal Protective Equipment
PTDI	Provisional tolerable daily intake
PVC	Polyvinyl Chloride
PY	Pyrethroids
RDP	Rural Development Project
SADC	Southern Africa Development Community
SC	Suspension Concentrate
SEA	Strategic Environmental Assessment
TAB	Tablets
TDI	Tolerable daily intake
TEQ	Toxic Equivalent
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNIMA	University of Malawi
WHO	World Health Organization
WP	Wettable Powder
ZESCO	Zambia Electricity Supply Commission

Table of Contents

List of Tables

List of Figures

Acknowledgements

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R.P. Kabwaza

DIRECTOR, ENVIRONMENTAL AFFAIRS DEPARTMENT

Foreword

The use of chemicals constitutes an essential means of achieving socio-economic development in countries including Malawi. This entails maximizing the full benefits of chemicals while minimizing the adverse health and environmental impacts of these chemical substances. Effective utilization and management of chemicals most of which are toxic require that appropriate legal and technical infrastructure should be in place for producing and handling chemicals safely and ensuring that they are used properly.

The Ministry of Mines, Natural Resources and Environment has been coordinating a project called "Enabling activities to facilitate early action on the implementation of Stockholm Convention on POPs". The project aimed at formulating a National Implementation Plan (NIP) and specific action plans on POPs. The Director of Environmental Affairs, Mr. Ralph P. Kabwaza supervised the whole process of the production of the Malawi NIP with technical and financial assistance from the United Nations Industrial Development Organization (UNIDO) and the Global Environmental Facility (GEF).

The Malawi NIP is consistent with Article 7 of the Stockholm Convention on POPs, which requires that countries develop and implement national plans to ensure effective management of POPs and other toxic substances.

This report therefore concerns strategies, objectives, priority activities and their timeline. The draft NIP was reviewed and endorsed by various stakeholders on 12 September 2005. The stakeholders involved were drawn from various institutions, which included the private sector, academic and research institutions, the civil society/NGOs and sectoral ministries. The Consultative workshop agreed on eight objectives, which need to be undertaken to effectively implement NIP. These were to:

(i) Increase awareness and education of the Malawian communities and partners on POPs and their effects on health and the environment;
(ii) Enhance and where necessary develop skills and competencies of partners at all levels for effective research, monitoring, modeling, dissemination, negotiations and effective implementation of programmes;
(iii) Integrate management of POPs and other persistent toxic substances in national socio-economic development programmes;
(iv) Develop policy, legal and institutional frameworks for effective management of POPs and PTS;
(v) Develop and implement effective disposal and management systems of obsolete POPS, stock piles of toxic substances and contaminated sites;
(vi) Develop and institute monitoring and evaluation (M&E) tools and indicators for assessing impact of POPs on socio-economic activities and implementation programmes;
(vii) Identify and promote coordination and networking among responsible institutions, and
(viii) Develop and implement sustainable resource mobilization strategies for effective programme and project implementations and infrastructure development.

The NIP report was further endorsed by the Steering Committee of the project on 3rd December 2005 and finally by the National Council on the Environment on 20th December 2005 who recommended it for submission to the United Nations Industrial Development Organization. The report is yet to be submitted to the Cabinet Committee on Agriculture and Natural Resources for political commitment. Malawi Government seeks partnership with its investment partners to translate NIP into action and thus to reverse human and environmental degradation from POPs. Malawi is very committed to participating in effective implementation of the Stockholm Convention.

M. M. Mononga

SECRETARY FOR MINES, NATURAL RESOURCES AND ENVIRONMENT

Executive summary

This national implementation plan (NIP) has been prepared to allow Malawi effectively manage Persistent Organic Pollutants (POPs) and other persistent toxic substances (PTSs) consistent with the requirements of the Stockholm Convention on Persistent Organic Pollutants (POPs), which Malawi signed in 2002. Under the Convention, Malawi has been able to implement a project called *"Enabling activities to facilitate early action on the implementation of the Stockholm Convention on POPs"*. The Project involves five phases:

(i) Determining -Coordinating Mechanism and Organizing Process;
(ii) Establishing a POPs Inventory and Assessing National Infrastructure and Capacity;
(iii) Priority Setting and Determining Objectives;
(iv) Formulating a National Implementation Plan (NIP) and specific Action Plans on POPs; and
(v) Endorsement of NIP by Stakeholders.

The NIP has been prepared based on the inventories, priorities and objectives determined for the management of POPs. POPs inventories established the state and extent of POPs problems in the country**.** The inventories recommended strategies for effective management of POPs in Malawi to protect human health and the environment from their deleterious effects.

Assessment of the POPs in country

In order to assess the status and extent of POPs problems in Malawi, preliminary inventories on POPs were carried out between August 2003 and February 2004. The inventories identified POPs sources and quantities and undertook an assessment of legal and institutional framework; assessment of management practices; monitoring capacity and experience; identification of contaminated sites; and identification of public information awareness and education tools and mechanisms. Twenty-six national experts comprising members from the private sector, non-governmental organizations, academia, government departments, research institutions and the industry were involved

A survey on the presence and uses of POPs pesticides in Malawi involved 211 sites, which included chemical companies, estates, academic and research institutions, Agricultural Development and Marketing Corporation of Malawi markets, super markets and produce markets. The findings of the survey showed that aldrin, dieldrin, endrin, DDT and toxaphene have been used in agriculture mainly for the control of insect pests in crops and livestock. These pesticides were also utilized together with heptachlor in forests for termite control. Chlordane was found to be the commonly used POPs pesticide in Malawi. Up to 1.546 metric tones of chlordane, fifty liters of toxaphene and less than 10 kg of DDT were recorded. Chlordane is used to control termites in the construction industry, tea and coffee estates.

The survey also recorded 310.894 metric tones of obsolete pesticides. These included organophosphates, carbamates and pyrethroids. Some of the containers were in bad shape and thus require urgent clean-up programme.

During the survey, it was observed that Malawi does not manufacture pesticides. All pesticides that are marketed in the country are imported either from the neighbouring countries or from overseas. There is always high demand though for pesticides and as a result there is so much illegal trade of pesticides.

Though use of POPs pesticides was banned in the country, illegal use and trade of POPs continues to be taking place. There are a lot of unlicensed dealers and vendors selling pesticides and other chemicals on the open markets especially in the districts along the boarders (Mozambique, Zambia and Tanzania). This has led to the uncontrolled entry as well as accumulation of stockpiles and obsolete pesticides in the country including POPs. These pesticides are commonly used to protect plants from plague insects. The POPs pesticides being traded include aldrin, dieldrin, endrin, heptachlor, mirex and toxaphene and DDT. Their exact quantities could not be established during the surveys.

The inventory on Polychlorinated biphenyls (PCBs) established that the Electricity Supply Corporation of Malawi is the major importer of PCBs through transformers However, the management of PCBs containing oil and equipment is poor and there is little awareness on the dangers posed by PCBs. During the inventory some sites were designated as contaminated by PCBs and some of these sites are located close to fragile ecosystems, such as water bodies, flora and fauna, food processing units and schools thereby posing risk of exposure to the general public and the environment.

The inventory on dioxins and furans showed that the main media of release of dioxins and furans in Malawi were air and land through emissions and residue deposits respectively. Management of dioxins and furans is a new issue in the country hence need for more studies on their emissions.

The surveys showed that very little public information, awareness and education exist on POPs and other toxic substances in the country. Limited awareness on use and risks associated with POPs has resulted in poor management of the chemicals consequently affecting human health and the environment. It has been further established that very limited information on human health impacts directly linked to POPs in the country is available. Capacity to assess human exposure to POPs in the country was also found to be limited. Since POPs have been used and unintentionally produced in the country for a long time, it can be envisaged that quite a large percentage of the Malawian population has been exposed to POPs. No studies have been conducted on causes of certain diseases and their linkage to POPs.

Furthermore, no specific regulatory framework for the management of POPs and PCBs in particular exists in the country. POPs are being used without any management measures being enforced.

Present institutional management and regulatory framework of POPs pesticides including production and use of POPs pesticides

The control of POPs pesticides falls under several ministries including the Ministry of Agriculture (MOA) through the Pesticides Act (2000), Plant Protection Act (1967) and Seeds

Act (1996). The other ministries involved include Mines, Natural Resources and Environment (Environment Management Act, 1996) and the Fisheries Conservation and Management Act (1997), Commerce and Industry (Malawi Bureau of Standards Act, 1972), Ministry of Health and Population (Public Health Act, 1947), Pharmacy, Medicines and Poisons Board (1996), Ministry of Trade and Private Sector Development (Control of Goods Act and Ministry of Labour and Vocational Training (Occupational, Safety, Health and Welfare Act, 1997).

In the past, POPs pesticides were used in agriculture, forestry and construction industry for the control of termites. Currently, the only POPs pesticide that is officially in use is chlordane, which is being used in the construction industry as well as in agriculture particularly on coffee and tea for the control of termites. Chlordane is also being used in forestry. At present chlordane is legally used but there is a gradual phase out plan. The Government is committed to stopping any further importation of POPs pesticides. Malawi continues to identify alternatives to POPs pesticides (MOAI&FS, 1976/77). Some of the major achievements in identifying alternatives to the POPs pesticides include:

(i) The use of aldrin, heptachlor, dieldrin, and endrin, which has been replaced by carbofuran, chloropyrifos and carbosulfan for soil pest;
(ii) Toxaphene, which has been replaced by amitraz for the control of ticks in livestock; and
(iii) Chlordane for the control of termites and other soil pests in the tea, coffee and tobacco industry which is being replaced by carbofuran and carbosulfan;

Import and export of POPs pesticides

The Pesticides Control Board (PCB), established by an Act of Parliament in 2000, monitors and regulates all pesticides imports into Malawi. Although the Pesticides Act 2000 is silent on the importation of POPs pesticides, Malawi is concerned about health and environmental hazards that POPs pesticides cause, the Board will amend the Act to include POPs pesticides. This will enable Malawi to comply with the Stockholm Convention on the import and export of POPs pesticides. It is thus necessary to:

(i) Investigate the most effective alternative to chlordane;
(ii) Develop and implement POPs and pesticides stockpile clean-up programmes;
(iii) Institute mechanisms to prevent future stock piles; and
(iv) Monitor and evaluate the efficiency of an action plan.

National priorities and objectives for the management of POPs

The priorities and objectives, which were identified for the management of POPs, were based on the inventories, which constituted a basis for the development of action plans and NIP. Some of the priorities, which were identified during prioritization for the effective management of POPs included:

- Strengthening of institutional and regulatory framework to ensure effective compliance with national and international laws;

- Capacity building for regulators, decision makers, training and research institutions, civil societies and the private sector towards forging a partnership that will facilitate effectiveness of national strategies for POPs and other persistent toxic substances reduction;

- Awareness raising at all levels about the effects of POPs and other persistent toxic substances and their management;

- Removing existing environmental data gaps to achieve meaningful policy interventions to protect humans and the environment from risk of exposure to POPs and other persistent toxic substances;

- Environmental monitoring of POPs and other persistent toxic substances levels at national level in water, sediments, biota, air, livestock and human blood / breast milk to identify all the hot spots for remedial action; and

- Studying the pathways and fate of POPs and other persistent toxic substances in Malawi so that the critical pathways and routes of exposure can be identified, followed by the evaluation of the relative impact of processes, estimation of transport fluxes, and assessment of remedial measures.

The action plans presented in the NIP are thus consistent with the national priorities to ensure a safe environment and healthy nation. Implementation of the NIP is expected to commence in July **2006 up until 2025. The investment required is estimated at US$ 22,074,000.00 for the whole period**. Key project areas, which Malawi has prioritized, include:

(i) Creation of enabling environment supportive of POPs management;
(ii) Public awareness and information exchange;
(iii) Health and environmental impact of POPs;
(iv) Strengthening institutional capacity;
(v) Management of POPs and obsolete stockpiles;
(vi) Management of POPs wastes and contaminated sites;
(vii) POPs alternatives and technology transfer; and
(viii) Local, regional and international networking.

The Malawi nation and its key stakeholders identified several key milestones as monitoring tools for effective implementation of the NIP. These are:

By 2010

(i) Malawi NIP integrated within the regional NIP;
(ii) POPs management included in all relevant legislation;
(iii) Media reports addressing POPs increased by 50%;
(iv) A legal framework restricting complete use of DDT in Malawi in place;
(v) Certification mechanism for POPs related issues including registering in place;
(vi) At least 50% reduction in cross-border importation POPs;
(vii) Over 50% of Malawian population aware of POPs issues;
(viii) Skilled personnel enhanced in management of POPs by 20%;

By 2015

(ix) Over 90% reduction in POPs pesticides including chlordane and DDT use;
(x) At least 30% of the population using 30% of the alternatives to POPs;
(xi) Emissions of PCDDs/and PCDFs reduced by 25%;
(xii) At least 50 % reduction of equipment containing PCBs with 10% PCB oils of volumes greater than 5 liters;

By 2025

(xiii) 75 % reduction of 0.05% PCBs oils of volumes greater than 5 liters;
(xiv) At least 30% of training, research and development institution are addressing management of POPs issues;
(xv) Complete elimination of stockpiles and decontamination of contaminated sites; and
(xvi) Allocation of funds for POPs management annually increased by 10% during the first five years.

Chapter 1: Introduction

1.1 Persistent Organic Pollutants and their properties

Persistent Organic Pollutants (POPs) are a class of organic compounds of anthropogenic origin that resist photolytic, chemical and biological degradation. They concentrate in fatty tissues of living organisms through processes of bioaccumulation and bio-magnification. Concentrations are magnified up the food chain. For example, fish, predatory birds, mammals and humans, who are higher in the food chain absorb the greatest concentrations of POPs.

POPs have been used as pesticides to protect plants from plague insects and control vector-borne diseases. They are also used as heat-resistant compounds in the case of Polychlorinated biphenyls (PCBs), which are primarily used in electrical equipment such as transformers. POPs such as dioxins and furans are generated as by-products of incomplete combustion and chemical processes. At present twelve chemicals have been proved to exhibit POPs characteristics and these chemicals are divided into three categories. The first category is composed of intentionally produced pesticides (i.e. Aldrin, Dieldrin, DDT, Endrin, Chlordane, Hexachlorobenzene, Mirex, Toxaphene and Heptachlor). The second category comprises industrial chemicals, which are Polychlorinated biphenyls (PCBs) and hexachlorobenzene while the third is the unintentionally produced emissions of certain industrial and combustion processes, which include polychlorinated para dibenzodioxins and polychlorinated dibenzofurans.

1.2 Status and extent of Persistent Organic Pollutants in Malawi

Management of POPs and PTS is a relatively new subject in the national agenda of many developing countries including Malawi. Hence, there is very limited information and capacity to manage POPs and evaluate the impacts on human health and the environment directly associated with POPs. In Malawi the inventories established that POPs have been widely used in the country and are also produced unintentionally. For example, DDT has been used as a pesticide since the 1960s until the late 80s mainly in agriculture to control major insect pests as well as for malaria vector control. Similarly, aldrin and dieldrin were also used in the past in the forestry plantations while chlordane is still being used to date for control of termites in forests as well as in the construction industry.

1.3 Risk assessment and analysis

In Malawi, human beings are exposed to POPs through diet, occupational accidents and the environment. Exposure to POPs, either acute or chronic, can be associated with a wide range of health effects ranging from illness to death. Laboratory research in wild animals and environmental impact assessments implicate POPs in endocrine disruption, reproductive and immune dysfunction, neurobehavioral disorders and cancer. POPs are known to reduce immunity in infants and children, and also cause increased developmental abnormalities, neurobehavioral impairment and breast cancer and tumour induction or promotion.

The Malawian farming communities comprise largely women and children who are therefore vulnerable to the dangers of POPs. The risk to POPs pesticides contamination is mainly due to improper disposal of obsolete pesticides and containers. This is compounded by lack of awareness among the users and handling personnel. Pesticide containers, after the products are used up, are given out to labourers and the surrounding communities for use to draw drinking water, thus putting the whole farming households at greater risk.

Personnel working at industries that have PCBs containing equipment and products are also at high risk due to PCBs exposure. These include workers in Electricity Companies. Workers handle PCBs containing equipment without appropriate protective wear. This is exacerbated by little awareness on the dangers posed by PCBs. The general public is also at risk of exposure to PCBs as some of the PCBs contaminated sites were close to water bodies, schools, residential areas and food processing units. Acute exposures to high levels of PCBs have been associated with skin rashes, itching and burning, eye irritation, skin and fingernail pigmentation changes, liver dysfunction, reduced immune system, irritation of the respiratory tract, headaches, dizziness, depression, memory loss, nervousness, fatigue and impotence. Chronic effects of low-level PCBs exposures include liver damage, reproductive and developmental defects and possibly cancer. PCBs contamination in the country is mainly occupational.

Research has shown that high-level of exposure to dioxins and furans can cause variations in serum lipid level, microsomal enzyme induction, and gastrointestinal alterations. Other studies of high-level occupational exposure have found associations with some types of cancer, and have concluded that uterus and lactational exposures to dioxins and furans are capable of affecting the hypothalamic/pituitary/thyroid regulatory system in human infants. According to U.S. EPA, effects on humans, including hormonal and metabolic changes, have been documented as dioxin body burdens and exposures are only slightly higher than those of the general population.

Dioxins are known to be toxic at extremely low doses. On average, Americans are exposed to only 1 to 3 picograms per kilogram of body weight per day and the U.S. population revealed an average body burden of 7-8 nano-g/kg of body weight (U.S. EPA, 1982). A 2000 evaluation indicates that adult daily intakes of dioxin and related compounds, including dioxin-like PCBs average 70pgTEQ(DFP). It is interesting that in most industrialized nations of the world, dioxin body burdens and exposures are in the same range. Levels in developing countries are assumed lower although limited analytical data exists. To reduce potential exposure and risks, the World Health Organization recently lowered by more than fifty per cent the tolerable daily intake from 10 pg, fixed in 1990, to 4 pg/kg bw. This is based on a recognition that subtle effects may already occur in the general population in developed countries at levels of 2 to 6 picograms, (WFPHA, 2000).

The impacts and extent of exposure to various POPs such as PCBs, POPs pesticides, dioxins and furans in Malawi are not well recognized due to lack of awareness of the degree of emissions and its associated health and environmental effects. It is expected that exposure to these toxic substances has some negative impacts in Malawi.

1.4 International and national interventions to deal with POPs

At global level, several interventions have been made with regard to the safe use of chemicals in general and POPs in particular. Aware that POPs pose major and increasing threat to human health and the environment, in May 1995, the Governing Council of the United Nations Environment Programme (UNEP) requested in its decision 18/32 that an international assessment process be undertaken of an initial list of the twelve POPs (the so-called "dirty dozen").

An inter-governmental negotiating committee (INC) was established to prepare an international legally binding instrument for the implementation of international action to deal with POPs. The Committee, which started its work in June 1998, concluded the assignment in December 2000. The INC also established an expert group to develop criteria and a procedure for identifying additional POPs as candidates for future international action as well as a number of immediate actions to deal with POPs. At the end of these processes, in May 2001, an international legally binding instrument called Stockholm Convention on Persistent Organic Pollutants was adopted. Malawi signed the Convention in May 2002. The Convention aims at protecting human health and the environment from persistent organic pollutants. It deals with issues such as measures to reduce or eliminate releases of POPs, processes of adding more POPs and technical and financial assistance to manage POPs. This is consistent with the precautionary approach set forth in Principle 15 of the Rio Declaration on Environment and Development where serious threats of serious or irreversible damage to the environment are dealt with.

1.5 Country obligations under the Stockholm Convention

Consistent with the obligations to the Stockholm Convention, Malawi accessed financial support from GEF through United Nations Industrial Development Organization (UNIDO) as its implementing agency. UNIDO assisted Malawi in the development of the project proposal and provided backstopping technical expertise for the execution of the activities of the project. The 2-year project titled "Enabling activities to facilitate early action on the implementation of the Stockholm Convention on POPs in Malawi" was approved and commenced in June 2003. The objective of the project has been to strengthen national capacity and enhance knowledge and understanding amongst decision and policy makers, managers, NGOs and the general public to manage POPs and other toxic substances effectively. Until now Malawi has:

(i) Established coordination mechanism and process organization;
(ii) Undertaken POPs inventories and assessment of national infrastructure capacity; and
(iii) Completed priority assessment and objective setting.

The last two stages; formulation of the NIP and its endorsement are addressed in the report. A consultative stakeholder workshop of August 2005 approved and endorsed the Malawi NIP. The main outcome of the project is thus for the NIP to achieve effective implementation and compliance with the Stockholm Convention on POPs. Article 7 of the Stockholm Convention on POPs.

This report is about the Malawi National Implementation Plan (NIP), which will guide effective management of POPs in the country. The second chapter describes the country baseline, the

current situation and state of knowledge in the country about POPs and status of institutional and other capacity to address the problem, key findings on the inventories and priority assessment and objective setting. In the third Chapter strategy and action plan elements of the NIP are presented. The implementation strategy provides specific activities, action plans and strategies to achieve Convention obligations and other objectives set in the country. Various annexes, which provide important and relevant information specific to the action plans and other relevant information to meet the objectives of the NIP, are also included.

Chapter 2: Country Profile Baseline

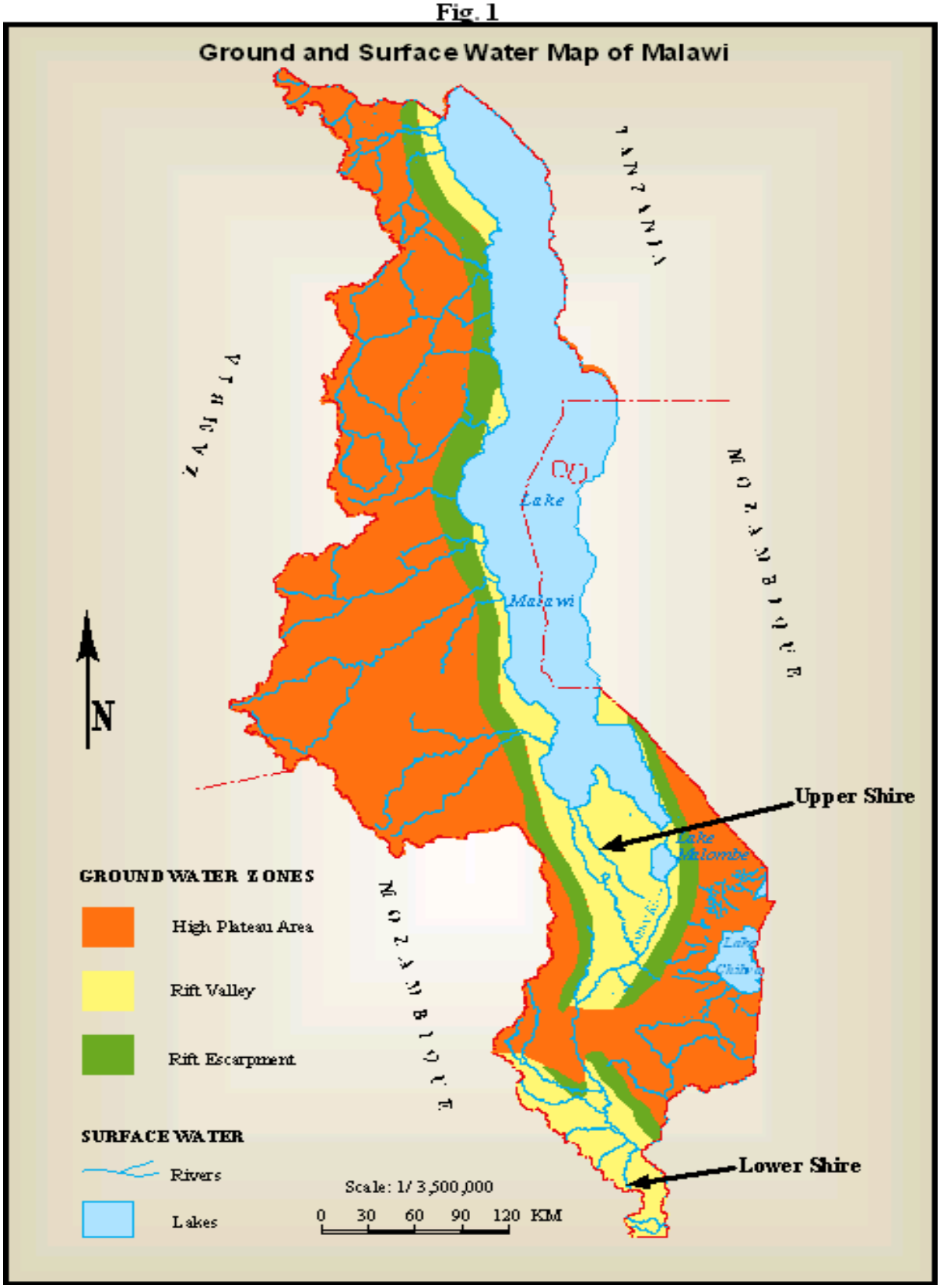
2.1 Country profile

2.1.1 Geography and population

Malawi is located in southern Africa and is bordered by Tanzania in the north, Mozambique in the east, south and southeast, and Zambia in the west. The total area is 118,000 square kilometres of which 80% is land and the remainder is covered by water, mostly Lake Malawi, covering 28,750 square kilometres. About 60% of the country has been modified by human activity with only 36% under natural vegetation, 20% in game reserves, national parks and forest reserves. Four main physiographic zones are recognized; highlands, plateau, escarpment and rift valley plains.

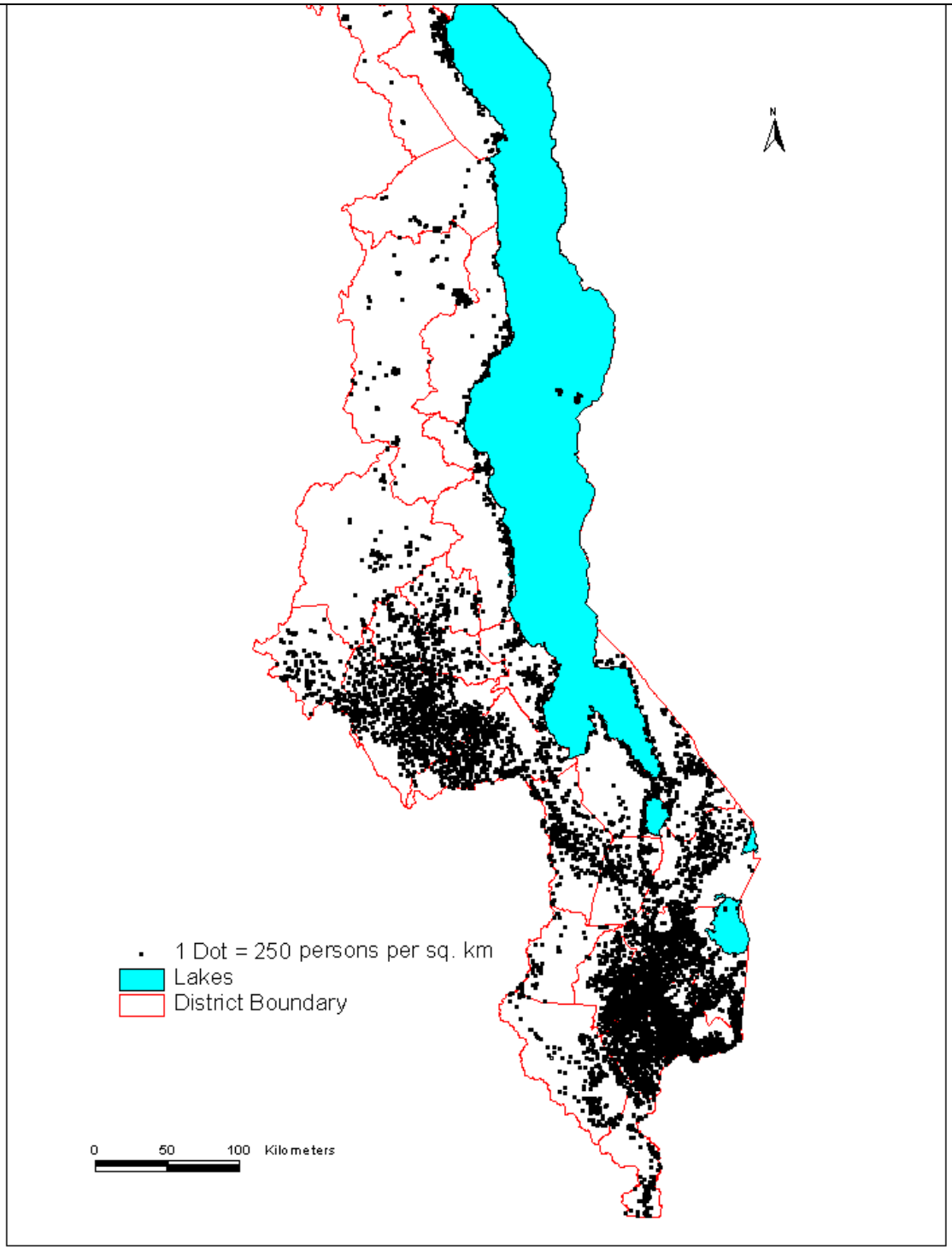
The major water body in the country is Lake Malawi, which is to the southernmost of the Rift Valley. The geography of Lake Malawi reflects it's positioning in the great African rift valley system, characterized by being a long, relatively narrow, and deep water-body. It is the ninth largest lake by surface area, but stands as the fourth deepest and also fourth largest body of freshwater on the globe. Its catchment area, where the six drainage basins are located, comprises inland ancient plateau and associated mountains, rift valley escarpment, and the lakeshore flood plains. Metamorphic and igneous gneiss, schist and granite dominate the drainage basins. Figure 1 gives ground and surface water supply of Malawi.

Fig. 1


Ground and Surface Water Map of Malawi
Lake
Malawi
N
Upper Shire
Lake
Malombe
Lower Shire
GROUND WATER ZONES
High Plateau Area
Rift Valley
Rift Escarpment
SURFACE WATER
Rivers
Lakes
Scale: 1/ 3,500,000
0 30 60 90 120 KM

The population of Malawi is estimated at 12 million people with an average density of 105 people/km^2. The annual growth rate of population is estimated at 2%. The high growth rate is due to a number of factors, which include a high and stable total fertility rate of 6.7 births per female (1992), early marriages, lack of child spacing knowledge and a decline in the crude death rate (6.7 per 1,000). Figure 2 gives an outline of population density of Malawi as of 1988 census.

Figure 2. Population density of Malawi (Census of 1988)



Malawi's mortality rates are the highest in the Sub-Saharan Region. This is largely due to poor environmental and public health facilities and HIV/AIDS pandemic. Life expectancy has decreased from 48 years in 1990 to 39 in 2000. Malawi therefore has a young and dependent population with children less than 15 years representing 50% of the population. The population distribution is rather skewed; about 50% lives in the Southern Region and 10% in the Northern Region. Rural-urban migration has also been on the increase in Malawi. The proportion of people living in the urban areas increased from 6% in the 1970s to 24% in 1999, and is mostly concentrated in Blantyre, Lilongwe, Mzuzu and Zomba creating s pressure on the limited social amenities like water supply, health facilities and waste disposal facilities. About 86% of the population lives in rural areas and most of these depend on subsistence agriculture for their livelihood. About 69.5% and 46.5% of the rural and urban populations, respectively, are economically active of which 83% is engaged in agriculture, animal husbandry, forestry and fisheries sectors.

The country has a wide range of relief, which is a major determinant of the climatic, hydrological and edaphic conditions. Malawi, due to the large lake, high plateau and rugged relief has a distinct climate. The country experiences good rainfall during the rainy season from November to April with an annual mean of 1.037mm. The mean monthly temperatures range from 10^{o}C-16^{o}C in highland areas, 16^{o}C-26^{o}C on the plateau and 20^{o}C-29^{o}C along the lakeshore. The country has a good network of river systems, divided into 17 Water Resources Areas (WRA) with each WRA pertaining to a river basin. All the main rivers and Lakeshore Rivers are perennial. The climate is classed into three types; cool between May and July, dry (winter), and hot, which coincides with the rainy season.

The vegetation of Malawi is associated with its six drainage basins, the vegetation predominantly a mixture of woodlands (evergreen, *Brachystegia* woodland, etc.). Most of the gentler slopes are under cultivation. It is mostly the hillsides that are forest covered. Forest resources are generally declining (47% to 28% between 1975 and 2000) due to deforestation at a national average of 2.8%.

Table 1: Physiographic zones and erosion surfaces in Malawi

Physiographic zone	**Erosion surface/equivalent**	**Altitude (m)**	**Slopes (^{0})**	**Examples**
High plateau	Gondwana	1500 – 2400	5 – 15	Nyika, Viphya, Zomba,
Hill country	Post Gondwana	1400 – 1500	Moderate to steep	Dissected Nyika, Viphya, Zomba, Mulanje
Plains	African	600 – 1400	2 – 5	Lilongwe-Kasungu
Rift Valley Scarp	Post African	Post African	Steep	Thyolo and Livingstonia
Rift Valley Floor	**Quarternary**	30 – 500	30 – 500	Karonga, Nkhota kota, Salima and Lower Shire

Source: State of the Environment report, 2002

Malawi is divided into five zones: Rift Valley Floor, Rift Valley Scarp zone, Plains, and High Plateau. The characteristics of the zones are shown in Table 1. Variations in altitude and latitude have give rise to a wide range of climate, soil and vegetation types.

Malawi therefore has diverse topographical features: very low lying areas in the Lower Shire Basin to High hilly areas in the Northern region and parts of the Southern and Central region. The low-lying areas support cotton production while the hilly areas support production of coffee and tea.

Malawi has a wide diversity of vegetation largely due to physiography, climate and edaphic factors. The major types of biotic communities of Malawi are Montane evergreen forest/grassland, Closed canopy woodlands (tall *Brachystegia/Jubernadia/Isoberlina*), Mopane woodland, Sand dune vegetation, Grasslands (seasonally perennially wet/swamp), Lakes (fresh/ saline lakes water) and Islands.

Soil is a critical resource for Malawi whose economy is mainly agricultural based. However, it is estimated that soil is eroding at an alarming rate of 20t/ha/yr mainly due to deforestation and poor land resources management. This results in sedimentation of rivers, which leads to increased incidents of flooding and filling of dams. Sedimentation has also been associated with declining capacity of hydro electricity generation on Shire River. Malawi has four main classes of soils, Latosols, Lithosols, Calcimorphic soil and Hydromorphic soils. Most of the soils in the rift valley are alluvial, rich in soil nutrients and ideal for agriculture.

The major sources of water are natural rainfall, rivers, streams, lakes, groundwater and artificially impounded water such as dams, dugouts and reservoirs. Naturally, rainfall is the single source of water that feeds all the other sources. Lake Malawi is the largest reservoir of water in Malawi and it is harnessed in the production of electricity along the Shire River, which is the major outlet of the lake. The other extensive water bodies are Lake Chilwa, Lake Chiuta and Lake Malombe. Malawi depends on the water resources for various purposes such as domestic use, industrial development, hydropower generation and irrigation. Lake Malawi and the Shire River also serve as cheap means of transport.

2.1.2 Political and economic profile

For thirty years (from independence in 1964 to 1994) Malawi had one party political system, which governed the country. The multi-party democratic government was introduced in 1994. The Head of Government is the President, elected into office by majority popular vote, with a maximum of two consecutive 5-year terms. The National Assembly is made of parliamentarians from various parties elected from constituencies distributed throughout the country. Malawi has adopted a decentralized political and administrative structure to district, town, municipal and city assembly levels. The Local Government Act (1997?) provides for creation of committees at Area, Ward or Village level to facilitate participation of the people in the assembly's decision making in all matters including environment and natural resources management. The Judiciary is responsible for the administration of justice in the country.

The United Nations (UN) classifies Malawi as one of the least developed countries with one of the lowest Human Development Index values (HDI) in the world. Malawi's Human Development Index ranking out of 174 countries was at 163 in the year 2002 with HDI value of

0.400. The estimated Gross Domestic Product (GDP) per capita was US$182 in 1999 (the lowest in the 14-member SADC grouping). The percentage of people living below the poverty line was 65% in 1998 while 29% were in absolute poverty. A significant proportion of the population is engaged exclusively in subsistence farming, 60 % of which in the 2001/2 season were food insecure. Female-headed households shoulder a greater burden of poverty. Low per capita land availability accounts for low income, declining welfare and food insecurity. The majority of smallholder farmers have less than 1 ha of land. This is exacerbated by rapid environmental degradation, limited affordable appropriate technology options, inadequate knowledge and skills in productive use of land and natural resources, inadequate access to land, poor health status including HIV/AIDS, rapid population growth and gender inequalities.

The economic growth of Malawi declined from 7% in 1980 to an average of between 2 and 4% per year during 1997-2000 period. This is largely a result of drought in 1992, high population growth, rising inflation and dependency on external financing. This resulted in 43% of smallholder households not having enough income to meet their basic needs and 30% having insufficient food to satisfy their calorific needs. Smallholder agriculture contributes 80% of total food production, 10% of exports, 90% of employment and 25% of the GDP. To increase agricultural productivity, the Malawi Government implemented the starter pack scheme in 1998/99 growing season with financial support from World Bank. This facility targeted 1.8 million registered poor people and resulted in 800,000 metric tonnes surplus of maize.

The contribution of industry to GDP dropped from 16% in 1995 to 12% in 1999 partly due to closing down of industries. There are 392 registered small and medium scale industries scattered within Blantyre, Lilongwe and Mzuzu. The rate of growth of industry has declined from 39 new companies registered/ per year in 1990 to only 8/per year in 1999.

In May 2002, Government of Malawi launched a Poverty Reduction Strategy (MPRS) and the National Economic Growth Strategy for poverty reduction through socio-economic and political empowerment of the poor. The PRSP was developed through wide participation of a broad range of stakeholders at national and district levels. The PRSP is the overarching strategy that will form the basis of all future activities by all stakeholders, including Government. The overall goal of the PRSP is to achieve sustainable poverty reduction through empowerment of the poor through prioritization and action. This is presently being implemented proactively through the Pro-poor Growth Strategy.

Malawi has signed and is committed to the NEPAD whose goals are to accelerate growth and sustainable development, eradicate widespread and severe poverty and to halt the marginalization of Africa in globalization process. The principles of NEPAD include sustainable utilization of natural resources and environment. These efforts are consistent with G8-African Administration Plan and the millennium goals.

Malawi participated in the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa from 26 August to 4 September 2002 and presented a report on sustainable development. The Summit broadened and strengthened the understanding of sustainable development particularly the important linkages between poverty, the environment and the utilization of natural resources. An NSSD Technical Committee has been established to

provide political support and direction on all matters related to the NSSD and the National Council for the Environment (NCE) is the technical oversight body, responsible for monitoring the implementation of the WSSD recommendations.

2.1.2.1 Education

Since 1995, the Government has increased budget allocation to the education sector consistent with the Free Primary Education Policy, which was introduced as a way of curbing illiteracy in the country. The free primary education programme has resulted in increased enrollment in schools. Education is known to lower fertility rates, improves agricultural productivity, health and nutrition and increases earning power. Increased access to education and improved quality of education will be key components of the poverty reduction and growth strategy. Government aims to attain 90 - 95 percent enrolment and retention rates each year. To achieve this, Government is fostering partnership with the private sector in order to maintain access and improve quality of education by providing the necessary infrastructure, equipment, teaching and learning materials and qualified teachers. Implementing a curriculum that addresses both academic and nonacademic needs of students is an important priority.

At secondary education level, Government continues to create a secondary school system that increases access to 25 percent. Improving the quality of Community Day Secondary Schools by enhancing teaching quality and rationalizing allocation of resources within the secondary school system is a priority.

Tertiary education continues to provide for middle and high-level manpower requirements for the management of the economy. There is an urgent need to expand access to tertiary education through expanding distance education mode and encouraging private sector investment.

2.1.2.2 Health

Health status of the Malawian population is below World Heath Organization standards. Life expectancy has fallen from 43.5 years in 1995 to 39.5 years in 1999. Infant mortality was at 131.1 per 1,000 live births in 1999; under-five mortality was 227 per 1,000 and maternal mortality 620 per 100,000 live births. The major health problems include malnutrition, diarrhea diseases, acute respiratory infections, high levels of maternal, infant and child mortality, HIV/AIDS and an increase in the number of cases of tuberculosis. Poverty contributes to these poor health statistics, while the poor health status of the population undermines prospects for growth and poverty reduction. Investing in basic health care is, therefore, a crucial component of the growth strategy. The overall policy goal of the health sector is to raise the level of the health status of all Malawians by reducing the incidence of disease and occurrence of death. Government has therefore put in place a number of policy measures, which will have a significant impact on the health status of the Malawi population. For example, the Essential Health Package (EHP) promotes preventative and curative health services. Government also recently developed a policy for human resources development in light of the critical human resource constraints in the health sector exacerbated by HIV/AIDs, which is now being addressed.

HIV/AIDS continues to have a devastating impact on the economy and thus threatens to undermine prospects for growth and poverty reduction. Malawi's HIV/AIDS statistics are among the worst in the Africa Region and the World. Sero-prevalence rates are estimated at 25.3 percent in urban areas, 21 percent in semi-urban areas and 11 percent in rural areas. HIV/AIDS is reducing life expectancy making it a major catastrophe in world history. AIDS is targeting the most productive and active members of society thus causing a devastating impact on development. Child mortality is rising and research suggests that by 2010, infant mortality will be 60 percent higher than it would be without HIV/AIDS. This continues to increase the dependency ratio and deprives society of skilled professionals. Children are being orphaned in huge numbers and care for orphans often falls on extended families, stretching the capacity of these social safety nets. HIV/AIDs has reduced national income since illness and death have a major impact on national productivity and savings. Labour productivity has also dropped and the benefits of education have been lost. Malawi Government therefore launched the National Response to HIV/AIDS in October 1999 and the Strategic Framework for HIV/AIDS in January 2000 to address these pressing issues. The multi-sectoral Strategic Framework for HIV/AIDS is now being implemented with full participation of communities.

2.1.2.3 Decentralized Environmental Management

Malawi has currently undertaken a devolution process following approval of the National Decentralization Policy by Cabinet in 1998. The Environmental Affairs Department (EAD) has been instrumental in developing a Decentralized Environmental Management (DEM) strategy devolving Environmental Natural Resource Management (ENRM) to local authorities in line with Vision 2020, the PRSP and the Local Government Act. This is supported by the Community Based Natural Resources Management (CBNRM) strategy that empowers communities in sustainable natural resource management and is consistent with the National Land Resources Management Policy and Strategy (2000). The strategy has put in place a framework plan of action and mechanisms to sustain funding of district communities, the skills of which should be improved to mobilize funds. Malawi is now preparing mechanisms to establish an Environment Fund to support sustainable development initiatives at district and local levels. This Fund will eventually be established as the mechanism for conditional grants for the District Environmental Action Plans (DEAPs) and for inter-governmental fiscal transfers to the District Development Funds (DDF). In addition, Malawi’s Environment Endowment Trust (MEET) and Mulanje Mountain Conservation Trust (MMCT) have been established as funding agencies for environmental micro-projects.

Principles of community participation and involvement in sustainable development initiatives have been integrated in State of the Environment Reporting and the preparation of the DEAPs. The Forestry Policy of 1996 and the Act of 1997 as well as the National Forestry Program of 2000 seek to empower CBNRM through community management plans and private sector involvement in forest plantation. These have incorporated capacity building initiatives to enhance sustainable natural resources and environmental management. NGO Strategy on Decentralised Environmental Management outlines how ENRM/NGOs in Malawi plan to get involved in CBNRM through decentralization. It includes such elements as institution building, involvement of NGOs in mobilizing communities to prepare SOERs and DEAPs. The DANIDA Environment Support programme (DESP), UNDP, and Environment and Natural Resources

Management Project (ENRMP) have significantly enhanced the ability of 27 Assemblies to implement decentralized environmental management.

2.1.3 Profiles of economic sectors

2.1.3.1 Agricultural Sector

Malawi's economy depends on agricultural crops and natural resources such as maize, tobacco, tea and sugar as well as fisheries, accounting for approximately 40% of GDP and 90% of export earnings (65% alone from the tobacco industry). This dependence on natural resources underscores the critical importance of environmental management to ensure sustainable development. Agriculture continues to provide 60-70% of the inputs to the manufacturing sector and dominates the commercial and distribution industry. Of the 9.4 million ha land, 5.6 million is arable while infrastructure, forests, mountains and parks constitute the rest. The rate of urbanization was about 13% in 1992, which was the lowest in the SADC region. Tanzania, Mozambique and Botswana have 22%, 30% and 27% urbanization, respectively. The mean land holding for agriculture is below 1 ha for a family of five in the rural areas. The majority of the rural households live below the poverty threshold of US$1 per day. Eighty-five percent of Malawi's population derives their livelihood from agriculture and the sector accounts for over 30 percent of GDP and close to 70 percent of export earnings. Consequently, the Government's overall policy objective in the agricultural sector is to improve the well being of Malawians through growth and poverty reduction. Government is committed to:

(i) Intensifying its efforts to tackle long-term structural constraints facing the agriculture sector and the farming community in particular;
(ii) Embarking on a number of programmes aimed at complimenting policy reform by cushioning the effects of market liberalization on poor households. This includes the targeted Starter Pack Programme; and
(iii) Increasing agricultural productivity and to enhance food security on a sustainable basis. Soil conservation, promoting soil fertility and strengthening environmental conservation are thus the key to this end.

Important strategic objectives include improving household level food security and the nutritional status of the population, expanding and diversifying crop and livestock production and exports. More recently, there is a policy shift to exploiting the national irrigation potential and implement irrigation schemes, which focus on environmental and financial sustainability. Promoting the participation of the large scale sector in terms of national food security as well as a source of economic growth and intersectoral linkages through water utilization and commercialization of agriculture remains a priority. These efforts are expected to add value to national export diversification initiatives and thus reduce over-dependence on tobacco as a source of export revenue. Important crops in this strategy include cotton, groundnuts, pulses and non-traditional exports including paprika, cut flowers and horticulture.

2.1.3.2 Natural Resources and Environment

The majority of Malawi's population relies heavily on capital derived from natural resources, including forestry and fisheries. The management of these Malawi's natural resources is critical to the achieving sustainable economic growth and poverty reduction. Government has thus become increasingly concerned about the deterioration and the associated loss of natural resources. Current initiatives in this area include promoting sustainable use and management of natural resources, facilitating restoration and maintenance of essential ecosystems and ecological processes. The Government will also focus on enhancing awareness on the importance of sound environmental management, promoting co-operation between Government, local communities, NGOs, the private sector and other stakeholders in sustainable use and management of the natural resources and environment.

This sector is an important source of employment, rural income, food security and import substitution. The fisheries sector has a significant economic and nutritional role to Malawi's population, currently estimated at about 12 million people. In Malawi fisheries resources are sources of livelihood to an estimated 300,000 people in terms of small-scale fisheries, 95% of the fish catch is achieved through traditional means providing about 70% of animal protein to the country. Fisheries habitat is currently being threatened by water hyacinth (*Eichhornia crassipes*), which is now found in 11 out of 28 Districts of the country resulting in destruction of fish breeding habitats. The fisheries sector contributes 4% towards the GDP. Forested land has declined from 47% in 1975 to 28% in 2002, with rate of deforestation the highest in the SADC region at currently 1.6% per annum. This has been attributed to over-dependence on fuel wood for energy and agriculture expansion. Only 4% of the population in Malawi has access to electricity compared to the SADC average of 20%.

After the Rio Conference, Malawi launched the National Environmental Action Plan (NEAP) in 1994 that was developed through consultations at all levels. The NEAP is seen as Malawi's operational tool for implementation of Agenda 21. The NEAP identified nine priority environmental issues: high soil erosion, soil fertility loss, deforestation, over-fishing, loss of biodiversity, water resource degradation and depletion, human habitat degradation, air pollution and climate change. Capacity building at all levels was identified as a crosscutting issue needing immediate attention. In 1998, the first State of the Environment Report (SOER) was published illustrating the current status of natural resources and progress made towards the NEAP. This assessment is repeated annually and, in addition, 23 District Environmental Action Plans (DEAPs) have already been produced. The country has now revised and developed the second NEAP 2002, which has incorporated recommendations from the WSSD.

The National Environment Policy (1996), developed from the NEAP, established the central principles of environment and natural resource management policy. The Environment Support Programme (1998) also grew out of the NEAP and was established to integrate environmental concerns into the socio-economic development of Malawi. These national efforts will address commitments and obligations to the Stockholm Convention, Rotterdam Convention, Basel Convention and the Montreal Protocol and participates in a number of international debates on the environment. The national decentralization programme will facilitate implementation at local and ground levels.

2.1.3.3 Private Sector Participation And Development

Government recognizes and acknowledges the role of the private sector as the engine of growth of the economy. Presently, several constraints hinder the development of the private sector. These include weak structure of the private sector, non-competitive environment, dependence on a narrow product base, macro-economic instability, a small domestic market, low productivity, legal and regulatory constraints, and problems in terms of access to infrastructure. Consequently, Government has put in place new policies, legislation and institutions to support private sector development. The new policies include the Integrated Trade and Industry Policy, Small and Medium Scale Enterprises Policy, the Co-operatives Society Act and the Competition and Fair Trading Act. Important private sector development strategies include the Privatization Programme designed to foster increased efficiency in the economy, increase competition and reduce monopoly, and promote participation by the Malawi public in enterprises and raise revenue for Government. Further policies include investment promotion, industrial technology promotion and improvement of the quality of economic infrastructure and effective collaboration with the private sector in trade and industry matters. To attract foreign investment, Malawi has created conducive environment to attract private foreign investment by promoting macroeconomic stability and improving access to and the quality of local infrastructure. The Malawi Government is now implementing the pro-poor economic growth strategy, which aims to improve the socioeconomic status and livelihoods of the rural communities. The local communities are provided with skills and support services to participate in development efforts. Specific programmes include diversification of livelihood and income generation activities.

2.1.3.4 Economic diversification

The mining sector in Malawi generally contributes about 3 percent to total GDP and therefore the sector can play a significant role in promoting economic growth and diversification. Reviewing the legal framework to improve competitiveness with the sector to promote private sector investment is underway. Government is further promoting the exportation, exploitation and processing of minerals to enhance exports and imports substitution through private sector development.

Tourism has potential to increase significantly its contribution to the economy. This is being supported to compliment the tobacco sector which ahs not faired well in recent years. Investing and attracting visitors and tourists to the country with striking natural beauties such as the lake, mountains and national parks constitutes an important strategy. Tourism is expected to be an engine of growth, capable of dynamizing and rejuvenating other sectors of the economy. It promises to significantly increase the country's foreign exchange earnings and providing employment.

Presently, the performance of the tourism sector is negatively affected by inadequate and poor infrastructure, lack of clear investment incentives and problems in accessing finance due to high interest rates. Government is thus committed to improving economic infrastructure that will promote private sector development and economic diversification. Tourism therefore has potential for growth and economic diversification, provided the transport infrastructure is improved and maintained to satisfactory levels. Government has thus implemented the Road

Maintenance Initiative aimed at improving the quality of existing road infrastructure and addressing the maintenance backlog. The National Roads Authority (NRA), which is an autonomous entity, is partially financed by a fuel levy that ensures financial sustainability. To expand the transport networks, Government is also exploring options to upgrade the Nacala Corridor and the Shire –Zambezi River corridor to promote export competitiveness and reducing import costs. In telecommunications, Government has established an independent Malawi Communications Regulatory Authority (MACRA) to regulate telecommunications, posts, broadcasting and radio. Government is fairing very well in attracting private sector investment in telecommunications.

In the power sector, ESCOM, which is not financially viable, has increasingly proved unable to provide reliable and efficient power supplies resulting in losses for industry. Government has consequently strengthened the management and financial viability of ESCOM and to promote private sector investment in generation, transmission and distribution of power. The Energy Act (2004) provides a viable framework for the energy sector improvement supportive of industrialization

2.1.3.5 Decentralization and Poverty Reduction

To increase community participation in development endeavors, Malawi had embarked on decentralization process in order that political and administrative authority is placed at the district level. The key objectives of the policy include creating a democratic environment and institutions that will promote good governance, development and community participation. This policy seeks to eliminate dual administration existing at district level by establishing one unified structure, the District Assembly. This is expected to achieve cost effectiveness and efficiency in service delivery, promoting accountability and transparency and thus assisting government to reduce people's poverty. The Local Government Act aims to achieve all these aspirations. The development of the requisite infrastructure for community-based agro-industry would therefore contribute significantly to the attainment of food security and enhancement of the incomes and livelihoods of rural households.

2.2 Institutional, policy and regulatory framework

Malawi has taken on a responsibility in its constitution to "manage the environment responsibly, prevent degradation, provide a healthy life for all, protect the rights of future generations and conserve and enhance biological diversity." The Environment Management Act (EMA, 1996) is the instrument through which it is implemented. It provides for the creation of regulations on all aspects of environmental management. Besides this, a number of acts in sectors such as forestry, fisheries, water, etc., have been passed. In 2002, sector-specific EIA guidelines, environmental management systems and audit guidelines in irrigation, drainage, waste management, sanitation, and mining were developed. However, there is inadequate/weak enforcement of these legislations.

2.2.1 Environmental policy, sustainable development policy and general legislative framework

Following nationwide consultations, network activities and national workshops, Malawi, in 1998, came up with the following Vision Statement: *By the Year 2020, Malawi as a God-fearing nation will be secure, democratically mature, environmentally sustainable, self reliant with equal opportunities for and active participation by all, having social services, vibrant cultural and religious values and being a technologically driven middle-income country*. To accomplish this vision, Malawi has put in place strategies to successfully achieve good governance. These are sustainable economic growth and development, vibrant culture, well developed economic infrastructure, food security and nutrition, science and technology-led development, social sector development, fair and equitable distribution of income and wealth, and sustainable environmental management.

This NEAP, which was developed in 1994, has the ultimate aim of gearing Malawi's environmental policy towards improving the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. The policy, specifically, seeks to:

a) Maintain the ecosystems and ecological processes essential for the functioning of the biosphere;
b) Ensure sound management of natural resources and the environment; adequately protect humans, animals and plants, their biological communities and habitats against harmful impacts and destructive practices, and preserve biological diversity;
c) Guide development in accordance with quality requirements to prevent, reduce, and as far as possible, eliminate pollution and nuisances;
d) Integrate environmental considerations in sectoral, structural and socio-economic planning at the national, regional, district and grass roots levels; and
e) Seek common solutions to transboundary environmental problems.

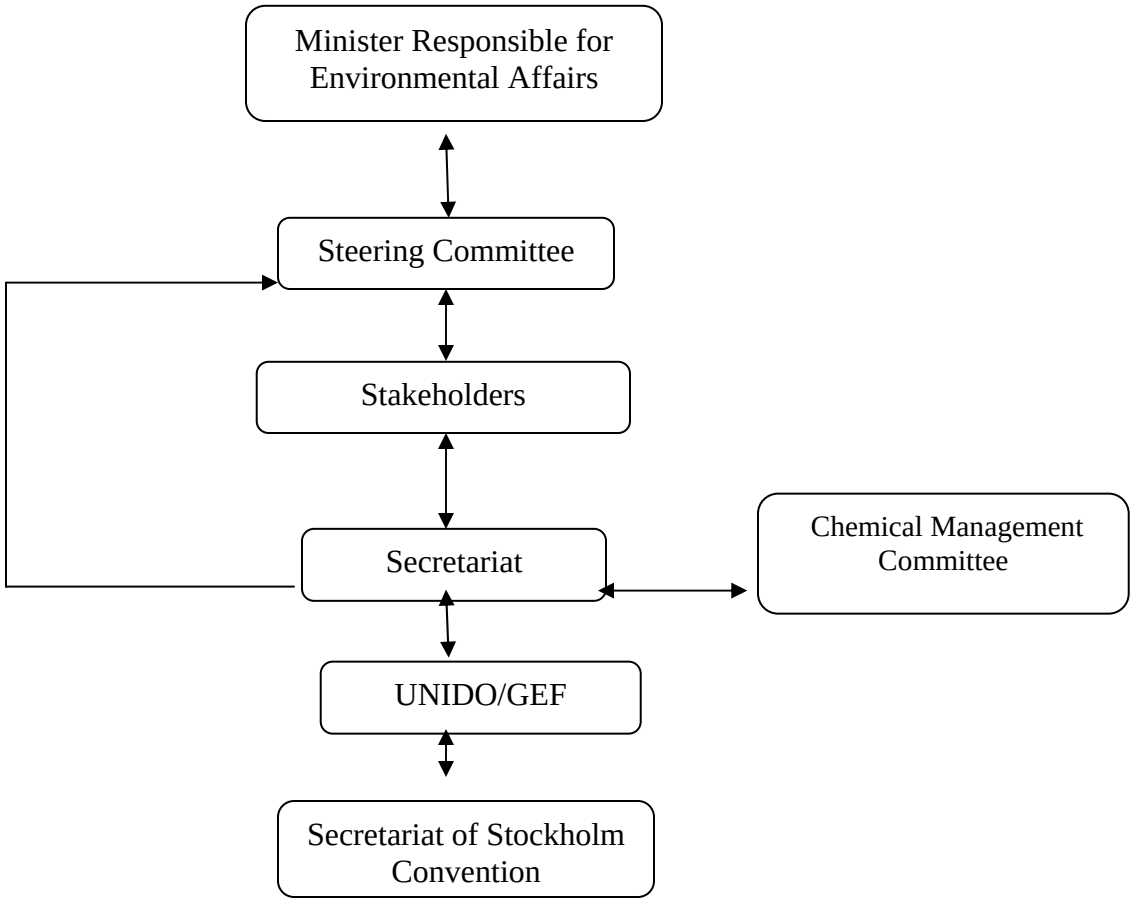
Since the Rio Summit in 1992, Malawi has initiated a number of institutional reforms, policies and programs to address environmental degradation and ensure sustainable utilization of the environment and natural resources. The Ministry of Mines, Natural Resources and Environment has 6 departments: Environmental Affairs, Fisheries, Forestry, Energy, Geological Surveys and Mining. The Ministry recently reviewed its performance and direction resulting in the production of a Strategic Plan for the 2002-2006. The Environmental Affairs Department (EAD), established in 1994, is charged with promoting sustainable use and management of environment and natural resources, strengthening the legal and institutional framework, as well as coordinating and assisting line Ministries and other stakeholders to integrate environmental issues into national socio-economic policies and programs. Presently there are 27 environmental offices, one in each district except Neno, serviced by an Environment District Officer (EDO) who is the link-pin to mainstreaming ENRM in the Assembly.

To ensure efficient and effective implementation, the Environment Management Act has established the National Council for the Environment (NCE), comprising Principal Secretaries in various development sectors, and its technical arm, the Technical Committee on the Environment (TCE), comprising of ENRM Sector Specialists. A Cabinet Committee for Agriculture and Natural Resources was established in 2001 and provides policy and political guidance on matters

of environmental protection and management at cabinet level. A Parliamentary Committee on Agriculture and Natural Resources leads and actively advocates the promotion of environmental programs in Parliament.

Figure 3 gives an out line of an institutional structure or the coordination of persistent organic pollutants activities in Malawi

Fig 3 Institutional structure or the coordination of persistent organic pollutants activities in Malawi



To achieve its mandate, EAD has established a Network of Environmental Focal Points (NEFP) in over 100 relevant Government institutions, the private sector and NGOs, which should be strengthened. District Environment Sub-Committees (DESCs) have been established to mainstream ENRM in the district structures and an EIA Inspectorate to monitor EIAs and the implementation of EMA to ensure sustainable development at district level.

2.2.2 Roles and responsibilities of ministries, agencies and other governmental institutions involved in POPs life cycles (from source to disposal, environmental fate and health monitoring)

Several institutions in Malawi are involved in the management of toxic chemicals (Table 2).

Table 2: Roles and Responsibilities of Relevant Institutions Related to Chemicals

Institution	Roles
National Research	Policies development and implementation, planning, coordination and monitoring of policy oriented research.
Ministry of Industry, Science and Technology	Policies development and implementation, planning, coordination and monitoring of policy related to industry, science and technology
Local Government Authorities	Policies implementation and enforcement of laws.
Ministry of Transport and Communication	Policies development and implementation, planning and coordination of transport aspects.
Ministry of Mines, Natural Resources and Environment	Policies development and implementation, Planning and coordination of natural resources and environmental matters.
Ministry of Health	Policies development and implementation, planning and coordination of health and population issues.
Ministry of Trade and Private sector Development	Policies development and implementation, planning and coordination of trade aspects and private sector development
Ministry of Home Affairs	Enforcement of Law and Order
Ministry of Justice & Constitutional Affairs	Development of Legislation
Ministry of Agriculture, Department Agricultural Research Services	Policies development and implementation, planning coordination of agriculture development aspects and Regulation of plant protection substances management.
Ministry of Water Development and Irrigation	Policies development and implementation, planning and coordination of water matters and monitoring of water quality.
National Council for the Environment (NCE)	Advisor on policy and technical matters on environment and environmental monitoring.
Tertiary education and research institutions	Training and research and technical backstopping
ESCOM	Manages electrical equipment some of which contain PCBs and sites that are contaminated with PCBs.
Malawi Bureau of Standards (MBS)	Development of National standards and Quality Control
Pesticides Control Board	Research, control and regulation of plant protection substances.
Media	Information dissemination and public sensitization
Occupational Health Department and Hospitals	Diagnosis of occupational health related diseases and treatment of the same.
Private Sector	Wide participation in investment, importation and sale of toxic substances and also use of these in various industrial processes
NGOs	Creation of awareness, facilitating sharing of experiences and expertise for the planning, design and implementation of environmental programmes at national, regional, district and community levels
Pharmacy, Medicines & Poisons Board	Regulate and classify types of drugs used in Malawi

2.2.2.1 Private Sector/Civil Society and NGO Role in ENRM

NGOs have emerged as major partners in development and conservation activities particularly through enhancing education and raising awareness among the public. NGOs help in designing and implementation of policies, programmes and action plans, and setting out specifications for Environmental Impacts Assessments including advocacy roles through their environmental campaigns.

NGOs in Malawi fall generally into three categories of being religion-based, sector-specific, or having a broad developmental mandate. The latter are often international NGOs based in Malawi or those having local affiliates. The development of Malawian originated NGOs has been a relatively recent phenomenon to an extent that many of them are still in their initial institutional capacity phase and are seeking sustainable niches to merit their existence. Many NGOs are familiar with the project's intended activities as they have been involved in diverse environmental rehabilitation work after the Mozambican refugees returned home in the early 1990's. It is established that these non governmental entities have long been advocates of, and are committed to two important main strategic influences in the sector, one being the Decentralised Environmental Management (DEM) approach and secondly, the Community Based Natural Resource Management (CBNRM) guiding principles. Working with communities as their core clients, NGOs have striven to address the challenge to balance sustainable use of local resources for improved livelihoods with exercising of community responsibility for sound environmental management. It is understood that NGOs will become valuable executing agencies and secondary stakeholders in the implementation of most of the socio-economic development programmes.

The various opportunities for the involvement of NGOs will be determined as sectoral and district governmental capacities to execute management actions and facilitate activities are ascertained. Their role will become valuable at implementation level particularly with regard to building district and community capacity and skills. The NGOs have analyzed their potential role in Decentralised Environmental Management and developed a strategy through the facilitation of the umbrella NGO network, the Coordination Unit for the Rehabilitation for the Environment (CURE).

The NGOs in assisting the government in the process of Decentralised Environmental Management have defined five core strategic areas for focus: capacity building services to strengthen community structures and organizations, technical NRM skills services, the networking of communities to external development agencies, conflict resolution, and assistance to channel resources to fund community activities.

The Government of Malawi has the responsibility of developing environmental codes for the private sector. However, there are weak monitoring mechanisms or incentive packages to ensure compliance with EMA codes of conduct including Environmental Impact Assessments (EIAs).

The Government of Malawi continues to consolidate its co-operation with the private sector and fosters the establishment of venture capital funds for sustainable development projects and programmes. The private sector will be encouraged to support small and medium-scale

entrepreneurs engaged in sustainable development activities. The private sector continues to participate in procurement, marketing and use of various chemical substances for the development of the agriculture and construction sectors. The private sector cooperates with Malawi Government is ensuring sustainable management of the environment.

2.2.2.2 Scientific and Technology Community

Malawi has two Universities comprising a total of six campuses. The country recently restructured the Natural Resources College (NRC) and TEVETA to train artisans/technicians so as to improve the knowledge base in Malawi on sciences and technology. The National Research Council of Malawi (NRCM) has drafted a code of practice for Science and Technology (S&T) and the Department of Agriculture Research Technical Services (DARTS) and the Agricultural Sciences Committee facilitate national research in agriculture in Malawi. The Forest Research Institute of Malawi (FRIM) conducts Forest Research and Malawi Fisheries Research Institute (MAFRI) spearheads research in capture fisheries in Malawian waters.

Each of these institutions has either/or a combination of usage, management or regulatory functions. Their functions are often not coordinated, with some institutions experiencing conflicts in the execution of duties leading to duplication of efforts, gaps in regulation and control of waste resources.

2.2.3 Relevant International Commitments and Obligations On Chemicals for Malawi

Consistent with the Constitution and EMA (1996), Malawi participates in a number of activities under several international conventions and agreements on chemicals management. These include

(i) Stockholm Convention on POPs (2001);
(ii) The Rotterdam Convention on Prior Informed Consent (PIC) Procedure of certain Pesticides and Chemicals in International Trade (1998);
(iii) The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)
(iv) Bamako Convention on the Control of Transboundary Movements of Hazardous Wastes (1991)
(v) FAO International Code of Conduct for the Distribution and Use of Pesticides (as amended in 2003)
(vi) ILO Convention on the Safety of Chemicals at the Workplace (1990)
(vii) The UN Convention on Substances that Deplete the Ozone Layer (Vienna Convention) (1985)
(viii) Montreal Protocol on Substances that Deplete the Ozone Layer (1987)
(ix) London Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer (1990)
(x) UN Chemicals Weapons Convention (1993)
(xi) The provisions of the Rio Declaration on Environment and Development and Agenda 21 (1992).

Specifically, the Malawi NIP therefore addresses its commitments to the Stockholm Convention on POPs (2001).

2.2.4 Description of existing legislation and regulations addressing POPs (manufactured chemicals and unintentionally produced POPs)

Malawi is committed to addressing its commitment to "take appropriate measures, irrespective of the existing levels of environmental pollution and extent of degradation, to control pollution and the importation and use of potentially toxic chemicals and substances". To this end, the various gaps isolated in the POPs inventories require addressing in the immediate and medium terms (Table 3).

The inventory on POPs legislation established that there is no specific legislation on POPs in Malawi. However, a number of regulatory frameworks have been put in place that govern the import, export, use and monitoring of pesticides and other chemicals including POPs in the country.

The inventory further showed that quite a number of sectoral legislation regulates specific areas of chemicals management in the country. For instance, the Ministry of Commerce and Industry implements the Malawi Bureau of Standards Act (1987) through the Malawi Bureau of Standards. The Environment Management Act (1996) has provisions for pollution control and regulation of wastes. The Ministry of Agriculture, (MoA) is responsible for the implementation of the Pesticides Act (2000) and its regulations. This act constitutes and manages the importation, exportation, manufacture, distribution, storage, disposal, sales, repackaging and use of all pesticides in Malawi through the Pesticides Control Board. The Fisheries Conservation and Management Act (1997) provides for mandatory monitoring and control of pollution of various water bodies from toxic chemicals/substances including POPs. The Act provides for penalties for both pollution and failure to remove pollutants. The Industrial Licensing Act (1991) provides for licencing of industries involved (i) the manufacture of fire arms, ammunition and chemical and biological weapons, (ii) the manufacture of explosives, (iii) the processing of hazardous waste and (iv) the manufacture of products which use radioactive material. The Electricity Supply Corporation of Malawi (ESCOM), which is the major consumer of PCBs in Malawi, is a member of the Power Institute of East and Southern Africa (PIESA). There is no specific legislation that regulates the management of PCBs in Malawi but as a member of the PIESA, which has produced PCB Guidelines, ESCOM is expected to follow the PIESA guidelines in its operations. The Occupational Safety, Health and Welfare Act (1997) has provisions for the safety and welfare of employees handling hazardous substances. The Business () needs to include management of businesses involved in the marketing of toxic substances wincludeing POPs

Table 3: Gaps and deficiencies in institutional and legal framework for POPs

Convention requirements	Inventory findings	Gaps and deficiencies
Article 3: Measures to reduce or eliminate releases from intentional production and use		
Take legal or administrative measures	Pesticides Act (2000) Environment Management Act (1996) Public Health Act (1947) Pharmacy, Poisons and Medicines Act (1987) These Acts do not address issues of elimination of Annex A chemicals	The Acts do not address issues of elimination of Annex A chemicals Lack of legal provision to restrict production and use of DDT for public health Acts do not address specifically issues of POPs
Restrict production and use of Annex B chemicals	Pesticides Act (2000) requires that DDT is not utilized for agricultural use	There is no legal provision consolidating the banned use of DDT
Article 5: measures to reduce or eliminate releases from unintentional production		
Take measures to reduce or eliminate releases from anthropogenic sources of Annex C chemicals	These Acts deal with the issues of emission in general terms	Issues of dioxins and furans are not addressed'
Develop an action plan or where appropriate a regional or sub regional action plan and implement it.	There is no management practices known There is lack of capacity and experience to monitor releases of PCCD and PCDF PCCD and PCDF are not covered in the existing legislation	Inadequacies in the existing policies and laws No coordination mechanisms and institutional arrangement Lack of awareness
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes		
Article 6 (1) (e): Develop strategies for identifying sites contaminated by POPs and ensure remediation of those sites is performed in an environmentally sound manner	Several sites contaminated with POPs were identified. Several sites contaminated with POPs were identified	Inadequate capacity in terms of specialized skills, remediation technology and financial resources
	No monitoring or environmentally sound management of such sites. Improper management of stockpiles and wastes, leaking equipment or packaging are major causes of contamination by PCBs, POPs Pesticides and DDT. Some potential sites likely to be contaminated with PCDD/PCDF were identified. Lack of legal provision for management of sites contaminated with PCDD/PCDF Lack of schemes for monitoring and control of releases of all POPs Lack of sound disposal facilities	Inadequate legal provisions on management of POPs Pesticides contamination

Convention requirements	Inventory findings	Gaps and deficiencies
	No registration/registry of contaminated sites Lack of contingency plan to address spillage of POPs	
Stockpile quantity and identity	Inventory identified 17.4 MT of obsolete stocks of POPs Pesticides identified (Aldrin, Dieldrin and Toxaphene were among identified POPs Pesticides) Leaking of POPs Pesticides into the environment	The Pharmacy Drugs and Poisons Act (1967) does not provide for the identification and quantification of stockpiles Improper handling and storage Lack of appropriate disposal facilities and skilled personnel Continuous leak and spills of POPs Pesticides into the environment
Article 6(1)(c): Sound management of stockpiles and wastes	Unsafe disposal of obsolete POPs Pesticides Poor storage of empty containers	Difficulties in enforcement of relevant legislation, particularly requirement to dispose waste after approval from authorities Weak institutional capacity to manage contaminated sites
Article 10: Public Information, awareness and education		
Promote and facilitate awareness amongst scientists, educators, technical and managerial personnel Development and exchange of education and public awareness material Development and implementation of training programme	There is inadequate capacity and experience to manage and monitor releases of POPs There is limited knowledge on POPs	Most training institutions have limited capacity in training issues of POPs The existing legislation do not address issues of awareness raising
Ensure availability and accessibility of all available information to the public	Provision of public information is not mandatory No adequate national data and information on POPs for dissemination to public	The relevant policies and legislation do not provide for availability and accessibility of public information on POPs
Collection and dissemination of information on estimates of the annual quantities	Existing dissemination pathways lack focus on POPs There is no comprehensive national technical information on POPs	Lack of information base Weak institutional capacity
	Lack of awareness on hazards of POPs	Scanty existing awareness raising programmes Lack of information centers
Article 11: **Research development and monitoring**	Lack of research on the extent of contamination No monitoring or control of POPs releases	Weak institutional capacity in research and monitoring of POPs Lack of monitoring of POPs releases schemes. Lack of POPs related health-monitoring schemes.

2.2.5 Key approaches and procedures for POPs chemical and pesticide management including enforcement and monitoring requirements

In Malawi there is no specific legislation on POPs. However, under the Fundamental Principles in the Constitution of Malawi, Malawians are given the responsibility to manage the environment responsibly in order to prevent degradation of the environment for a healthy living and working environment for the people of Malawi. Several regulatory frameworks governing the regulation, approval, monitoring, import and export of chemicals in the country include those legislations from the Ministries of Mines, Natural Resources and Environment, Health and Population, Local Government (City/Town/District Assemblies), Labour and Vocational Training, Commerce and Industry, Malawi Bureau of Standards, Pesticides Control Board and Malawi Revenue Authority.

The Environment Management Act (EMA), (1996). The Act contains provisions for pollution control and regulation of waste. Specifically,

(i) Section 42 of EMA places the responsibility of preventing discharge or emission of any pollutant into the environment on the polluter, including the removal or disposal of any pollutant. Until now no specific regulations have been developed for monitoring POPs and no standards exist for POPs

(ii) Section 38 of EMA regulates the handling, storage, transportation and classification of wastes. Under this Provision, no person shall store, transport, classify or destroy waste other than domestic waste, or operate a waste disposal site or plant, or generate waste except in accordance with a license issued under this section.

(iii) Section 39 of EMA regulates the importation and exportation of hazardous waste. Under this Provision, no person shall import or export any hazardous waste or substance, except under a permit issued by the Minister subject to such conditions as the Minister may determine. It is also required that a written confirmation from an appropriate authority of the receiving country that the hazardous waste or substance may be exported to that country is provided to the Minister. Section 39 incorporates the Basel and Bamako Conventions including the Prior Informed Consent Convention.

(iv) Section 40 of the EMA deals with classifying of pesticides and hazardous substances including labeling, packaging, manufacture, importation and exportation, distribution, registration, storage, handling, monitoring and transportation. The need to expand the chemical profile to include POPs is thus a priority.

Section 40 of the EMA is therefore the most pertinent legal provision for regulation of POPs, while Section 39 deals with issues of importation and exportation of hazardous waste or substance and takes into account the Basel and Bamako Conventions including the Prior Informed Consent Convention.

The Environmental Affairs Department as the Focal Point of the Stockholm Convention in Malawi is responsible, as stipulated in Article 4 of the Stockholm Convention, for registration of one or more types of specific exemptions listed in Annex A or Annex B. Thus Malawi through the EAD can register for, or

withdraw from, specific exemptions with respect to a particular chemical. Malawi has only done this through SADC. EAD is also required to facilitate or undertake the exchange of information relevant to the reduction or elimination of the production, use and release of POPs and also alternatives to POPs, including information relating to their risks as well as to their economic and social costs as indicated in Article 9, Paragraph 1 (a) and (b), and Paragraph 3 of the Stockholm Convention. EAD consequently developed a draft Sanitation and Waste Management Regulations of 1998 to cover sorting out and disposal of waste including trans-boundary movement. The second schedule of the same regulations, under item H12, cover wastes or substances which when released, present or may present immediate or delayed adverse impacts to the environment by bio-accumulation and or toxic effects upon biotic systems, and which can be used to cover PCBs. The provisions of this regulation satisfy Paragraph 1(d) of Article 6 of the Stockholm Convention: Parties are required to take appropriate measures so that obsolete chemicals referred to as waste, are handled, collected, transported and sorted in an environmentally sound manner, and are disposed of in such a way that the POPs content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of POPs.

Malawi Bureau of Standards Act (1987). The Act is implemented by the Ministry of Commerce and Industry (Chapter 51:02 of the Laws of Malawi) through the Malawi Bureau of Standards**,** whose objectives include to provide for the testing of locally manufactured or imported commodities with a view to determining whether such commodities comply with the provisions of this Act, the Merchandise Marks Act or any other law relating to standards of quality. Thus, the Bureau inspects, tests and certifies imports and exports of all commodities including POPs substances. Further MBS under Section 20 of the MBS Act may by General Notice publish in the Gazette, declare any specification or code of practice framed, developed or prepared by the Bureau to be a Malawi Standard and shall in like manner give notice of any replacement or abolition of a Malawi Standard so declared. The Malawi Bureau of Standards has therefore the duty and obligation to assist in the preparation and framing of any specifications or codes of practice required by it, and in response to paragraph 1 (i) of Article 3 of the Stockholm Convention and also to develop standards that will prohibit production and use of chemicals listed in Annex A and B of the Convention.

Pesticides Act (2000). The Act under the Ministry of Agriculture (MOA) is responsible for the implementation of the Pesticides Act (Chapter 35:05 of the Laws of Malawi) and its Regulations. This Act through the Pesticides Control Board provides for the importation, exportation, manufacture, distribution, storage, disposal, sales, repackaging and use of all pesticides in Malawi. Section 17 of the Pesticides Act stipulates that subject to subsection (2); no person shall import, manufacture or sell a pesticide, which has not been registered under this Act. It further stipulates that an unregistered pesticide may be imported under an import permit issued under Section 20 for the purpose of analysis, registration or research, or under a pest emergency permit issued under Section 52; and manufactured for export in accordance with a license to manufacture issued under Section 24.

This means that only those pesticides that are registered under this Act can be imported or sold without a permit. Article 3, Paragraph 1(a) (ii) of the Stockholm Convention stipulates that each Party shall prohibit and / or take the legal and administrative measures necessary to eliminate its import and export of the POPs pesticides and PCBs in accordance with the provisions of Article 3 Paragraph 2 of the Stockholm Convention.

Section 34 of the Pesticides Act which is in agreement with the Occupational, Safety, Health and Welfare Act, places the responsibility for the safety, health and welfare of their employees including providing and requiring the employees to use facilities, equipment and clothing conducive to the safe handling of pesticides (including POPs) under the employers.

Section 37 of the Pesticides Act prohibits the disposal of any pesticides container or packaging in a manner that is unduly hazardous to human or animal health or the environment or that is contrary to any written law.

Section 38 of the Pesticides Act stipulates that the Board may by notification in the Gazette designate any duly qualified person to be an inspector for the purposes of this Act. Duties and powers of the inspector are outlined in Section 39 of the Act, and these include periodic inspections and monitoring of establishments, which manufacture, import, export, store, sell, distribute or use pesticides to determine whether the provisions of this Act are being complied with.

Section 44 of the Act penalizes any person who imports, manufactures, stores for sale, sells or advertises an unregistered pesticide contrary to Section 17; manufactures, exports, distributes, stores for sale or sells a pesticide contrary to section 23, 28 or 29 of the Act; carries on the business of a commercial pesticide applicator with a license contrary to Section 26, with a fine, and states that such person is liable to imprisonment for up to 3 years.

Section 48 of the Act mandates the Board, where it believes on reasonable grounds that the Act or any regulations made under the Act have been contravened, to close any premises or seize any pesticides, equipment, instrument or any other thing.

Section 53 of the Act mandates the Minister responsible, on the advice of the Board, to make regulations for carrying out or giving effect to this Act, without prejudice to the generality of this provision, including regulations of environmentally sound disposal of pesticides and their containers.

The Pesticides Control Board carries out public awareness programmes through the media (radio), seminars and workshops, meetings in collaboration with other Ministries and Departments. However, high costs associated with raising awareness through the said channels compromise the extent of awareness raised to the public on dangers of misuse and mismanagement of pesticides.

Although, the Pesticides Act contributes to addressing Article 3 (3) of the Stockholm Convention, which states that, “Each Party shall take measures to regulate with the aim of preventing the production and use of new pesticides, which exhibit the characteristics of persistent organic pollutants,” private agencies and individuals continue import the pesticides without the knowledge of the Board.

Important regulatory frameworks containing provisions for management of pesticides include the Pharmacy, Medicines and Poisons Act of 1996 (Chapter 35:01 of the Laws of Malawi) implemented by the Ministry of Health and Population which describes pesticides as drugs; the Plant Protection Act of 1957 (Chapter 64:01) implemented by the Ministry of Agriculture, Irrigation and Food Security in which fumigants are regulated; the Seeds Act of 1996 (Chapter 67:02) which regulates seed treatment with pesticides; The Occupational Safety, Health and Welfare Act (1997) under the Ministry of Labour and Vocational Training which deals with the safety and welfare of employees handling hazardous

substances the Ministry of Commerce and Industry through the Department of Customs and Excise of the Ministry of Finance responsible for the clearing of imports and exports of all commodities including POPs substances; and the Decentralization Act (2002) which empowers local authorities, City, Town and District Assemblies, to appropriate infrastructure for collection, categorizing, recycling and disposal of municipal waste. Training of assembly personnel in categorizing, recycling and disposal of municipal waste would be essential. This is also the case for personnel in health facilities who are limited in the ability to isolate causes of POPs related ailments.

The Occupational Safety, Health and Welfare Act (1997) (Chapter 55:07). This Act contains provisions dealing with the safety and welfare of employees handling hazardous substances. The provisions are as follows;

(i) Section 13(1) places a duty on every employer to ensure the safety, health and welfare of all his employees at work.

(ii) Section 13 (2)(6) mandates the employer to make arrangements for ensuring safety, and absence of risks to health, in connection with the use, handling, storage and transportation of articles and substances.

(iii) Section 51(1) mandates that manufacturers, importers and suppliers of hazardous substances used at workplaces, including those in the agricultural section, shall provide sufficient information on such substances as well as the precautions to be taken.

(iv) Section 51(3) requires hazardous substances to be clearly labeled giving their relevant characteristics and instruction on their use.

(v) Section 51(4) requires containers of hazardous substances to carry, or be accompanied by, instructions for the safe handling of the contents and procedures to be followed in case of spoilage.

(vi) Section 81 (7) stipulates that where the use of hazardous chemicals is likely to penetrate the skin and cause rash, skin contact with hazardous chemical shall be avoided and personal hygiene and the type of clothing worm shall be such as to enable rapid removal of any chemical from skin contact.

The Local Government Act (1998) (Chapter 22:01). The Act allows cities and district assemblies to promulgate by-laws, particularly solid waste management by-laws. Subsequently, Local authorities have personnel involved in promoting and safeguarding public health through the enforcement of the Public Health Act of 1944. However, the absence of the Act there is need for provision of appropriate infrastructure for collection, categorizing, recycling and disposal of municipal waste as well as trained personnel for categorizing, recycling and disposal of municipal waste compounds efficiency.

The Public Health Act (1947). The Act and its by-laws forbid the indiscriminate dumping and burning of refuse and therefore places the duty to maintain cleanliness of areas on local authorities. Specifically:

(i) Section 60 imposes a duty on every local authority to take all lawful, necessary and reasonably practicable measures for maintaining its area at all times in a clean and sanitary condition.

(ii) Section 143 mandates the Minister responsible for public health, to make rules regarding licensing, regulation and inspection of laundries and washhouses, regulation, inspection and control of sanitary and crematoria and the disposal and burial of corpses. Considering that laundries, sanitary and crematoria and other animal corpses or carcasses are some of the documented potential sources of releases of unintentionally released pollutants such as dioxins and furans, these particular rules are essential in an attempt to avoid or minimize the releases of these pollutants.

In Malawi the Act has strengthened effective management of disposal of medical waste as well as the Health Care Waste Management Policy (2003). The Malaria Control Policy (2002) promotes the use of pyrethroids, instead of DDT, in the control of malaria. And this constitutes an important strategy towards eliminating the use of DDT as required by the Stockholm Convention.

To ensure safety of staff handling and working with electrical equipment containing PCBs, the Electricity Supply Corporation of Malawi (ESCOM), is a member of the Power Institute of East and Southern Africa (PIESA). The network has produced PCB Guidelines, which now ESCOM is implementing. ESCOM is increasing the capacity of human resource in identification and labeling, sampling, monitoring and testing PCBs methods, clean up of spills, servicing and reclassifying of PCB containing equipment.

It is clear that harmonization of the various legal instruments will ensure effective management of POPs in Malawi. This will remove any conflicts in enforcement, monitoring and review process

2.3 Assessment of the POPs issues in the country

In order to assess the status and extent of POPs problems in the country, preliminary inventories on POPs were carried out between August 2003 and February 2004. The inventories identified POPs sources and quantities assessed legal and institutional framework; management practices; monitoring capacity and experience; contaminated sites; and determined the level and extent of public information, awareness and education. The study involved twenty-six national experts drawn from the private sector, non-governmental organizations, academia, government departments, research institutions and the industry were involved. Important and statues of various POPs in the country are shown in Table 4**.**

Table 4: Status of POPs in Malawi

Name of Chemical	Current status/control action	Details e.g. reason for control action, remaining allowed uses, etc.
Aldrin	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Chlordane	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Dieldrin	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
DDT	Banned since 1984	Chemical is persistent. Other cheaper and safer alternatives such as synthetic pyrethroids for insect control for public health and agriculture are preferred
Heptaclor	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Hexachloro-benzene	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Mirex	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Dioxins & Furans (PCDDs/PCDFs)	There is limited information on release into the environment	-
Polychlorinated Biphenyls (PCBs)	Importation of transformers and capacitors with PCBs oil continues	-
Toxaphene	Banned since 1985	Chemical is persistent. Safer alternatives preferred.

The inventory on POPs showed that POPs pesticides continue to be used in the country in agriculture, forestry and construction industries for the control of termites. For example, chlordane is being used in large quantities in construction and agriculture especially in tea and coffee estates to control termites. DDT widely used in the 1960s to control insect pests in cotton was banned in Malawi the 1980s. However it is still being illegally sold in some open markets of the country. Although the sources of the DDT could not be established, the problem is exacerbated by cross border movements. The inventory consequently further revealed that the country has limited personnel to monitor the movement of these pesticides into and across the country. There is also a large quantity of obsolete pesticides being improperly stored in most of the estates and warehouses.

The inventory on PCBs established that besides transformers (80% of which belong to ESCOM) and other electrical applications, PCBs are used in open applications such as paint manufacturing. In Malawi the management of PCBs containing oil and equipment is poor. This is compounded by little awareness on the dangers posed by PCBs among the public. Several sites designated as contaminated by PCBs are located close to fragile systems, e.g. water bodies, flora and fauna, food processing units and schools. These pose serious risk of exposure to the general public and the environment.

The inventory on dioxins and furans revealed that the main media of release of dioxins and furans in Malawi were air and land through residue deposits. Due to absence of studies on furan and dioxins in the country, the effects on human health and the environment are not well appreciated. Consequently management of sources of dioxins and furans is weak and ineffective.

The inventories showed that there is very little public information and awareness on POPs and other toxic substances, the public is thus not well educated. The lack of awareness on the risks associated with POPs has resulted in poor management of these chemicals. Consequently human health and the

environment are further negatively affected. The potential impacts of POPs on human health are also not established. This is exacerbated by absence or limited capacity to assess human exposure to POPs in the country. No studies have been conducted to determine the causes of certain diseases and their linkage and association to POPs.

The surveys further showed that Malawi does not have a specific regulatory framework for the management of POPs including PCBs. Due to conflicts and non-harmonization of various legal instruments, enforcement is very weak and ineffective. POPs are being used without any management measures being enforced.

2.3.1 Assessment with respect to Annex A Part I Chemicals (POPs pesticides) and POPs stockpiles

2.3.1.1 Introduction

A national survey undertaken between August 2003 and February 2004 determined the presence and uses of POPs pesticides in Malawi. About 211 sites including chemical companies, estates, academic and research institutions, ADMARC markets, super markets and produce markets were visited. The study showed that aldrin, dieldrin, endrin, DDT and toxaphene have been used in agriculture mainly for the control of insect pests in crops and livestock. These pesticides were also utilized together with heptachlor in forests for termite control. Chlordane is officially used to control termites in the construction industry, tea and coffee estates. The total quantities of POPs pesticides chlordane, toxaphene and DDT are provided in Table 5. About 1.546 metric tonnes of chlordane, fifty liters of toxaphene and less than 10 kg of DDT were determined. To reduce the use of these POPs pesticides, some estates and organizations are testing various alternatives such as aldicarst, carbosulfan, and dursban to replace chlordane. The survey further identified 310.894 metric tones of obsolete pesticides countrywide. Such pesticides include organophosphates, carbamates and pyrethroids. Most of containers were in bad shape and an urgent clean-up programme is thus necessary and a priority.

The survey on POPs pesticides also revealed that Malawi does not manufacture pesticides. Thus, all pesticides marketed in the country are imported either from the neighbouring countries or from overseas. There is always high demand though for pesticides and as a result there is so much illegal trade of pesticides. Although the use of some POPs pesticides was banned in the country, illegal use and trading of POPs are prevalent in the country. Several unlicensed dealers and vendors sell POPs pesticides on the open markets especially in those districts along the boarders. This practice has facilitated uncontrolled entry as well as accumulation of stockpiles and obsolete pesticides in the country. The most important POPs pesticides traded include aldrin, dieldrin, endrin, heptachlor, mirex and toxaphene and DDT. Due to limited time, the quantities and distribution of these pesticides were not established; this requires verification in due course. Sites where POPs pesticides were found in Malawi are shown in Table 5.

In Malawi, the management of POPs pesticides falls under different ministries. The Pesticides Act 2000 under the Ministry of Agriculture leads the monitoring of imports and use of agricultural pesticides. EMA (1996) provides the general and enforcement framework for chemical pollution in Malawi. Important supportive legislation includes Malawi Bureau of Standards Act (1972), Pharmacy, Medicines and Poisons Board (1996), Plant Protection Act 1967 and Seeds Act (1996); and Occupational, Safety, Health and Welfare Act (1997).

Table 5: Sites where POPs pesticides were found in Malawi

Sites	Chlordane (litres)	DDT (kg)	Toxaphene (litres)
Balaka Pest Control	2.0		
Mangochi ADMARC	1.0		
Makandi Estate	115.0		
Limbe Agriculture Trading Company	58.0		
Capital Pest Control	7.0		
Lilongwe Central regional veterinary			50
Lilongwe ADMARC	2.5		
ARET	6.0		
Lauderdale	2.0		
Antipest	3.0		
Kasungu Agricultural Trading Company	3.0		
Mbabvi Estate	18.75		
Wuli Chemical Company	4.5		
Mzuzu ADMARC		195 oz	
Ntcheu RTC		1 sachet	
Mzuzu Agricultural Trading Company	94.0		
Lilongwe Agriculture Trading Company	1,095.0		
Akonda Trading Company	5.0		
Chemicals and Marketing Company (Mzuzu)	125.0		
TOTAL	**1,546.46**	**6.67**	**50**

2.3.1.2 Past, present and projected future production and use of POPs pesticides

Until now Malawi does not produce POPs pesticides. Although chlordane is legally used now, Malawi Government is committed to its gradual phase-out and thus a plan has been developed. The Government is also committed to stopping any further importation of existing POPs pesticides and identifying alternatives to POPS pesticides (MOAI&FS, 1976/77). Present major achievements in this direction include:

(i) The use of aldrin, heptachlor, dieldrin, and endrin has been replaced by carbofuran, chloropyrifos and carbosulfan for soil pest;
(ii) Toxaphene has been replaced by amitraz for the control of ticks in livestock;
(iii) Chlordane for the control of termites and other soil pests in the tea, coffee and tobacco industry is being replaced by carbofuran and carbosulfan;

In the past POPs pesticides were used in agriculture, forestry and construction industry for the control of termites. Currently, the only POPs pesticide in use is chlordane, which is being used in the construction industry as well as in agriculture particularly on coffee and tea for the control of termites. Chlordane is also being used in forestry.

2.3.1.3 Import and export of POPs pesticides

To effectively control the importation and export of POPs pesticides, the Pesticides Control Board (PCB), established by an Act of Parliament in 2000, monitors and regulates all pesticides' imports into Malawi. This intervention is necessary to minimize the health and environmental hazards associated with POPs pesticides use and handling. Although the Pesticides Act 2000 is silent on the importation of POPs pesticides, their inclusion is critical and urgent. This will enhance greater adherence to non-importation and possible export of these even under different names. It is also essential that Malawi should be able to comply with the Stockholm Convention on the import and export of POPs pesticides.

2.3.1.4. Gaps and deficiencies in POPs Pesticides management

The gaps and deficiencies on POPs pesticides are provided in Table 6. Addressing these will achieve a clear environment for the people and ensure balanced ecosystems. The safety and health of biodiversity will be assured.

Table 6: Gaps and deficiencies in POPs Pesticides management

Convention requirements	Inventory findings	Gaps and deficiencies
Article 3: Measures to reduce or eliminate releases from intentional production and use		
Prevent production, use, import and export of POPs pesticides	All POPs Pesticides were in use in the past. Malawi never produced any POPs pesticides. All POPs pesticides are imported.	Inadequate legal provision on POPs Pesticides, including lack of provisions to regulate production, import and use Low awareness of importers and custom officers on pesticides importation requirements Lack of specific provisions to control donations Inadequate information on the past, uses, import and export
Preventing the production and use of new POPs Pesticides	No POPs Pesticides registered	Lack of continued education to update skills to evaluate technical data submitted during registration Lack of identification of undeclared pesticides ingredients Lack of specialized skills and appropriate analytical equipment for analysis
Assessing currently used pesticides	Uncoordinated monitoring of pesticides Poor enforcement on existing legislation Reporting of obsolete stocks is not done Inadequate assessment of currently used pesticides	Inadequate skills and lack of appropriate equipment for monitoring Inadequate training on pesticides inspectorate services Inadequate working tools
Implementing Standards and guidelines to minimize exposure	In adequate guidelines on importation, registration, labeling and certification/licensing are in place Need to adopt CODEX Alimentarius, FAO/WHO food standards	Lack of guidelines on risk minimization procedures on handling, transportation, storage and disposal of obsolete stocks Lack of national standards or guidelines for Maximum Residue Limits (MRLs) to assess exposure to POPs
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes		
Safe storage	Indiscriminate waste disposal of wastes causing cross contamination of wastes with POPs Pesticides	Inadequate skills, scarce financial resources and lack of equipment Poor waste management practices Weak enforcement mechanisms

Stockpile quantity and identity	Inventory could not establish exact quantities of POPs pesticides. Small quantities of DDT and chlordane were found Leaking of POPs Pesticides into the environment	The Pesticide Act does not provide for the identification and quantification of stockpiles Improper handling and storage Lack of appropriate disposal facilities and skilled personnel Continuous leak and spills of POPs Pesticides into the environment
Sound management of stockpiles and wastes	Poor storage of empty containers and improper reuse of empty containers for domestic purposes Suspected use of obsolete POPs Pesticides Unsafe disposal of obsolete POPs Pesticides Lack of model for POPs identification and management	Lack of specialized skills and appropriate analytical equipment Improper disposal of POPs Pesticides empty containers. Difficulties in enforcement of some provisions of the legislation, for example centralized requirement to dispose waste after approval from authorities Lack of public awareness on health and environmental risks associated with obsolete POPs Pesticides
Contaminated sites - identification and remediation	Improper disposal of POPs Pesticides waste Lack of technologies and technical know-how on remediation of contaminated sites	Regulations do not cover contamination aspects sites No studies on human risks No registration requirement of contaminated sites
Article 9: Information exchange		
Information exchange	No research findings on levels of POPs Pesticides in environment Limited mechanisms for information exchange Network of experts working groups on POPs Pesticides have been established No studies on effects of POPs Pesticides to human health were conducted	Inadequate collaboration and coordination amongst relevant organizations leading to poor information exchange and data keeping Lack of national information on POPs Pesticides and their risks to human health Poor documentation of data Inadequate information dissemination pathways
Alternatives to POPs (risks, economic and social)	Promotion of IPM & IVM in the country is at very low levels Researches on IPM and IVM are very low Non-chemicals alternatives to POPs Pesticides are non existent	Inadequate resources for dissemination of information on the viable alternatives Lack of resources to ascertain suitability of alternatives and assess their risks to human health and the environment

Article 10: Public information, awareness and education		
Training of workers, scientists, educators, technical and managerial personnel	Untrained custom officers, pesticides dealers There are no specific Radio/TV programs on POPs Pesticides education	Inadequate resources to support preparation and execution of training and awareness raising programs
	Basic training is provided to pesticides sellers and pest control operators through seminars, pest management courses	Lack of continuing education to cope up with up-to date training needs for trainers. Lack of sustainable funding mechanism
Article 11: Research, development and monitoring		
Monitoring of POPs pesticide products at end use	Post registration surveillance is undertaken by Pesticides Control Board	Inadequate update continued skills, equipment and financial resources to monitor the registered pesticides in the field Weak information flow to extension officers and end-users about POPs Pesticides use and their effects Lack of identification means for POPs Pesticides usage i.e. equipment, procedures
Monitoring of presence, levels and trends in human and environment	No data on the residue levels of POPs in water, air, soil, breast milk and animal fat No monitoring of effects of POPs Pesticides in human and environment	Inadequate specialized skills, appropriate analytical equipment and financial resources to carry out monitoring There is no legal provision for monitoring of POPs Pesticides releases and their effects to human and environment
Environment transport, fate and transformation	Information on transport, fate is non existents	Lack of specialized skills, appropriate analytical equipment, financial resources and absence of programmes to carry out regular monitoring There is no provisions focusing on environment, transport, fate and transformation
Social-economic and cultural impacts	Use of obsolete POPs Pesticides in some areas is suspected Alternatives of POPs Pesticides could be accepted if available and affordable Illegal trade of POPs Pesticides exists because they are considered to be cheap and believed to be the most effective	Inadequate awareness on presence of alternatives to end users Lack of health and environmental risks assessment to alternatives Inadequate information on cost implications of the alternatives Lack of socio-economic and cultural studies on the acceptability and affordability of alternatives

2.3.2 Assessment with respect to Annex A, part II chemicals (Polychlorinated biphenyls and Polychlorinated biphenyls containing materials)

2.3.2.1 Introduction

The assessment of Annex A part II chemicals, Polychlorinated biphenyls (PCBs) and Polychlorinated biphenyls containing materials established that no specific legislation on PCBs exists in Malawi. However, several pieces of legislation such as Environment Management Act (EMA), Public Health Act and Water Resources Act address different aspects of pollution control. Some of the legislation are old and require updating. In the absence of a single unifying legislation, development of regulations for PCB management would not enable the Government of Malawi to meet its obligations under the Stockholm Convention.

The absence of a legislation on PCBs means that no single institution is responsible for the regulation and monitoring the use of PCBs in Malawi. Presently, the Environmental Affairs Department under the EMA (1996) is committed to regulating, and monitoring the use and management of PCBs in line with the requirements of the Stockholm Convention on POPs. The survey further indicated that, there is limited human and infrastructure capacity to manage PCBs. Malawi has both limited human and institutional capacity to effectively undertake analyses of PCBs. The results of PCBs presented above were obtained using the SADC provide toolkit.

The survey revealed that workers handling transformers are not aware of the hazards associated with PCB containing oil. This is evident by the non-use of protective clothing and appliances when carrying out repairs of transformers. Development of national specific regulations on PCBs is required. The Power Institute of East and Southern Africa (PIESA) has produced PCB Guidelines, which ESCOM as a member of the institute is expected to adopt.

The inventory identified 211 PCB contaminated sites, most of which are in the southern region (157 sites). The central and northern regions have 51 and 3 sites respectively. Due to the proximity of these sites to water bodies, food processing units, schools, gardens, residential areas and their extent of contamination, these were classified as priority sites. Such priority sites include ESCOM Power House (Blantyre) which is near Mudi river a tributary of Shire River; Nkula Power Station, at Walkers Ferry; ESCOM, Zomba substation, near Mulunguzi River and ESCOM, Lilongwe substation, which is near Lilongwe River.

Using 1757 transformers the survey established that 541 were manufactured before 1985, when developed countries stopped producing PCB oil (UNEP Chemical, 1999). The total oil content in these transformers is 395168 liters. Thus 28% of the transformer oil may contain PCBs, which needs proper management. To establish this, 188 transformers were sampled and oil analyzed for PCBs. The results showed that 61 of the transformers (32%) contained > 50 ppm while 68% (127 transformers) contained less than 50 ppm. It could therefore be postulated that nearly a third of the transformers in Malawi contain greater than 50 ppm PCB levels while the rest less than this value. It is interesting from the study that more than 50% of the transformers containing > 50 ppm are close to sensitive areas such as schools, water systems, hospitals and food processing areas.

Although PCB use was restricted in the 1980s, it seems possible that some transformer manufacturers continued filling their transformers with PCB containing oil. The presence of PCBs in transformers manufactured between 1985 and 2003 confirms this. This exacerbates exposure to these toxic substances among the ESCOM personnel handling these transformers.. The full extent of PCB adulteration was not established. This constitutes a priority in continuing efforts.

2.3.2.2 Regulatory framework for PCBs

2.3.2.2.1 International and national Regulatory Framework for PCB Management

To ensure effective management of PCBs Malawi is party to a number of International Multilateral Environmental Agreements (MEAs) aimed at promoting sound chemical management. These MEAs are legally binding and by being a party to these conventions Malawi is obliged to phase out the use of certain POPs including PCB and put in place mechanisms for good chemical management. At local levels, Malawi is committed to implementing EMA (1996) and all relevant pieces of legislation.

2.3.2.2.2 Institutional framework for management of PCBs

Considering the adverse impact of PCBs on human health and the environment, there is need for an institutional structure to support proper PCB management at international, regional and national levels where responsibilities and liabilities of various stakeholders in PCB management are clear.

At global level there are institutional structures, which have been set up to manage PCBs. These include the Secretariats of chemical conventions such as the Stockholm Convention on POPs, Rotterdam Convention on Prior Informed Consent and the Basel Convention on the Transboundary Movement of Hazardous Wastes. At the SADC Regional level, there is the PIESA, which has developed Guidelines for PCBs. Malawi, and in particular ESCOM, is a member of the PIESA and is therefore expected to follow these guidelines. However, at national level, there is no institutional structure to regulate use and monitor the management of PCBs. As individual units, various stakeholders deal with different aspects of PCBs, but there is no coordinated approach.

EAD has been appointed as the POPs focal point for Malawi. Strengthening the capacity of this Department is thus urgent. While EAD coordinates all environmental issues and monitors all development activities to ensure that they are implemented in an environmental sustainable manner, it is the responsibility of every person to safeguard the environment from irresponsible behavior that may pose health risks, environmental, social and economic problems. Further, the participation of key stakeholders in PCB use, handling and management is a priority. Important and key stakeholders to this exercise include the Ministry of Labour and Vocational training, Ministry of Health and Population Services, Ministry of Finance, Ministry of Commerce and industry, University of Malawi, ESCOM, Malawi Bureau of Standards, Malawi Revenue

Authority, NGOs and other various sectors of the industry that handle, contribute and dispose of PCB containing substances. Table 7 gives a list of the different stakeholders on PCBs and their proposed responsibilities.

Table 7: Proposed roles of various stakeholders in PCB management

Institution	Proposed Role
EAD	POPs Focal Point Coordinate all environmental issues EIA and pollution control Assess impact of PCBs on environment Monitor development activities to ensure they do not harm the environment
Department of Local Government (Local Authorities)	Make by-laws for management of wastes
Oil Suppliers	Provide Information Data Sheets (IDS) for the products they sell e.g. Transformer oil. IDS to provide information on handling, management and disposal.
Ministry of Labour and Vocational Training (Factories Inspectorate)	Enforce provisions of the OHSWA Inspect premises to ensure that workers are not exposed to PCBs
Malawi Bureau of Standards	Inspect, sample and test imports of transformer oil and other related products for presence of PCBs Prepare Codes of Practice for PCB Management
ESCOM	Import PCB free transformers Use, manage and dispose of PCB containing transformers and oil Safe and careful storage of decommissioned transformers Disposal of decommissioned transformers
Academic Institutions	Teach and conduct research on PCBs
Ministry of Water Development	Monitor drinking water quality Conduct physical, chemical and biological analysis of water
Ministry of Commerce and Industry	Issue Import Licenses for PCB containing equipment and goods
Ministry of Health and Population	Monitor impacts of PCBs on human health
Ministry of Finance	Provide financial support for PCB management
Malawi Revenue Authority	Check imports for presence of PCBs and exercise Import Controls
NGOs	Raise awareness on adverse impacts of PCBs on human health and the environment
General population	Sensitize them on adverse impacts of PCBs on human health and the environment and how they can be protected
Private Sector e.g. Paint manufacturers and suppliers	Import and manufacture of epoxy paints, which contain PCBs. Consider possible alternatives to epoxy paints
Malawi Industrial Research and Technology Development Center	Undertake appropriate research and development pertaining to PCBs and possible alternatives
Women, Children and the least educated	Sensitize them on PCBs and the health and environmental impacts of PCBs
Private sector	Effective and safe management of POPs

2.3.2.3 Management of Waste Oil and associated stockpiles

The surveys revealed that the management of transformer waste oil poses problems due to lack of identified storage sites. Consequently, the transformer oil was stored in drums in the open for use as an additive. This practice was discontinued when it transpired that

burning of the waste oil produced dioxins and furans as by-products. The stockpiles of these oils therefore constitute a source of contamination and may be recycled for domestic use or manufacture of pomade.

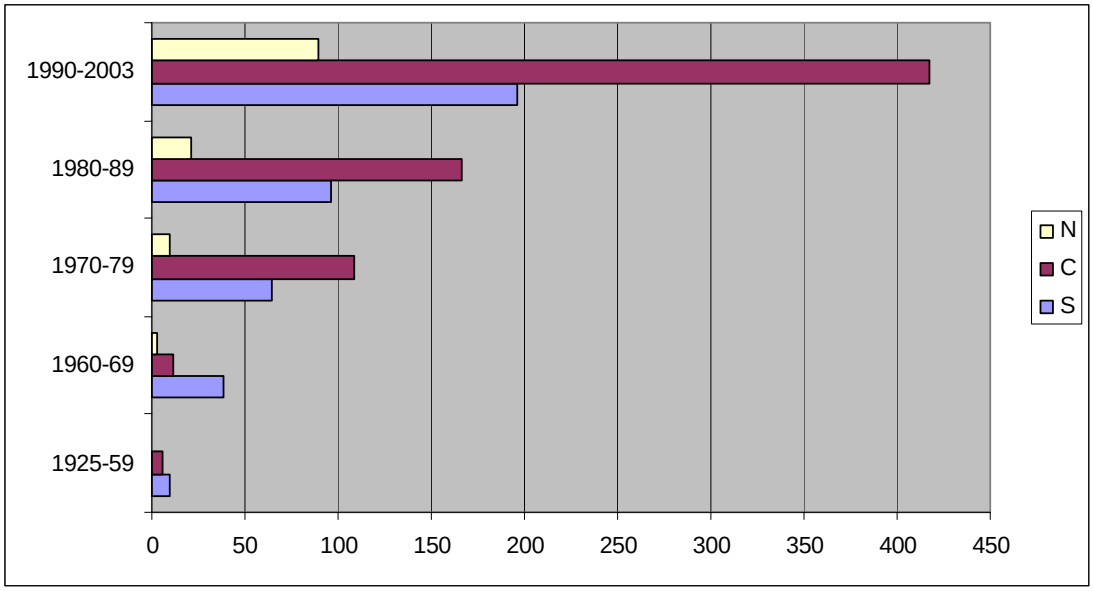
2.3.2.4 Management of semi-closed and open applications

During the survey, semi-closed applications were not identified but general observations indicated that no special measures are implemented for containment of oil from hydraulic equipment. This was observed at construction sites and therefore leakage is very possible. These semi-closed applications are thus important sources of contamination.

Paint manufacturing is the main source of PCBs from open sources in the country, although paint factories did not indicate any special measures for containment of PCBs. It is probable that some tins having residues of PCB-containing paint end at landfills as solid waste. There have been media reports indicating that people drain oil transformers and use it for cooking and cane furniture production. This increases PCB exposure to the members of the general public.

ESCOM stores large quantities of waste transformer oils in drums, most of which are full. The oils are likely to contain PCBs. About 450 damaged transformers are kept in open spaces at Blantyre powerhouse and Lilongwe substations PCBs escape through volatilization. In Figure 4 the distribution of suspected PCB oil containing transformers for the period 1925-2003 are provided. This shows that most of the old transformers are still in use and they continue to function satisfactorily.

Figure 4: Distribution of suspected PCB oil containing transformers for the period 1925-2003



NB: N - Northern Region S - Southern Region C – Central Region

The major hotspots identified in the survey are Blantyre Powerhouse; Nkula Power Station, which is near Shire River, Zomba substation which is near Mulunguzi river and Lilongwe substation which is near Lilongwe river. Management of these hotspots is necessary to reduce PCB contamination with aquatic life.

2.3.2.5 Gaps and deficiencies associated with PCBs contamination and management

These are provided in Table 8.

Table 8 : Gaps and deficiencies associated with PCBs contamination and management

Convention requirements	Inventory findings	Gaps and deficiencies
Article 3: Requires Parties to reduce or eliminate releases from intentional production and use	Oils and equipment suspected to be contaminated with PCBs still in use. Suspected PCB oils and equipment have been imported. Management of oils and equipment suspected to contain PCBs is inadequate by ESCOM Lack of awareness on PCBs and their impacts	Insufficient schemes for monitoring releases Lack of sound disposal facilities. Inadequate PCBs management capacity. The lack of legal provision addressing elimination of PCBs and sound management Inadequate financial resources to allow use of alternatives.
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes.	No monitoring, control and management schemes. Leaking equipment and improperly managed wastes No sound disposal methods/facilities of oils and equipment suspected to be contaminated with PCBs. Some contaminated sites are close to water sources	Limited schemes for monitoring releases. Lack of sound disposal facilities. Inadequate PCBs management capacity. No national guidelines on management of PCBs.
Article 9: Information exchange	Poor access to PCBs related information. Weak dissemination of the little available information	Lack of information access. Lack of information exchange. Poor information generation.
Article 10: Public information, awareness and education.	Limited awareness raising programmes Poor communication infrastructure. Weak institutional capacity and coordination Inadequate financial resources to support awareness raising programmes	Lack of awareness. Poor information dissemination. Inadequate information access
Article 11: Research development and monitoring.	No adequate information on alternatives No local research programmes on alternatives	Lack of information exchange. Lack of PCBs health related monitoring schemes. Inadequate financial resources to allow research on alternatives. Inadequate local research capacity on alternatives.

2.3.3 Assessment with respect to Annex B chemicals (DDT)

2.3.3.1 Introduction

The assessment of Annex B chemical (DDT) showed that DDT has been used as a pesticide in Malawi since the 1960s largely on cotton to control major insect pests (MOAIFS, 1976). DDT had also found extensive use in malaria vector control. For public health DDT had been impregnated in mosquito coils, used over time to repel mosquitoes. The use of DDT in the agricultural and public health sectors has exacerbated exposure to a large proportion of the Malawian population. The long-term effects of low-level exposure to DDT have not been established.

The Agricultural Development and Marketing Corporation (ADMARC) was the main importer of DDT for agricultural purposes in Malawi until liberalization. The dangers associated with DDT use were not known in the country until in the early 1980s. Makoka Research Station conducted research on DDT application techniques (Mathews, 1979) and its persistence in water bodies. The research results revealed that DDT, DDE and DDD residues accumulated in water and fish at the farm's dam in very high levels. Important side effects of DDT and organochlorines include violent tremors, loss of movement, convulsions and death. These show that they have neurotoxic effects on humans.

Considering the dangers that DDT poses to human health and the environment, Malawi government stopped importing DDT for use in agriculture from 1985 and instituted a programme focusing on alternative pesticides such as organophosphates, carbamates, pyrethroids and bio-pesticides. Included in the ban was the importation of mosquito coils impregnated with DDT to repel mosquitoes.

The survey showed that only 6.67 Kg of stockpiles of DDT was detected /found at Mzuzu ADMARC while reasonable quantities in the open markets in Ntcheu, Dedza, Lilongwe and those parts of Malawi bordering with Mozambique, Tanzania and Zambia. It was not possible to determine the sources of DDT; this constitutes a significant challenge. Further, the survey showed that DDT is being sold using different trade names. The extent and level of exposure to DDT among the farming communities is not easy to estimate.

2.3.3.2 DDT quantities in Malawi

Several studies in Malawi have provided evidence of DDT accumulation in water and sediments in rivers in Malawi (Kangera, 2002,Mandala, 2002and Banda,(2004). Studies done at Makoka Research station have also revealed that water and fish at the farm's dam contained residues of DDT, DDE and DDD well after the DDT ban in 1985. This shows that despite the ban DDT and its metabolites exits in vegetables, water and soil sediments in the country. . The alternatives presently being used include organophosphates, carbamates, pyrethroids and bio-pesticides. Some of the alternatives have been found to have the same effectiveness in controlling the same pests, which were previously being controlled by DDT.

The presence of 6.67 kg of DDT indicates that DDT is still being used and kept in Malawi. The survey also showed that no additional stockpiles of DDT and its waste were detected. This is because pesticide suppliers in the tea/coffee growing areas procured sufficient for each season. . The absence and or limited enforcement mechanisms have exacerbated this problem. Strengthening of capacities is a priority in the various institutions including the Environmental Affairs Department; Pesticides control Board, University of Malawi, Ministry of Agriculture and the Research Council of Malawi alternatives.

2.3.3.3 The Present institutional management and regulatory framework

The control of DDT falls under several ministries but the parent ministry is the Ministry of Agriculture, Irrigation and Food Security (MoAIFS) under the Pesticides Act 2000. Important ministries involved include Mines, Natural Resources and Environment (Environmental Management Act 1996), Commerce and Industry (Malawi Bureau of Standards Act 1972), Health and Population (Pharmacy, Medicines and Poisons Board 1996), MoAIFS (Plant Protection Act 1967 and Seeds Act 1996); and Labour and Vocational Training (Occupational, Safety, Health and Welfare 1997). The survey revealed that interested institutions work in isolation and no harmonization of their approaches exits to deal with the DDT problem in the country effectively.

2.3.3.4 Past, Present and projected future production and use of DDT

The use of DDT in Malawi began as early as 1964 in cotton industry to control major insect pests such as the cotton-bollworms. This pesticide was used for more than two decades in the major cotton growing areas of Malawi, which included Shire valley, Phalombe plains, Salima, Henga valley, and Karonga. to the use DDT in cotton and other crops stopped 1985 consistent with the world ban.

The ban of DDT was not accompanied by the enactment of a national legislation to regulate this development. All the DDT used by the cotton industry was imported from Zimbabwe, the United Kingdom and Germany. To ensure sustainable control of crop pests, both government and the chemical industry developed a programme on alternatives, which were socially and economically acceptable. Achievements to this end include:

- Identification of alternative pesticides such as deltamethrin, ripcord, lambda cyhalothrin, thiodicarb and carbaryl for cotton pests;
- Identification of alternative pesticides such as carbofuran and carbosulfan for tobacco soil pests;
- Identification of alternative pesticides such as deltamethrin, carbaryl, fenitrothion and sumicidin for maize stemborers and armyworms; and
- Identification of alternative pesticides such as deltamethrin, permithrin and lambda cyhalothrin for household pests, against mosquitoes.

2.3.3.5 Import and export of DDT

Until recently, the Pesticides Control Board has not processed any permits to import DDT. The presence of some DDT in the country is due to illegal importation and trading. Strengthening enforcement of the 1985 ban by Malawi government is necessary. No official exporting of DDT exits in the country. Movement across the boundaries thus accounts for the amount obtaining in Malawi.

2.3.3.6 Gaps and deficiencies

The most important gaps and deficiencies associated with DDT are shown in Table 9.

Table 9: Gaps and deficiencies associated with DDT

Convention requirements	Inventory findings	Gaps and deficiencies
Article 3: Measures to reduce or eliminate releases from intentional production and use		
Restrict production, use, import and export	Malawi never produced DDT but imported it DDT was used as pesticide in the past to control insect pests In the 1980s DDT use as a pesticide was banned in the country	Lack of specific legislation to control use Lack of awareness to importers and custom officers on importation requirements
Screening during registration	Legislation stipulates stringent requirements on registration of pesticides in general but not specific to POPs	Inadequate skills to evaluate technical data submitted during registration Lack of continuing education programme to upgrade professional skills to cope with changing screening requirements Lack of specific provision on screening of pesticides
Assessing currently used DDT	Uncoordinated monitoring of DDT in the field Weak enforcement on existing legislation	Inadequate specialized skills and lack of appropriate equipment for monitoring of DDT Uncoordinated monitoring of DDT in the field
Standards and guidelines to minimize exposure	Guidelines on importation, registration, labeling and certification/licensing are specifically for DDT not in place Malawi has not adopted CODEX Alimentarius, FAO/WHO food standards	Lack of guidelines on risk minimization procedures for handling, storage and disposal of obsolete stocks of DDT Lack of national standards on maximum residue level in food and the environment
Article 4: Registration for specific exemption		
Production and use specific exemptions	DDT could be used for malaria vector control in the case of an out break	The demand is not known
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes		
Safe storage	The whereabouts of most of obsolete stocks of DDT are not known DDT is mostly being used for vegetable farming in the bordering towns	Inadequate skills, scarce financial resources and lack of working tools Weak legislation enforcement mechanisms

DDT stockpiles and wastes	Inventory identified 1.67 kg of unused DDT in Malawi though evidence showed that there were tone and tones of the chemical being traded illegally Those dealing in the illegal trade of DDT are now aware of the dangers of DDT and users handle the chemical poorly as DDT is just found among other pesticides.	Improper handling and storage Lack of sound disposal means Continuous leaks and spills into the environment and contamination with other pesticides
Sound management of wastes stockpiles and empty packaging materials	Improper disposal of packaging material Suspected use of DDT still continues in the country Poor storage of empty containers Reuse of empty containers domestically	Lack of specialized skills on DDT management Lack of appropriate analytical equipment for monitoring of DDT and their effects Improper disposal of empty containers Lack of public awareness on health and the environmental risks associated with exposure to obsolete DDT
Contaminated sites - identification and remediation		No studies on environment and human health effects No registration requirement of contaminated sites
Article 9: Information exchange		
Information exchange	No studies on the levels and effects of DDT to human health was conducted	Inadequate collaboration and coordination on information exchange and data keeping Lack of national information on DDT and their risks Poor documentation of data
Alternatives to DDT (risks, economic and social)	Researches on IPM/IVM to replace DDT not conducted	Lack of resources to ascertain suitability of alternatives and risks to human health and the environment Inadequate resources for dissemination of information on alternatives
Article 10: Public information, awareness and education		
Training to scientists, workers, technical and managerial personnel.	Untrained custom officers, pesticides dealers There is no radio/TV programs on DDT education Basic training is provided to pesticides sellers through seminars, pest management courses	Inadequate resources for preparation and execution of the training and awareness programs Scarce resources and lack of continuing education for trainers Lack of sustainable funding mechanism

Article 11: Research, development and monitoring		
Monitoring of DDT products at end use		Inadequate specialized skills and equipment Inadequate financial and human resources Inadequate monitoring Weak information flow to extension workers and end-users on DDT effects Lack of verification means on DDT usage i.e. equipment and procedures
Monitoring of DDT presence, levels and trends in human and environment	No monitoring of effects of DDT in human and environment has been done	Inadequate specialized skills, appropriate analytical equipment and financial resources to carry out monitoring There is no legal provision for monitoring of effects of DDT to human and environment No specifically trained inspectors on DDT The inspectors are under-equipped
Environment, transport, fate and transformation	Information on transport, fate and transformation is not available No research on transport of DDT has been conducted	Inadequate specialized skills, appropriate analytical equipment and financial resources to carry out regular monitoring There is no legal provision focusing on environment, transport, fate and transformation
Social-economic and cultural impacts	DDT being used No public awareness programs on environmental and health risks of DDT to end users Some alternatives of DDT are in use, but there is a need to ascertain efficacy, safety, acceptability and affordability Majority of the communities cannot afford the alternatives There is illegal trade of DDT because of its effectiveness and low cost	Absence of health and environmental risks assessment on DDT alternatives Inadequate information on cost implications of the alternatives Lack of socio-economic and cultural studies

2.3.4 Assessment with respect to release from unintentional production of Annex C chemicals (PCCD/PCDF, HCB and PCBs)

2.3.4.1 Introduction

Malawi also undertook an inventory of releases from unintentional production of Annex C chemicals. The inventory targeted medical waste incineration (medical waste crude burning) , iron and steel production and foundries, fossil fuel power plants, biomass power plants, household heating and cooking, cement production, lime production, brick production, and uncontrolled combustion. The survey indicated that potential PCDD/PCDF releases to air, water and land exist in Malawi. It was estimated that air, land (residue) and other products receive 55.1% (528.6 g. TEQ per annum), 38.2% (366.7 g TEQ per annum) and 6.7% (64.1g TEQ per annum) of dioxins and furans emissions respectively. The major sources for emissions of dioxins and furans are uncontrolled combustion processes, waste incineration and disposal /land filling. Uncontrolled combustion (landfills, fires and burning of domestic waste) is responsible for the highest releases into the air (84.2%) and residue (99.99%).

Uncontrolled domestic waste burning accounts for 34.7% (183.3 g TEQ) releases into the air and 99.78% (366.5 g. TEQ per annum) through residue. Landfill fires are contributing 49.5% (261.8g. TEQ per annum) into the air. Thus uncontrolled domestic waste burning is the major source of contamination of dioxins and furans through residues, which is which is presently not controlled. Incineration of animal carcasses, which is presently not controlled, is responsible for 11.4% (60.0 g TEQ per annum) releases into the air. In Malawi medical waste, which is indiscriminately burnt, contributes 0.7% (3.5g TEQ per annum) into the air. Within the disposal /landfill category, crude composting contributes 100% through this media.

The most important uncontrolled combustion activities that contribute to emissions are landfill fires and wanton domestic waste burning. Although local authorities have designated waste disposal sites, the proximity of such sites exacerbates exposure to scavengers, which include children. The sites are often set on fire releasing dioxins and furans. Further, composting of waste in landfill sites generates dioxins and furans through chemical processes.

The tendency to scavenge various products back to homesteads further enhances releases and exposure. The poor management of domestic refuse in shallow dug pits dug and their frequent burning releases furans and dioxins into residential areas. People and the environment are thus at greater risk. Medical waste incineration within the health facility compounds exacerbates exposure among the health workers, patients and guardians to these toxic substances. Malawi continues to use old and dilapidated incinerators increase whose efficiencies are very poor and thus greater releases of dioxins and furans. Wanton bush fires are common in Malawi and are more prevalent during the dry season between April – October every year. This burning releases furans and dioxins into the environment where animals feed on vegetation, and when humans feed on these animals they accumulate the dioxins and furans in their tissues. Further rainwater washes ash into water bodies, which are sources of drinking water, further contaminating the environment. The releases of dioxin and furans were not quantified due the lack of measuring equipment. The summary values provided in Table 10 were estimated using literature.

Table 10: Summary of estimated Dioxins and Furans releases at National level.

Source category	Annual release (g TEQ/a)				
	Air	**Water**	**Land**	**Product**	**Residue**
Waste Incineration	112.84	NA	NA	NA	0.017
Ferrous and non-ferrous metal production	0.23	ND*	NA	NA	0.044
Power generation and heating	12,889.31605	NA	ND	NA	0.303812
Production of Mineral Products	0.807	ND	ND	ND	0.031009
Transport	0.599	NA**	NA	NA	ND
Uncontrolled combustion processes	2504.18	ND	38.8	NA	ND
Production of chemicals and consumer goods	NE***	NE	NE	NE	NE
Miscellaneous	0.00037	NA	NA	NA	NA
Disposal/land filling	ND	ND	NA	NA	NA
Identification of Potential Hot-Spot	NE	NE	NE	NE	NE
Total	15,507.972426	ND	38.8	ND	0.395821

ND = Not determined; ** NA = Not applicable; NE = Not estimated**

Clearly, power generation accounts for 75% of the releases. This is not surprising because energy is required for steam generation in industries. Some of the major industries, which are the major sources of PCDD/PCDF releases, are pulp and paper mill, leather industries, petroleum industry, chemical industries and sugar processing. These were not covered in the study due to time; these have not been in operation since 1990s. Their continued contribution to releases is still required. Studies are required to establish levels of contamination.

In Malawi the survey showed that very few policies and laws deal with the control of releases of dioxins and furans and most of these policies and laws do not have special focus on PCDD/PCDF. Besides, these policies are poorly enforced due to weak and limited institutional capacities. Most of industries still use old technologies without or with minimum air pollution control facilities. Further, the country continues to procure outmoded technologies. Legislation, which monitors and controls the importation of these and complete phase out, is needed.

The gaps and deficiencies identified are provided in Table 11.

Table 11: Gaps and deficiencies in the control of PCDD/PCDF releases

Convention requirements	Inventory findings	Gaps and deficiencies
Article 5: Measures to reduce or eliminate releases from unintentional production		
Develop an action plan or where appropriate a regional or sub regional action plan and implement it. The plan should include: Evaluation of current and projected releases, efficacy of laws and policies related to the management of such releases, steps to promote education and training.	There is no management practices known There is lack of capacity and experience to monitor releases of PCCD and PCDF PCCD and PCDF are not covered in the existing legislation	Lack of national emission factors Lack of input information for estimation of releases for some of the sources No schemes for monitoring releases Inadequacies in the existing policies and laws No coordination mechanisms and institutional arrangement Lack of awareness
Promote the application of available, feasible measures that can expeditiously achieve release reduction or source elimination.	Most industries operate on old technologies Most industries have no pollution control facilities	Inadequate capacity in terms of specialized skills and financial resources Lack of well instituted technology acquisition , screening procedure and standards
Promote the development and require the use of substitute or modified materials, products and processes to prevent the formation and release of chemicals listed in Annex C	No local research programmes on alternatives Inadequate information on available alternatives	Poor access of information on available alternatives Inadequate financial resources to allow research on alternatives
Promote the use of Best Available Techniques (BATs) and Best Environmental Practices (BEPs)	No information on BATs and BEPs	BATs and BEPs are not established

2.3.5 Information on the state of knowledge on stockpiles, contaminated sites and wastes, identification, likely numbers, relevant regulations, guidance, remediation measures and data on releases from sites

2.3.5.1 Introduction

A national inventory was conducted to identify and characterize contaminated sites, liability and capacities to deal with the identified POPs contaminated sites satisfactorily in Malawi. The inventory resulted in several agriculture areas as well as warehouses and storage places being designated as POPs contaminated. The targeted contaminated sites included those showing accumulation of POPs and PCB based oil transformers

2.3.5.2 Priority sites identification

The priority sites/stockpiles for PCBs, POPs pesticides and furans/dioxins are described below:

PCB contaminated sites. These sites were identified and grouped as (i) contaminated sites with closed application of PCBs, (ii) contaminated sites with semi-closed application of PCBs, (iii) contaminated sites with open application of PCBs and (iv) other contaminated sites

The inventory showed that a total of 189 sites were identified as PCBs, contaminated; nearly 51% are in the South Region, 37% in Central and 12% in Northern Regions. About 82.5% of the contaminated sites have transformers manufactured between 1936 and 1989. Blantyre, the main commercial and oldest industrial city gave the highest concentration of transformers (78). While Lilongwe recorded 24 transformers, Chikwawa, Zomba, Mwanza and Dedza had a total of twelve transformers.

Pesticides Contaminated Sites: Several sites contaminated with POPs pesticides were identified. These include Salima ADD; Shire Valley ADD; Phalombe; Mangochi; Balaka; Karonga; and Henga Valley were categorized contaminated with pesticides. The most important storage and garden areas included Limbe ADMARC; Zomba RDP; Lifuwu Research Station; Kasonjola Press Agriculture; Wimbe Press Agriculture; Chitedze Research Station; Santhe Press Agriculture; and Mkondezi Research Station.

Furans and dioxins: Sites were labeled contaminated with dioxins and furans if the sites showed evidence of by-products of combustion or any chemical process involving raw material emitting dioxins and furans. The inventory revealed that the main source of furans and dioxins in Malawi is bush burning and incineration of domestic and health care waste.

2.3.5.3 Current capacities and experiences for management of sites

Malawi has limited capacity (human resources and facilities) to deal with contamination. As much as local authorities manage these contaminated sites, strengthening of their capacity is necessary. Limited scientific capacity and skills exist for the analysis of these POPs such that the presence of some of these has been established. However, data on release of furan and dioxins is non-existent. The country through EAD has an outreach arm responsible for increasing awareness and education on the effects of POPs; this however is weak presently.

2.3.5.4 Responsibility/liability

Various players are involved in the management of contaminated sites and stockpiles. The most important key stakeholders are NGOs, public institutions, the private sector, ESCOM, Universities, MBS, local authorities. They are responsible for the identification, providing guidance and undertaking remediation measures.

2.3.6 Summary of the future production, use and releases of POPs requirements for exemptions

Malawi presently does not manufacture any POPs chemicals. In the short to medium term, Malawi does not have plans to participate in the production of POPs. The POPs chemicals used in the country have been imported outside the country. POPs pesticides in the country were being used in agriculture, forestry and construction industry for the control of termites. Due to the absence of alternatives, chlordane continue to be used in the construction industry as well as in agriculture particularly on coffee and tea for the control of termites. Consequently, Malawi will

seek exemption for chlordane. Malawi will use Table 12 gives a possible initial list of information items needed to assist the Conference of the Parties in evaluating the continued need for DDT for disease vector control.

Table 12: Possible initial list of information items needed to assist the conference of the parties in evaluating the continued need for DDT for disease vector control

A Production and Use of DDT

1. Availability (source, quality)
2. Efficacy (entomological, including susceptibility and resistance management, epidemiological)
3. Acceptability
4. Annual use for disease control (in kg of active ingredient, by disease and target population)
5. Current stocks, including stock management
6. Human & environmental safety (risk assessment, regulatory measures)
7. Cost analysis

B DDT Alternatives (insecticides, methods & strategies)

B 1 Alternative Insecticides including bio-pesticides

1. Alternative insecticide and bio-pesticide options in use
2. Availability (source, quality)
3. Efficacy (entomological, including susceptibility & resistance management, epidemiological)
4. Acceptability
5. Annual use for disease control (in kg of active ingredient, by type of application, disease and target population)
6. Current stocks, including stock management
7. Human & environmental safety (risk assessment, regulatory measures)
8. Cost analysis

B2 Non-chemical Methods

1. Non-chemical options in use
2. Availability (source, quality)
3. Efficacy (entomological, epidemiological)
4. Acceptability
5. Annual use for disease control (by disease and target population)
6. Current stocks, including stock management
7. Human & environmental safety (risk assessment, regulatory measures)
8. Cost analysis

B3 Strategies

1. Disease management strategies
2. vector control strategies
3. Resistance management strategies

C **Systems Strengthening**

1. Institutional set-ups
2. Capacity for planning, implementing, monitoring and evaluation (financial, human resources infrastructure)
3. Capacity for operational research (financial, human resources, infrastructure)
4. Capacity for insecticide management (regulatory: registration & control)
5. Targets and needs for reducing reliance on DDT

Until now, Malawi does not use DDT for the control of malaria vector control. Malaria is the number one burden of diseases in Malawi. For example, in 2002, 27% of the population received treatment for malaria while about 7 % of the patients admitted into hospitals died from malaria. Therefore, the widespread prevalence of malaria incidence may necessitate the continued use of POPs pesticides such as DDT for disease vector control. Meanwhile Pyrethrum used in bed nets, and spraying oil on stagnant water, and clearing bushes are used as alternative strategies to control mosquitoes.

2.3.7 Existing programmes for monitoring releases and environmental and human health impacts, including findings

2.3.7.1 Introduction

In Malawi POPs is a relatively new subject and consequently very limited information exists on human health impacts directly linked to POPs. The survey established that health impacts of POPs are not well established and documented in Malawi. Data pertaining to POPs health and environmental impacts dose not exist although POPs have been used in the country for some time. Due to frequent exposure, the Malawi population is exposed to POPs from unintentional releases. Since the 1960s, the farming communities have been exposed to POPs pesticides including DDT, aldrin and dieldrin. This is due to their use in the forestry plantations and construction industry. With increasing and frequent contact with PCBs containing oils and equipment in the electricity industry in the country, the workers have been seriously exposed.

2.3.7.2 Declaration and reporting of priority pollutant releases

Elsewhere, using animal research, POPs have been implicated in endocrine disruption, reproductive and immune dysfunction, neurobehavioral disorders and cancer. More recently, some POPs have been implicated to reduce immunity in infants and children, and the concomitant increase in infection, development of abnormalities, neurobehavioral impairment and cancer and tumor induction or promotion. There is emerging evidence that some POPs are also a potentially risk factor in the etiology of human breast cancer.

2.3.7.3 Current monitoring standards and capacity for POPs

The survey showed that Malawi has limited institutional capacity for monitoring of POPs Pesticides within the existing institutions in the country. Malawi Bureau of Standards and the University of Malawi lead in research in POPs releases to the environment. The development of national standards is underway; standards provided in the existing sectoral laws cover POPs parameters to limited extent. The MBS and EAD are coordinating proactively this exercise with key stakeholders. To monitor POPs Pesticides the Codex Alimentarius, FAO/WHO Standards are utilized. Efforts are underway to develop National Standards. Further, limited work has been undertaken to monitor PCBs and dioxins and furans releases due to limited resources and infrastructure. Malawi needs to strengthen the legal framework inclusive of monitoring of environmental quality in general terms as no specific legal requirement exists for monitoring of POPs and their impacts. EMA (1996) provides for this requirement, but POPs are remotely covered. This is a priority for Malawi because it can lead to application of precautionary

principle particularly in areas, which are heavily contaminated, and those that have potential of being contaminated with POPs due to past and ongoing activities.

2.3.7.4 Background and potential sources of POPs impact

Agriculture, which remains the main pillar of economic activities for Malawi and inevitably uses large quantities of chemicals to kill insect pests for better yields, constitutes the major source of POPs. Subsistence and commercial farmers use chemicals for pest control such that aldrin, chlordane, dieldrin, endrin, heptachlor, mirex and toxaphene. Use of POPs pesticides ranks highest in the southern region, followed by the central and finally the northern region. This implies that the gravity of exposure to these hazardous chemicals is most intense in the Southern region and least in the Northern Region.

Children and adults handling PCBs through a combination of diet, occupation, indoor and outdoor environments become exposed. Industrial workers are also at greater risk to exposure to PCBs as they handle PCBs containing equipment and products in their everyday work. These workers handle transformer oils without protective clothing. In the paint industry, some paint makers in Malawi such as Dulux, Valmore and Rainbow produce and or import limited amount of epoxy paints containing PCBs as base material. Dulux, Valmore and Rainbow paints manufacturers import about 1000, 500 and 300 litres of epoxy paint per year respectively.

The general public is exposed to PCBs through contact with PCBs contaminated environments especially contaminated sites close to water bodies and food processing units. Use of the PCB based oils for food cooking and cane furniture production constitutes an important potential source of exposure to PCBs.

Several activities involving combustion and subsequent releases of dioxins and furans exist in Malawi. The population is at risk of exposure to dioxins and furans releasing sources such as incineration, flame cutting of the transformers, domestic cooking, bush fires, open burning of waste, motor vehicle exhaust and cigarette smoking. Specifically, the population at highest risk is those subjected to multiple exposures from different and multiple sources. Multiple exposures are common in the urban and semi urban areas, affecting 1,425,785 people.

2.3.7.5 Evidence of presence of POPs in the environment, food, feed and humans

Malawi has undertaken several studies to determine the presence of some of the POPs in the environment. The presence and accumulation of organochlorine pesticides in soil, aquatic sediments and organisms are well established (Pereira et al, 1996). For example, high residual levels of DDT have been detected in mothers' breast milk in the rainy season in Venezuela, (Brunetto, 1996). The presence of DDT and other chloro-derivatives have been obtained in samples of sediments, water mussels (*Mutela dubia*) and fish (*Hydricynus vittatus*) from river mouths in Lake Kariba (Berg and Kautsky (1997). In Malawi, Kamperewera et al (2000) established relatively high levels of aldrin, lindane, hetachlor and some DDT isomers in Mtemankhokwe stream in Mangochi District. Aldrin was detected along the stream and was the most distributed compound. Its concentrations were greater than WHO values for drinking water (0.03 $\mu g\ L^{-1}$). All the organochlorine residues were prevalent between December and January when rainfall and soil loading rates were highest. This has been attributed to application of these

to improve agricultural production. Due to their resistance, downward leaching results in greater accumulation in the soil profile. In Lake Malawi, the values were relatively low (Karlsson et al, 2000) due to dilution. A recent study by Banda (2004) has shown that organochlorine residues exist in both water and sediments of the Lunyangwa Basin but no clearly defined patterns of seasonal or spatial variation. Dichlorodiphenyltrichloroethane (DDT), aldrin and the hexachlorocyclohexane (HCH isomers (γ-HCH, α-HCH and δ-HCH), appear to be the most persisted in water in the Lunyangwa River Basin and exceed the maximum limit (100 μg/L). The residues, α-HCH, δ-HCH and aldrin are the most prevalent in sediment samples. The concentrations of organochlorine pesticide residues are greater in the sediments than in the aqueous matrix.

Using the PCBs tool kit revealed that 32% of the ESCOM transformers contained > 50 ppm while 68% showed < 50 ppm. These transformers are close to public areas including schools, water systems, hospitals and food processing areas. It has not been possible to determine levels of furan and dioxins due to absence and lack of analytical equipment.

The gaps and deficiencies identified through critical analysis of various issues are described in Table 13.

Table 13: Gaps and deficiencies in promoting research, development and monitoring of POPs

Convention requirements	Inventory findings	Gaps and deficiencies
Article 11: Research , development and monitoring		
Undertake appropriate research, development and monitoring of POPs, their alternatives and to candidate POPs	Weak coordination of monitoring activities Lack of monitoring programme	Limited institutional capacity in the monitoring of POPs Monitoring of POPs and their impacts is not provided for in the existing relevant laws
Undertake research and monitoring of POPs presence, levels and trends in humans and the environment	Inadequate monitoring of residue levels by academic institutions Lack of monitoring of effects of POPs	There is limited institutional capacity in terms of specialized skills, equipment and financial resources
Establish methodologies for making inventories of generating sources and analytical techniques for the measurement of POPs releases	No monitoring done on dioxins and PCBs	Lack of institutional capacity to monitor releases of dioxins, furans and PCBs Lack of guidelines and standard for monitoring POPs
Undertake research for alleviating the effects of POPs on human health and the environment	Limited research activities on POPs Pesticides and DDT alternatives No research on impacts of POPs and their alternative to human health and the environment Awareness for the general public is very low	Inadequate research on alternatives and adverse effects to human and the environment
Article 15: Reporting		
Provide data on total quantities of production, import and export of POPs	No clear inter-institutional reporting system	Lack of legal requirement for reporting POPs issues to the Focal Point of the Convention

2.3.8 Current level of information, awareness and education among target groups; existing systems to communicate such information to the various groups; mechanisms for information exchange with other Parties to the Convention

2.3.8.1 Introduction

An inventory was undertaken to determine the level and extent of public information, awareness and education on POPs. The survey revealed that there is very little public information, awareness and education on POPs and other toxic substances in the country. Due to limited awareness on proper use and risks associated with POPs and poor environmental management of the chemicals the quality of human health and the environment have been affected. Although Government and its partners have formulated relevant policies, legislation and guidelines to ensure public awareness and involvement in environmental protection issues, most of these do not specifically address POPs.

The inventory further showed that (i) information exchange on POPs and toxic substances among stakeholders was very limited, (ii) no strategy exists to increase information exchange, (iii), policies and legislation are not implemented aggressively to enhance information exchange and (iv) the various stakeholders including NGOs and the media reporters are not fully involved and capacitated to facilitate information exchange.

2.3.8.2 Overview of public information policy/Practice related to Environment

Issues of public information are guaranteed by the Constitution of the land. In relation to responsible environmental management, it calls upon the state to prevent the degradation of the environment; provide a healthy living, learning and working environment for the people of Malawi; accord full recognition to the rights of future generations by means of environmental protection; and conserve and enhance the biological diversity of Malawi. (Chapter III Section 13(d)). These constitutional provisions related to public information and environmental management form the bases for establishment and operationalisation of institutional, policy and legal frameworks that are essential for the sustainable utilization, protection and management of the environment and natural resources in general and the protection of human health and the environment from POPs in particular in the country. Pursuant to the provisions of the Constitution, several policies and legislation related to information, pesticides and environmental management have been formulated or reviewed and approved while some are in draft form.

The relevant policies to public information that are in place include Malawi Communications Policy (1998), Malawi Information and Communications Technology (ICT) Policy (2003), the National Environmental Policy (NEP) (1996) while the Malawi Broadcasting Corporation Policy (MBCP) is in draft form. The ICT Policy (2003) replaced the Malawi Communications Policy, which did not adequately cover issues of information technology. The policy seeks to harness the power of information and communications technology in order to facilitate and promote national development. The NEP seeks to promote the efficient utilization and management of our environment and natural resources; facilitate the rehabilitation and management of essential ecosystems and ecological processes; enhance environmental education and public awareness of

the importance of sustainable utilization and management of the environment and natural resources; and promote cooperation between government, local communities, non-governmental organizations, the private sector in the environmental management and sustainable utilization of natural resources and the environment.

The legislation that are relevant to public information and environmental management are the Malawi Communications Act (1998), the Environment Management Act (EMA) (1996), and the associated Pesticides Regulations (2002), Pesticides Regulations 2002, the Plant Protection Act (PPA) (1967) and the Seeds Act of 1996. The Malawi Communications Act 1998 puts in place a legal framework for the regulation and provision of information and related services in the communications sector in Malawi comprising telecommunications, posts and broadcasting. The EMA seeks to enhance protection of human health and the environment by giving every person a right to a clean and health environment with a corresponding duty to protect it and prohibiting or reducing use of substances deemed harmful to human health and the environment, among other things.

Malawi developed a National Environmental Education and Communication (EE& C) Strategy (1996) for the promotion of EE and public awareness. The strategy describes EE scope, process and approaches in Malawi. The scope of EE is provided by a definition of EE that stakeholders adopted for Malawi that; is a process aimed at developing a population that is aware of, and concerned about the total environment and its associated problems, and which has the knowledge, value, attitudes, motivation, and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones. In this regard all formal and informal types of environmental education activities about and for each and every aspect of the environment communicated through the various media constitute EE. Through the strategy, the stakeholders in Malawi strive to:

(i) Increase public environmental awareness and participation of especially decision-makers at all levels such as traditional and religious leaders, women and farmers;
(ii) Integrate environmental issues into the formal education system; build institutional capacity for EE&C and public information;
(iii) Increase the quantity, quality and distribution EE&C materials; and
(iv) Decentralize EE&C activities to the local level in line with the National Decentralization Policy.

The development of an Environmental Education Training Manual in 2001 as a supporting document to the implementation of the Environmental Education and Communication Strategy has assisted facilitators greatly to conduct environmental awareness programmes to various target groups such as journalists, musicians, dramatists, youth groups, women organizations, local leaders, as well as political leaders by facilitating the delivery of accurate information by trainers from different environment and natural resources management sectors. The facilitation of effective and meaningful exchange and dissemination of public information that is essential for public participation enhances the degree to which people are aware of and concerned about their health and the environment for them to change their attitudes and behaviour for the better. There is also continual monitoring of the state of the environment report (SOER) since the first

was prepared in 1998 and the second edition was published in 2002. The National Environmental Action Plan (NEAP) prepared in 1994 was updated as well in 2002. Both the SOER and NEAP include EE and public awareness at both national and district levels. However, in all these key documents referred to above, issues of pollution arising from obsolete pesticides and POPs are currently not covered.

2.3.8.3 Present public information tools/mechanisms.

Malawi uses various pathways to share information and thus ensure increased awareness and education. The implementation of this project has been supported by a National Steering committee on POPs drawn from Health, agriculture, mines, natural resources and Environment, Environment & wildlife society, Revenue authority, Commerce, Trade and Industry, Malawi Chamber of commerce and Industry, University, Malawi Bureau of Standard, ESCOM and a non governmental organization representatives including the Association of Professional Chemists and Chemical Engineers of Malawi. This structure ensures information flow and thus greater awareness among the target groups. The National Point is responsible for communicating with the Stockholm Convention secretariat all matters relating to the application of the obligation stipulated in the convention. Implementation of the NIP requires greater and effective information exchange and stakeholder participation to achieve impact.

The Environmental Affairs Department and its partners including CURE and other NGOs develop various radio and television programmes and organize seminars, workshops and meetings at village and district levels to increase public participation and awareness. The country also commemorates UN and Africa days to related to the environment. These events include World Environment Day/ National Tree Planting Day/ Presidential Environmental Award in Mining. To ensure greater participation Malawi organizes essay Competitions (especially for school children), revises school curricula, supports NGOs/ CBOs/Environmental Clubs and drama/ songs and traditional dances. These are thus important pathways for the dissemination of information related to POPs.

2.3.8.4 Assessment of environment as a public priority

The Constitution of Malawi guarantees the following freedoms of opinion, expression, the press and access to information (Chapter IV Sections 34, 35, 36 and 37). In relation to the environmental as a public priority, the constitution calls upon the state to prevent the degradation of the environment; provide a healthy living, learning and working environment for the people of Malawi; accord full recognition to the rights of future generations by means of environmental protection; and conserve and enhance the biological diversity of Malawi. (Chapter III Section 13(d)). Consequently, EMA (1996) has and continues to strengthen its outreach and education unit. Further, relevant policies have been developed which promotes and ensures the public is well informed. These include Malawi Communications Policy (1998), Malawi Information and Communications Technology (ICT) Policy (2003), the National Environmental Policy (NEP) (1996) while the Malawi Broadcasting Corporation Policy (MBCP) is in draft form. The ICT Policy (2003) replaced the Malawi Communications Policy, which did not adequately cover

issues of information technology. The policy seeks to harness the power of information and communications technology in order to facilitate and promote national development.

2.3.8.5 Chemical contaminant and pollutant release public information Programmes

The country has adequate experience in this area. For example, under the Ozone project, Malawi organized several dissemination workshops and involved farmer organizations to reach the greater public. The involvement of ARET in this regard had resulted in efficient elimination of methyl bromide.

2.3.8.6 Information exchange with other partners

Since the inception of the Project, Malawi has exchanged information on POPs with its various partners. The three project reports have been submitted to UNIDO and intergovernmental for a. Regionally, Malawi has disseminated the progress of the project to the private sector locally and its investment partners such as UNIDO, UNITAR, UNEP and USAID.

The gaps and deficiencies associated with this component are presented in Table 14.

Table 14: Gaps and deficiencies in public information, awareness and education on POPs issues

Convention requirements	Inventory findings	Gaps and deficiencies
Article 10: public information, awareness and education		
Promote and facilitate public awareness, development and exchange of education and public awareness materials	Lack of awareness	Existing pathways lack focus on POPs Information at international level not easily accessible because of language and information technology barriers Lack of POPs technical expertise in the media
Training of workers, scientists, educators and technical and managerial personnel	Specific educational and public awareness programmes on POPs are not in place.	Inadequate training materials Inadequate training programmes inadequate resources in terms of specialized skill and finance
Ensure availability and accessibility of all available information to the public	Provision of public information is not mandatory No adequate national data and information on POPs for dissemination to public	The relevant policies and legislation do not provide for availability and accessibility of public information on POPs
Collection and dissemination of information on estimates of the annual quantities	The existing pathways lack focus on POPs There is no comprehensive national technical information on POPs	Lack of information base Weak institutional capacity

2.3.9 Relevant activities of non-governmental stakeholders

Consistent with EMA (1996) Malawi established a national Steering Committee, which includes NGOs active and involved in environmental chemical related issues. NGOs have emerged as major partners in development and conservation activities particularly through enhancing education and raising awareness among the public. NGOs are helping in designing and implementation of policies, programmes and action plans, and setting out specifications for EIAs including advocacy roles through their environmental campaigns. The inventory revealed that several NGOs exist which advocate and facilitate information transfer, education and awareness in environmental issues, New ones have since emerged.

NGOs in Malawi fall generally into three categories of being religion-based, sector-specific, or having a broad developmental mandate. Many NGOs are familiar with the project's intended activities These non governmental entities are advocates of, and are committed to two important main strategic influences in the sector, one being the Decentralised Environmental Management (DEM) approach and secondly, the Community Based Natural Resource Management (CBNRM) guiding principles. It is well understood that NGOs will become valuable executing agencies and secondary stakeholders in the implementation of most of the socio-economic development programmes.

The NGOs have analyzed their potential role in Decentralised Environmental Management and developed a strategy through the facilitation of the umbrella NGO network, the Coordination Unit for the Rehabilitation for the Environment (CURE). To increases efficiency, CURE, the umbrella organization on the environment represents the rest at the SC. During the inception and implementation of the Project, several NGOs participated in consultative workshops to review project plans and country reports. Important NGOs and their roles and activities are provided in Table 15.

Table 15: Roles and responsibilities of NGOs and other stakeholders in implementation of the NIP

NGO	Specific roles
CURE	Advocacy Networking
CONGOMA	Policy input
MEET	Funding
MMCT	Policy framework for communication
CAMA	Advocacy for consumers
FACSEAT	Toxicity of POPs
FECO	Publicity
CEPA	Policy advocacy
COJEA	Publicity
GREENWIGS	Policy advocacy

2.3.10 Overview of technical infrastructure for POPs assessment, measurement, analysis, alternatives and prevention measures, research and development-linkages to international programmes and projects

2.3.10.1 Introduction

Malawi has built a strong and vibrant scientific and technology infrastructure to support research and development endeavors on and into POPs assessment, measurement, analysis, alternatives and prevention measures, research and development. Some expertise to support national effort to manage POPs chemicals within and outside Government exists. The experts are drawn from public institutions. The country has the capacity and capability for data collection, analytical testing of chemicals, risk assessment, risk reduction, policy analysis, training and education, research into alternatives, monitoring and enforcement. This is however limited and declining due to brain drain and succumbing to HIV/AIDs pandemic. Universities, colleges, public and private foundation research institutes, implement research and development activities in science and technology. These institutions have developed both local and international networks to achieve greater relevance and impact and thus contribute to socioeconomic development.

Malawi has two Universities and a new one on science and technology will commence its programmes in mid 2006. The key Research institutions are the Department of Agriculture Research Technical Services (DARTS); The Forest Research Institute of Malawi (FRIM) conducts Forest Research and Malawi Fisheries Research Institute (MAFRI), ARET, TRF.

Each of these institutions has either/or a combination of usage, management or regulatory functions. Their functions are often not coordinated, with some institutions experiencing conflicts in the execution of duties leading to duplication of efforts, gaps in regulation and control and waste of resources.

2.3.10.2 Waste management facilities

Local Authorities have designated sites and facilities for the management of wastes including those from POPs. These facilities are available for use by service providers such as ESCOM. However, Malawi needs expanded facilities and adequate human resource to manage these more effectively and efficiently. Diversifying the resource base to support this component remains a priority.

2.3.10.3 Contaminated site remediation capability

The country has limited capacity to undertake remediation of contaminated sites. The University of Malawi programmes on environmental sciences at undergraduate and postgraduate levels needs to incorporate this component. The recruitment of such personnel by local authority will enhance their capacity in this sector.

2.3.10.4 Environmental monitoring capability

The Department of Environmental Affairs and its partner institutions have adequate capacity to implement environmental monitoring. About five years ago, an Association of EIA experts was

formed to support the assessment of environmental impact of projects. The University of Malawi continues to facilitate the training of EAD staff and other stakeholders to increase skills and competencies in this field. Most of the MSc students undertake projects, which are related to environmental monitoring.

2.3.10.5 Health monitoring capability

The Ministry of Health has some capacity for this component. It links with EAD, MOA, UNIMA and the Labor Ministry to generate information on the health impact of toxic chemicals and substances including POPs. To increase effectiveness, MOH has a separate environmental Health Section in the Ministry, staffed with competent personnel.

2.3.10.6 Research and development Assets

The country has basic infrastructure to support research and development studies on POPs. The S&T institutions have been well endowed with human resource until recently. In the past ten years, brain drain and loss of lives due to HIV/AIDs pandemic have compounded numbers and health on the ground respectively. The proposed NIP needs to be supported by a strong and functional R&D systems at all levels. This will consolidate studies, which have been initiated in this country.

2.3.10.7 Information management capacity

EAD and its associate partner Ministries have education and outreach units responsible for information packaging, dissemination and outreach programmes through various media outlets. The unit in EAD and its staff require strengthening. The media houses and ENRM NGOs including CURE have reasonable capacity to assist with information management in the country. Capacitating in all stakeholders in information management consistent with the new IT policy is being emphasized.

2.3.11 Identification of impacted populations or environments, estimated scale and magnitude of threats to public health and environmental quality and social implications for workers and local communities

In Malawi, the urban, semi-urban and rural communities are exposed to POPs through occupational and non-occupational exposure. Exposure to these toxic substances/chemicals is due to accidental, negligence at workplace or home, non-compliance to occupational safety guidelines and using POPs products for roadside vending. Vulnerable groups thus include wholesalers and retailers of pesticides, users, industrial, domestic and farm workers adults and children at home and the general public.

The survey on the presence, extent and use of POPs in the country revealed that human beings could be exposed to POPs through diet, occupational accidents and the environment. Exposure to POPs, either acute or chronic, can be associated with a wide range of health effects ranging from illness to death.

Laboratory research in wild animals and environmental impact assessments implicate POPs in endocrine disruption, reproductive and immune dysfunction, neurobehavioral disorders and cancer. Research findings have also shown that POPs reduce immunity in infants and children, and also cause increased development abnormalities, neurobehavioural impairment and breast cancer and tumour induction or promotion.

Personnel working at industries that have PCBs containing equipment and products are at high risk of PCBs exposure. This is because generally workers handle PCBs containing equipment without appropriate protective wear. This is compounded by little awareness on the dangers posed by PCBs. The general public is also at risk to the exposure of PCBs as some of the PCBs contaminated sites were close to water bodies, schools, residential areas and food processing units.

Acute exposures to high levels of PCBs have been associated with skin rashes, itching and burning, eye irritation, skin and fingernail pigmentation changes, disturbances in liver function and the immune system, irritation of the respiratory tract, headaches, dizziness, depression, memory loss, nervousness, fatigue and impotence. Chronic effects of low-level PCBs exposures reported include liver damage, reproductive and developmental effects and possibly cancer.

The Malawian farming communities comprise women and children implying that women and children are vulnerable to the dangers of POPs. The risk to POPs pesticides contamination is mainly due to improper disposal of obsolete pesticides and containers. This is compounded by lack of awareness among the users and handling personnel. Pesticide containers, after the products are used up, are given out to laborers and the surrounding communities for use to draw drinking water, thus putting the whole farming family at risk.

In humans, there is evidence that high-level exposure to dioxins and furans can cause variations in serum lipid level, microsomal enzyme induction, and gastrointestinal alterations. Other studies of high-level occupational exposure have found associations with some types of cancer, and have concluded that uterus and lactational exposures to dioxins and furans are capable of affecting the hypothalamic/pituitary/thyroid regulatory system in human infants. According to U.S. EPA, effects on humans, including hormonal and metabolic changes, have been documented at dioxin body burdens and exposures only slightly higher than those of the general population.

Dioxins are known to be toxic at extremely low doses. On average, Americans are exposed to only 1 to 3 picograms per kilogram of body weight per day and the U.S. population revealed an average body burden of 7-8 nano-g/kg of body weight (U.S. EPA, 1982). A 2000 evaluation indicates that adult daily intakes of dioxin and related compounds, including dioxin-like PCBs average 70pgTEQ(DFP).

In most industrialized nations of the world, dioxin body burdens and exposures are in the same range, with levels assumed to be somewhat lower in developing countries, where little testing has been done.

The World Health Organization recently lowered by more than half its tolerable daily intake from 10 pg, fixed previously in 1990, to 4 pg/kg bw, based on a recognition that subtle effects

may already occur in the general population in developed countries at levels of 2 to 6 picograms. (WFPHA, World Federation of Public Health Associations, 2000).

The impacts and extent of exposure to dioxins and furans in Malawi are not well recognized among the population due to lack of awareness of the degree of emissions and its associated health and environmental effects. It is expected that exposure to these toxic substances has some negative impacts in Malawi.

The most important hotspots for POPs in Malawi include transformer yards (places where transformers are repaired in the case of PCB's) dumping sites, incinerators in hospitals and bush fires for furans and dioxins; coffee, tea, and cotton estates, ADMARC warehouses and laboratories for POPs pesticides.

The international based scientific evidence suggests that some POPs have the potential to cause significant adverse effects to human health, at the local level, and at the regional and global level through long-range transport. POPs are linked to a variety of effects in humans, wildlife, and the environment. The toxicity of POPs to larger mammals is generally very low. In human beings important symptoms associated with POPs poisoning include violent tremors, loss of mobility, convulsions and death.

2.3.12 Details of relevant system for the assessment and listing of new chemicals

Malawi has two important and pertinent pieces of legislation, EMA (1996) and Pesticides Act (200) that have the mandate to effectively manage new chemicals, assessment and enlisting in the country. In accordance with the EMA the District Environmental Offices provide assessment and listing reports to the Environmental Affairs Department, which submit a consolidated report to the National Council on the Environment, Parliamentary Committee/ Cabinet Committee on the environment. EAD also obtain information from institutions, which deal with pesticides issues such as the PCB, ESCOM, UNIMA and estates.

In accordance with section 40 of the Pesticides Act the reporting procedure under the PCB starts with inspectors at entry points who gather information, compile data and subsequently report to the PCB Secretariat. The secretariat reports to the Board members during quarterly Board Meetings and the Registrar reports annually to SEARCH, FAO and UNEP. ESCOM has presently an assessment system to feed to PIESA; these will consolidate a national database on pesticides.

The establishment of Chemical Steering Committee will increase efficiency and effectiveness in the assessment and listing of POP. This committee will monitor and ensure that scientific approaches to these exercises are applied. The inclusion of guidelines for the assessment and listing of POPs in the two pieces of legislation is a priority. This will constitute an important strategy to reducing circulation and use of POPs in the country.

2.3.13 Details of relevant system for the assessment and regulation of chemicals already in the market

The Pesticides Control Board is responsible for the assessment and regulation of all pesticides on the market. This is besides the EMA (1996), which also has the mandate to effectively manage new chemicals, assessment and enlisting in the country. The implementing agency for the latter, PCB monitors new introduction and assess the use of existing ones. PCB works closely with the MRA to monitor imports at the borders. The establishment of Chemical Steering Committee will increase efficiency and effectiveness in the assessment of POP. The inclusion of POPs in all legislation and specific inclusion of assessment and enlisting of new chemicals constitutes an important strategy to reducing circulation and use of POPs in the country.

Malawi implements the reporting system consistent with the requirements of the Environment Management Act and the Pesticides Act. In accordance with the EMA the District Environmental Offices provide reports to the Environmental Affairs Department, which submit a consolidated report to the National Council on the Environment, Parliamentary Committee/ Cabinet Committee on the environment. EAD also obtains information from institutions, which deal with pesticides issues such as the PCB, ESCOM, UNIMA and estates.

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2.4 National priorities on POPs management and key issues

2.4.1 Introduction

During Phase III of the project, a set of multi-criteria for prioritization of POPs issues based on the findings of the inventories in phase II (inventory phase) were developed. This helped the country determine the significance of different aspects of the problems associated with POPs and rank all issues identified in the inventories for action and identify priority areas for attention. Through stakeholder consultation, missing information for full priority assessment was identified and subsequently, short, medium and long-term objectives for management of POPs in compliance with the Stockholm Convention were set and prioritized.

2.4.2 Priority issues and objectives

Fifty-one participants drawn from the key stakeholders participated in priority assessment and objectives setting for POPs during a workshop held on September 2004. The stakeholder consultative workshop agreed on the criteria of prioritization, prioritized the issues, objectives and strategies necessary for effective management of POPs in Malawi. The main identified priority issues were grouped in 4 major areas:

Legal and institutional framework for management of POPs

(i) Review of pollution control related policies and legislation for effective implementation of the Stockholm Convention;
(ii) Strengthening institutional capacity of the government departments and other institutions involved in implementation of the Rotterdam and Stockholm Conventions;
(iii) Strengthening and enhancing enforcement of relevant legislation;
(iv) Development of regulations on monitoring of POPs;
(v) Strengthening capacity of institutions responsible for coordination of monitoring of POPs releases;
(vi) Developing mechanisms to promote proper management of stockpiles of POPs Pesticides and DDT, wastes and contaminated sites; and
(vii) Establishing coordination mechanism pertaining to PCDD/PCDF management.

Monitoring of POPs

(i) Developing monitoring systems on POPs Pesticides and DDT and their impacts to human health and the environment;
(ii) Establishing monitoring standards and procedures/guidelines for POPs releases and procedure for assessment of impacts to human health and the environment; and
(iii) Creating schemes for monitoring, control and management of releases of POPs and contaminated sites

Technology for control of POPs releases

(i) Establishing facilities for disposal of POPs wastes and contaminated equipment;
(ii) Developing and implementing clean up and remediation schemes of POPs contaminated sites and those which pose threat of further contamination;
(iii) Promoting and encouraging adoption of best available techniques (BATs) and best environmental practices (BEPs), ; and
(iv) Instituting mechanisms for PCDD/PCDF release control.

Public information, awareness and education

(i) Developing technical information on POPs for use as reference materials in government departments and agencies, academic and research institutions and NGOs;
(ii) Improving information dissemination infrastructure in key institutions;
(iii) Establishing database on POPs; and
(iv) Developing programmes for raising awareness on POPs releases and their effects on human health and the environment.

The priority issues, objectives and strategies are provided in Table 16.

Table 16: Priority issues, objectives and associated strategies

Subsector	Priority Issues	Main Objective	Strategies
POPs Pesticides including DDT	Strengthening capacity in terms of manpower and infrastructure; Enhancing levels of awareness on risks of POPs Pesticides including DDT; Developing monitoring programs on effects and impacts of POPs Pesticides including DDT to human health and the environment; Strengthening legislation and enforcement mechanisms; Establishing environmentally sound technologies to manage POPs Pesticides including DDT wastes; Developing mechanisms to promote proper management of stockpiles of POPs Pesticides and DDT, wastes and contaminated sites; Reviewing legislation for POPs Pesticides management; Developing guidelines for POPs Pesticides management Developing programs to promote the use of alternatives of POPs Pesticides and DDT; Strengthen international co-operation on exchange of technical information to improve scientific knowledge and skills in POPs Pesticides including DDT management.	Production and use of POPs Pesticides including DDT eliminated	Strengthen legal framework and enforcement mechanisms Promote research and development of alternatives to POPs Pesticides Develop and implement mechanisms for promoting management of stockpiles of POPs Pesticides and contaminated sites Build national capacities in POPs Pesticides management Raise awareness to stakeholders on POPs Pesticides including DDT Minimize risks on environment and human health from POPs Pesticides including DDT Promote environmentally sound technology for the disposal of POPs Pesticides including DDT wastes Promote effective POPs Pesticides including DDT networking

Furans and dioxins	Creating public awareness on PCDD/PCDF sources and their effects on human health and the environment	Reduction and elimination of releases of PCDD/PCDF	Develop and implement public awareness creation programmes on PCDD/PCDF sources and their effects to human health and the environment Explore various media outlets for information sharing and dissemination Strengthen institutional capacity for control of PCDD/PCDF releases Establish effective mechanisms to strengthen coordination and collaboration on matters of PCDD/PCDF among relevant stakeholders Develop and maintain a database on PCDD/PCDF information Establish monitoring programmes for PCDD/PCDF emission sources Initiate and support studies on the development of local/regional emission
	Reviewing and formulating policies /regulations on management of PCDD/PCDF consistent with the Stockholm Convention		
	Enforcing existing policies/laws that have direct or indirect bearing on PCDD/PCDF management		
	Formulating and organizing training programmes on PCDD/PCDF management		
	Establishing monitoring programmes on emissions of PCDD/PCDF and institute mechanisms for PCDD/PCDF release control		
	Undertaking inventories to include specific studies to generate baseline information to complete existing gaps		
	Assessing the severity of contaminated sites and effect remedial measures/clean-up campaigns		
	Promoting research on alternative materials/ technologies targeting at reducing PCDD/PCDF releases		
	Acquiring and encouraging adoption of BATs and BEPs		
	Develop technology import standards and procedures to screen outmoded technologies		
	Implementing practical measures to reduce or eliminate PCDD/PCDF at source		

	Establishing coordination mechanism pertaining to the PCDD/PCDF management.		factors Update and carry out further inventory in areas not covered by the previous inventory Participate in regional and international initiatives geared towards managing PCDD/PCDF releases. Promote national, regional and international expert networking Institute mechanism for prevention and control of PCDD/PCDF releases Develop and implement economic incentive mechanisms for use of cleaner technologies. Support and encourage adoption of BATs and BEPs. Promote regional and international cooperation for joint strategies in managing PCDD/PCDF Promote research on and adoption of BATs and BEPs including alternative materials and technologies Promote and support clean up of contaminated sites
Reporting	Regulations on monitoring of POPs; Comprehensive POPs monitoring program; Strengthening capacity of institutions responsible for coordination of monitoring of POPs releases; •Strengthening institutional capacity for monitoring POPs releases in the relevant institutions;		Review and harmonize relevant legislations Develop and implement monitoring programmes Establish information dissemination programmes and improve information

	Monitoring standards and procedures/guidelines for POPs releases and assessment of impacts to human health and the environment Enhancing public awareness campaigns on POPs issues Development of research studies on alternatives and effects of POPs to human, animals and the environment particularly in areas		access including database Create public awareness on monitoring and evaluations information Develop appropriate standards and procedures Strengthen monitoring capacity for POPs, alternatives and their effects Establish and conduct training programmes
PCBs	Reviewing and establishing legislation and enforcement regimes on PCBs; Develop programmes for raising awareness on PCBs; Establish schemes for monitoring, control and management of releases of PCBs and sites contaminated with PCBs; Establishing cleanup and remediation schemes of contaminated sites; Conducting a comprehensive inventory of PCBs to cover the whole country; Developing facilities for disposal of PCBs; Enhance information generation, access and dissemination; Strengthening institutional capacity at all levels (community, civil society, political and decision making etc) to handle PCBs Strengthening local research capacity on alternatives and technologies. Schemes for monitoring and control of releases of POPs and sites contaminated with POPs Completion of comprehensive inventory of contaminated sites to cover the entire country; and enforcement regimes on POPs; Establishing clean up and remediation schemes/efforts; Enhancing information generation, access and dissemination Developing facilities for clean up and disposal of POPs which poses threat of further contamination; Strengthening institutional capacity to handle POPs contaminated sites; and	Phasing out and eventual elimination of PCBs	Establish and public awareness programmes Establish viable and cost-effective disposal alternatives Set up disposal facilities and strengthen transfer of environmentally sound technologies for PCB waste management. Strengthen international co-operation on exchange of technical information to improve scientific knowledge and skills in PCB management Strengthen information exchange networks within the country, region and the internationally

	Increasing local research capacity on clean up and remediation technologies.		
Research, development and monitoring of POPs, alternatives and effects	Enhance public awareness campaigns on POPs issues; and Updating legislation to include monitoring Develop regulations on monitoring of POPs; Establishing monitoring standards and procedures/guidelines for POPs releases and procedure for assessment of impacts to human health and the environment; Develop a comprehensive POPs monitoring program; Strengthen capacity of institutions responsible for research, development and monitoring of POPs releases; Develop research/studies on alternatives and effects of POPs to human, animals and the environment	Implement an effective monitoring programme on POPs releases and accumulation to the environment	Strengthen capacity of institutions involved in monitoring of POPs. Enhance partnership amongst institutions involved in monitoring of POPs Develop and enhance information exchange and coordination Strengthen monitoring capacity for POPs, alternatives and their effects Develop appropriate standards and procedures for monitoring Develop comprehensive POPs monitoring schemes Improve research capacity (laboratories, equipment and infrastructure) for effective R&D Develop and implement research programme on POPs, alternatives and their effects to human and the environment including contaminated sites Identify and promote the adoption of feasible alternatives
Contaminated sites and stockpiles	Establishment of legislation and enforcement regimes on POPs; Schemes for monitoring and management of releases of POPs and sites contaminated with POPs; Establishing clean up and remediation schemes/efforts; Completion of comprehensive inventory of contaminated sites to cover the entire country; Developing programmes for raising awareness on POPs;	Prevent POPs contamination and effectively manage contaminated sites	Assess awareness needs of various stakeholders and establish public awareness programmes Develop awareness materials (newsletters, brochures and fliers) Develop national technical information

	Developing facilities for clean up and disposal of POPs which poses threat of further contamination; Enhancing information generation, access and dissemination; Strengthening institutional capacity to handle POPs contaminated sites Increasing local research capacity on clean up and remediation technologies.		on POPs for dissemination Use appropriate language and complexity for different stakeholders Develop information base on sites contaminated with POPs Strengthen international co-operation on exchange of technical information to improve scientific knowledge and skills in POPs management Develop monitoring schemes and implement monitoring programmes Establish and regularly update register of stockpiles, wastes and contaminated sites Strengthen capacity of relevant institutions Establish sustainable funding mechanisms including economic incentive mechanisms
Public information, awareness and education on POPs	Strengthen existing policies/laws to address public awareness and involvement on POPs issues. Improvement of information dissemination infrastructure in key institutions; Develop technical information on POPs for use as reference materials in government departments and agencies, academic and research institutions and NGOs, private institutions; Establishment of national information centers, networks and databases on POPs; Incorporate POPs issues in Primary/secondary School and tertiary curricula;	Public awareness and knowledge on POPs issues enhanced	Improve information disseminating infrastructure in key institutions Strengthen information generation, storage management and dissemination Establish information exchange networks (national, regional, sub-regional and international) Establish and strengthen information centers

	Conduct training on POPs issues to media, customs personnel, agriculture extension officers, NGOs and other key actors in awareness creation; Supporting development and dissemination of public information and awareness materials on POPs in a common language; Development and effect educational materials on POPs Involvement of NGOs/CBOs/ religious/cultural groups in outreach		Establish a database on POPs Strengthen capacities of information generation, and management units Establish and implement training programmes for stakeholders Incorporate POPs issues in existing information dissemination mechanisms and school and college Develop information and awareness materials on POPs in a common language
Legislation	Strengthening the implementation of the Pesticides Act of 2000 and EMA 1996; POPs affected institutions establishing mechanisms to implement enabling activities for POPs phase out; Effective management of storage facilities, POPs equipment and contaminated material and sites Providing policy instruments relating to the management and handling of PCB's including purchase, use, containment, storage and destruction of PCBs Designating licensed PCBs storage area in Malawi Strengthening institutional capacity of the government departments and other institutions involved in implementation of the Basel, Rotterdam and Stockholm Conventions; Strengthening cooperation and collaboration among institutions involved in POPs management; Improving involvement of NGOs, CBOs and independent sector to increase sensitization of all actors on POPs management issues	Institutional and legal framework for elimination and management of releases of POPs strengthened	Review pollution control related policies and legislation for effective implementation of the Stockholm Convention Strengthen institutional capacity of the government departments and other institutions involved in implementation of the Rotterdam and Stockholm Conventions Strengthen and enhance enforcement of relevant legislation; Strengthen capacity of institutions responsible for coordination of monitoring of POPs releases Develop mechanisms to promote proper

	Promoting /strengthening Regional and International co-operation on exchange of technical information to improve scientific knowledge and skills in POPs management of the existing laws.		management of stockpiles of POPs Pesticides and DDT, wastes and contaminated sites Establish coordination mechanism pertaining to PCDD/PCDF management. Enhance and support partnership amongst institutions involved in POPs management

2.4.3 Malawi's priority objectives

The implementation plan articulated in Chapter 3 will facilitate Malawi's management of POPs and other PTS. This will ensure a well-informed Malawi society, which will subsequently manage POPs and other toxic substances for, improved welfare, increased cash incomes and healthier environment. The country's priority objectives to this end are thus seven-fold:

(i) Increase awareness and education of the Malawian communities and partners on the POPs and their effects of on health and the environment;
(ii) Enhance and where necessary develop skills and competencies of partners at all levels enhanced for effective research, monitoring, modeling, dissemination, negotiations and effective implementation of programmes;
(iii) Integrate management of POPs and other persistent toxic substances in national socio-economic development programme;
(iv) Develop policy, elgal and institutional frameworks for effective management of POPs and PTS;
(v) Develop and implement effective disposal and management systems of obsolete POPS, stock piles of toxic substances and contaminated sites;
(vi) Develop and institute monitoring and evaluation (M&E) tools and indicators for assessing impact of POPs on socio-economic activities and implementation programme;
(vii) Identify and promote coordination and networking among responsible institutions, and
(viii) Develop and implement sustainable resource mobilization strategies for effective programme and project implementations and infrastructure development.

Chapter 3: Strategy and action plan elements of the national implementation plan

3.1 Introduction

This chapter comprises various components of the implementation strategy for the NIP. It includes policy statement, strategies, activities, budgets and associated plans to achieve obligations under the Stockholm Convention on persistent organic pollutants.

3.1.1 Policy Statement

Malawi participated in the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992. At this Conference, Heads of States or Governments adopted " Agenda 21" – a document that seeks, among other things, to enhance sound management of chemicals. The document, outlined responsibilities of every nation towards the collective achievement of sustainable development. Of special relevance for chemicals management is the chapter 19 of "Agenda 21" which deals with environmentally sound management of chemicals, including illegal international traffic in toxic and dangerous products. Under this, governments are expected to develop actions and priorities relating to:

(i) Information exchange on toxic chemicals and chemicals risks;
(ii) Harmonization of classification and labeling of chemicals;
(iii) Expanding and accelerating international assessment of chemical risks;
(iv) Establishment of risk reduction programmes;
(v) Prevention of illegal international traffic in toxic and dangerous products; and
(vi) Strengthening national capabilities and capacities for the management of chemicals.

In response to this global concern, the Malawi Government has taken concrete steps and measures to address the above issues in order to achieve sustainable environmental protection and economic development. The ultimate aim of the overall National Environment Policy of Malawi is to promote sustainable social and economic development through sound management of the environment in the country. The policy, specifically, seeks to:

(i) Secure for all persons resident in Malawi now and in the future an environment suitable for their health and well-being;

(ii) Promote efficient utilization and management of the country's natural resources and encourage, where appropriate, long term self-sufficiency in food, fuel wood and other energy requirements;

(iii) Facilitate the restoration, maintenance and enhancement of the ecosystems and ecological processes essential for the functioning of the biosphere and prudent use of renewable resources;

(iv) Enhance public awareness of the importance of sound environmental understanding of various environmental issues and participating in addressing them; and

(v) Enhance co-operation with Governments and relevant international/ regional organizations, local communities, non-governmental organizations and the private sector in the management and protection of the environment.

This policy framework will attain these objectives in a period of 15 years from the inception of the NIP under the assumptions that financial technical and human resources capacity will be minimal interrupted by natural and economic pressures unforeseen during the period.

3.1.2 Government's Commitment To Address The POPs Issues

Within the context of chapter 19 of Agenda 21 and in line with the National Environmental Action Plan (NEAP) and the National Environmental Policy (NEP), Government seeks among other things to "take appropriate measures, irrespective of the existing levels of environmental pollution and extent of degradation, to control pollution and the importation and use of potentially toxic chemicals".

Persistent Organic Pollutants fall under the category of potentially toxic chemicals. Malawi is committed to the effective implementation of the provisions and obligations of the Stockholm Convention on POPs. The Environmental Affairs Department is expected to play a leading role in promoting safe management and use of chemicals (including POPs) for industrial, agricultural, public health and consumer uses in order to avoid damage to human health, the ecosystems, and the environment in general in ensuring sustainable development.

Initially, to ensure sound management of chemicals in Malawi, a national profile for chemicals management was prepared in 1998. The document provides a comprehensive assessment of the national chemicals management infrastructure relating to the legal, institutional, administrative and technical aspects, along with an understanding of the nature and extent of chemicals availability and use.

The overall objective of the sound management of POPs in Malawi is to strengthen the national capacity and capability to deliver a comprehensive assessment and intervention measures that will ameliorate the threats posed by exposure of POPs to humans and the environment. The National Implementation Plan will build on existing work and assessments and form an integral part of the national integrated chemicals management programme. It will take due account of the aims of the national sustainable development in the sense of social, economic and environmental policies and actions in order to maximize their overall benefits. This will avoid "reinventing the wheel" and link the NIP to related national chemicals management initiatives where possible to ensure maximum efficiency and reduce duplication of efforts.

The NIP has therefore been developed to create an enabling environment for the ultimate reduction and elimination of POPs based on voluntary and non- voluntary approaches and mechanism to the adoption and application of alternatives to POPs at industrial and enterprise level to ensure sustained recourse.

3.1.3 Endorsement of National Implementation Plan (NIP)

The process of developing the NIP involved active participation of broad-base relevant national stakeholders, including government ministries, departments and agencies; research institutions and academia; non-governmental organizations (including women and children activists), community based organizations; and the media. The NIP has been commended and endorsed by

the various and key stakeholders at a national workshop held on 12 September 2005 (Annex 1), the Steering Committee on 3rd December 2005 and finally the National Council for the Environment on 20th December 2005.

3.2 Implementation Principles and Approach.

3.2.1 Implementation Principles

An effective implementation of the Stockholm Convention on POPs in Malawi will revolve and be guarded by the following principles:

(i) **National inter-sectoral coordination:** A coordinated approach will be adopted, with co-operation among all relevant stakeholders at all levels with responsibilities related to chemicals management as well as those involved in activities that influence chemical safety, including representatives of industry, labour and public interest groups such as representatives of women and children groups;

(ii) **Data management and information sharing:** Implementers and stakeholders will be encouraged to ensure that appropriate and accurate data on chemical management is collected, processed, utilized and linked to environmental and health data bases for monitoring and evaluation of POPs impacts. This shall form the basis for public education, awareness and information sharing on local and international situation of POPs risks and management in Malawi;

(iii) **Strengthening and harmonization of institutional and regulatory frameworks:** Existing legislation and policies on chemical management will be reviewed in light of various conventions related to chemicals including POPs and where applicable new ones developed and enacted. Administrative review arrangements and mechanism will be set up in view of subsequent changes and emerging new scientific evidence of specific chemical or their derivatives on their impact on human health and environment;

(iv) **Capacity building:** Successful implementation of the NIP hinges on availability of adequate skilled personnel and appropriate infrastructure in chemical management. Efforts will be made to identify capacity gaps and training needs. Detailed plans and training programs facilitated through design of appropriate competence based short courses;

(v) **Research and Development:** Academia will be encouraged to develop and conduct research in specific areas related to POPs including epidemiological and environmental determinants that correlates with POPs in Malawi. (Characteristics of flora fauna and human population). Special emphasis will be placed on the vulnerable population such as people with low-income capacity both employed and unemployed, the elderly, women and children. Deliberate attempts shall be made on further research in identification of appropriate alternatives and trails on BEPs and BATs on POPs generating materials, processing and processes using locally available material resources to facilitate segregation, reuse, recycling, and waste minimization with maximum ultimate production of intended products.

(vi) Review, reporting, evaluation and updating of the NIP

3.2.2 Implementation Approach

3.2.2.1 Implementation review mechanism

Implementation of the NIP is multi-sectoral in approach and will therefore require well-coordinated mechanisms. At the center of coordination is the focal point under the direction of the National Steering Committee (NSC) on POPs. In order to implement an efficient review of the NIP, there is need to formally task a highly placed institution on regulating environmental issues in Malawi. The National Council on Environment plays a pivotal role on determining socio-economic and developmental impact on the environment in Malawi. Therefore annual reports with emphasis on the status of key milestones in the NIP shall be reviewed by the NCE in liaison with the NSC of POPs. Upon its recommendations, specific sections of the NIP may be reviewed based on evident outcomes or shortcomings, new scientific information on POPs, technological innovations on BATs and BEPs or changes of obligation of the convention as may be reviewed by the Conference of Parties. During the initial phase of implementation of the NIP major reviews may be effected within a period of 2 to 3 years and subsequently a lapse of 3 to 5 years. Any review to the NIP shall be done in consultation with stakeholders and the reviewed NIP duly circulated upon taking effect.

3.2.2.2 Outline Framework for Institutional Roles And Responsibilities

The outline framework for assigning institutional roles and responsibilities is presented in matrix below as shown in Table 17.

Table 17: Responsibility assignment matrixes

Strategies	Responsible Institutions/Organizations	Specific Role
National inter sectoral coordination	Ministry of Mines, Natural Resources and Environment (Environmental Affairs Department)	Overall coordination and monitoring and evaluation of POPs
	Ministry of Trade and Private Sector Development	Monitoring and evaluation of investment data
	Ministry of Commerce & Industry, Malawi Bureau of Standards	Setting Standards and Quality Assurance
	Ministry of Health	Human health impacts & Poisons, Vector Control
	University & research institutions	Research and Development
	Ministry of Agriculture	Pesticides, monitoring and evaluation
Data management & information sharing	Ministry of Mines, Natural Resources & Environment, EAD	National Database for POPs

Strategies	Responsible Institutions/Organizations	Specific Role
	Ministry of Information (ICT) Economic Planning and Development Resource Centres	Networking and linking with sectoral databases i.e. Health Agriculture and NSO Providing access to information
	National Research Council of Malawi	Development of information databases and providing public access to such Coordination and research
	Ministry of Local Government	Dissemination of information
	Media and civil society	Public information awareness and education
Strengthening & Harmonization of Institutional and Regulatory frameworks	Ministry of Justice Malawi Law Commission	Overall lead agency, reviewing drafting and building linkages of sectoral laws
	Ministry of Mines, Natural Resources & Environment, EAD and other relevant sectoral ministries	Institutionalizing & framing policies and enforcement
	Home Affairs	Enforcement and prosecution
	Office of the President and cabinet	Enactment and deciphering crosscutting issues
	Local Governments	Enforcement and development of bye laws
	Ministry of Industry, Science and Technology	Licensing of industries involved in hazardous chemical waste processing
	Ministry of Finance, Customs department (Malawi Revenues Authority)	Obligating funds to established institutions & effecting taxes on import and export. Enforcement Control imports of POPs containing equipment
	Ministry of Water Development and Irrigations	Enforcements of minimum levels of PCBs and other POPs in water
Capacity Building	Ministry of Mines, Natural Resources & Environment, EAD & sectoral ministries, Private Sector	Identification of gaps and training needs & placement
	Universities Ministry of Education	Developing and implementation of relevant training programs
	Ministry of Labour & Vocational Training	Training Artisan, Workers Safety
	Commerce & Privatization Ministry of Industry, Science and Technology	Promoting BAT
Monitoring, reporting and reviewing of NIP	National Council for the Environment & National Steering Committee	Overall responsibility ensuring reporting and Recommending review of NIP
	Sectoral ministries and department, Private sector	Submitting sectoral annual reports on implementation of NIP

Strategies	Responsible Institutions/Organizations	Specific Role
	EAD and sectoral ministries, industry,	Collect and package information and feed into intervention programmes
Research and Development	University and research institutions	Identify, design and conduct research

3.2.2.2.1 National Inter Sectoral Coordination

The implementation of this plan will continue to be spearheaded by the National Steering Committee which comprises key stakeholders namely Ministry of Mines, Natural Resources and Environment, Ministry of Agriculture and Food Security, Ministry of Finance, Ministry of Labour and Vocational Training, Malawi Bureau of Standards, Ministry of Health and Population, Non-Governmental Organization representatives, Malawi Confederation of Chambers of Commerce and Industry, Wild Life and Environmental Society of Malawi, University of Malawi and Mzuzu and ESCOM. The NSC will liaise through the secretariat / focal point with the National Council for Environment on matters that involve major projects approval to be implemented or coordinated by any sector under this program. The NCE may refer any matter deemed fit to the Technical Committee on Environment for their expert input. This is to ensure transparency and consistency with existing project approval mechanisms unless reviewed in due course, on activities that may have an impact on the environment as a result of implementation of this plan. Some remediation activities may have externalities that negatively affect other sectors of the environment and human health through linkages and synergies.

3.2.2.2.2 Data Management and Information Sharing

Through experience gained during inventory assessment of POPs, it is apparent that data management and information sharing be part of the major components of the implementation principle of the NIP. Data on environmental issue is grossly disjointed and in different formats and in most cases not available. It is only in recent years that the district state of environment report has attempted to harness data on a crude basis from various sectors. Scientific and accurate data in an appropriate format need to be collected, collated, analysed, interpreted, shared, stored and linked to development (water, agriculture, education, transport, industry) and health databases. A central database is required to provide baseline, trends and evidence-based information on implementation of the NIP and other related environmental programs and projects. The database will form the basis for ascertaining attainment of key milestone for the NIP and its review. Appropriate information technology specialists and equipment will be advanced from partners and Government including GEF. Deliberate effort will be made to involve the private business sector with a bearing on POPs related industry and MRA for export and import as well as tariffs on relevant raw materials which generate POPs when processed directly or indirectly.

3.2.2.2.3 Strengthening and Harmonization of Institutional and Regulatory Frameworks

Key to the effective implementation of the NIP is a sound legal and institutional framework. It is anticipated that priority will be given to address this area during the initial years of inception of

the NIP. Clear roles and responsibilities based on sound regulatory mechanisms will be defined for partners and stakeholders to operate in harmony. It is noted that regulatory frameworks in themselves are not enough. Efforts will be made to link or form ad hoc inspectorate teams with different but relevant expertise to conduct mandatory inspection on chemical management and monitoring the application of existing minimum BEP and use of BAT as may be stipulated by existing polices and regulations whenever necessary. The lead agency will be EAD in facilitating the formulation of regulation through the guidance of Ministry of Justice. Ministry of Justice will liaise with relevant stakeholders such as health, agriculture and commerce to ensure that legal provision are in line and provide mutual support to chemical management.

3.2.2.2.4 Capacity Building

Malawi is one of the least developed countries and suffers from high attrition of qualified staff through deaths (HIV/AIDS) and brain drain due to poor salaries and working conditions especially in the public sector. For the NIP to be accorded all the support from implementing partners and stakeholders, appropriate infrastructure, robust equipment and adequate numbers of short and long term courses spread in all sectors shall play a pivotal role in sustaining initiated activities under the NIP. It is recommended that Malawi universities and colleges develop courses inside the country or within SADC countries or regionally setup such courses and massively train personnel in relevant specialties to develop relevant skills in country and retain an acceptable number of personnel on the ground to facilitate implementation of the NIP and related programs. EAD and sectoral ministries on one hand and the University of Malawi, Mzuzu University and related colleges on the other, will be in the lead to explore financial mechanism and criteria for placement of training in relevant fields. Long-term measures will be to include certain aspects BEPs and BATs of chemical management in generic or basic training and postgraduate courses with emphasis on developing competencies.

3.2.2.2.5 Monitoring, reporting and Reviewing of NIP

Reporting will form the core functions of all implementers. Monthly and quarterly reports will be submitted for all involved in any activity covered in the NIP. It will be the responsibility of the implementers to ensure that adequate coverage of the activities in their projects or programs are well disseminated to other implementers and stakeholders at country level. The secretariat and the focal point will compile the various reports noting key areas and relating to key milestones. It will be the responsibility of the secretariat/ focal point to draft required reports to the Stockholm secretariat. The NSC on POPs will first approve the report in liaison with the NCE. The vetting of the report by the two committees will constitute government endorsement. Similarly it will be the responsibility of the two committees to sanction for a review of the NIP based on conditionality as specified under review mechanisms.

3.2.2.2.6 Research and Development

POPs alternatives pose one of the greatest challenges in poor economies including Malawi as the majority relies on cheap but environmentally unsound methods for their survival. Research or adaptation of Best Environmental Practices and Best Available Technology is a prerequisite to maintain appropriate environmentally sound and acceptable methods for poor economies.

Universities and research institution will liaise with various sectors to identify research areas on technology and alternatives to POPs including raw materials, which emit POPs when processed, or as a reaction or by-products. Further research will be required on best methods of mitigating already existing negative impact of POPs where applicable such as cleaning up. Implementers will seek technical adviser from time to time on issue related to use of BEP and BATs. Industry and civil society will be encouraged to disseminate new and innovative approaches, which have been proved in Malawi.

3.2.2.2.7 Monitoring and Supervision

Individual implementers will carry out monitoring of the various activities during implementation in the first place. However, independent monitoring will be required from time to time. EAD will be expected to constitute a team of experts from within and outside depending on the kind, level and extent of activity. Feedback will be essentially provided to the implementers so that necessary positive adjustment to the activities is carried out at appropriate times. On the job training may form part of the monitoring and supervision where necessary. Deliberate attempts shall be made to request implementers identify areas that require supervisory support and monitoring. All implementers will be required to draw schedules for internal and external supervision and monitoring of the projects or programs**.**

3.2.3 Major Milestones

The success of implementation of the NIP agreed at national consultative meeting will be monitored through various sector specific mechanisms. However major checkpoints will be determined through realization of certain outcomes as determined in this NIP in relation to obligations set out in the conventions. The checkpoints represent key deadlines for moving towards achieving the obligations of the convention include:

By 2010

(i) Malawi NIP integrated within the regional NIP achieved by July 2006;
(ii) POPs management included in all relevant legislation by 2007;
(iii) Media reports addressing POPs increased by 50% by 2007;
(iv) A legal framework restricting complete use of DDT in Malawi in place by 2007;
(v) Certification mechanism for POPs related issues including registering in place by 2008;
(vi) At least 50% reduction in cross-border importation POPs by 2010
(vii) Over 50% of Malawian population aware of POPs issues by 2010;
(viii) Skilled personnel enhanced in management of POPs by 20% by 2010;

By 2015

(ix) Over 90% reduction in POPs pesticides including chlordane and DDT use by 2012;
(x) At least 30% of the population using 30% of the alternatives to POPs by 2012
(xi) Emissions of PCDDs/and PCDFs reduced by 25% by 2015
(xii) At least 50 % reduction of equipment containing PCBs with 10% PCB oils of volumes greater than 5 liters by Dec 2015;

By 2025

(xiii) 75 % reduction of 0.05% PCBs oils of volumes greater than 5 liters by December 2020;

(xiv) At least 30% of training, research and development institution are addressing management of POPs issues by 2020
(xv) Complete elimination of stockpiles and decontamination of contaminated sites by 2025,and
(xvi) Allocation of funds for POPs management annually increased by 10% during the first five years.

These milestones will be achieved based on the following assumptions:

(i) Continued political support on chemical management
(ii) Environmental issues including chemical management are given due attention by investment partners
(iii) The private sector and the civil society remain committed and continue to play respective roles
(iv) The scientific and technical institutions and the local human resources are least affected by HIV/AIDs and brain drain.

3.3 Activities, Strategies, and Action Plans

The strategies, activities and actions that follow have been proposed in order to enhance national efforts towards the effective implementation of the Stockholm Convention on POPs.

3.3.1 Activity: Strengthen And Harmonize Institutional And Regulatory Measures

3.3.1.1 Background

In Malawi POPs have been widely used in the country and also produced unintentionally over the decades. For example, DDT has been utilized as a pesticide for over twenty years in the agriculture and health sector to control major insect pests and also for malaria vector control. Similarly aldrin and dieldrin were also used in the past in the forestry plantations while chlordane is still being used to date, for the control of termites in forests as well as in the construction industry. POPs such as PCBs are used as heat resistant compounds in electrical equipment including transformers
Globally several interventions have been made to ensure safe use of POPs. The Stockholm Convention provides measures to reduce or eliminate releases of POPs, processes of adding more POPs, and technical and financial assistance to manage POPs. The Convention advocates for a precautionary approach where there are threats of serious or irreversible damage to the environment. Malawi signed the Stockholm Convention in 2002 and initiated the ratification process during the development of the National Implementation Plan.

Section 13 (d) of the Constitution of the Republic of Malawi deals with environmental management in general. Currently no specific legislation deals with POPs in Malawi. However there are several regulatory frameworks in place, which govern the regulation, approval, monitoring, import and export of chemicals in the country. These regulatory frameworks include

(i) The Malawi Bureau of Standards Act (1987)
(ii) The Environment Management Act (1996)

(iii) The Pesticides Act (2000)
(iv) ESCOM is a member of the Power Institute of East and Southern Africa (PIESA) and;
(v) The Occupational Safety, Health and Welfare Act (1997)

Malawi as a signatory to the Convention accessed financial support from GEF to develop NIP to manage POPs. The specific project titled "enabling activities to facilitate early action on the implementation of the Stockholm Convention on POPs in Malawi" was launched in June 2003 and will last for 2 years.

During August 2003 to February 2004, a multi-sectoral team conducted an inventory assessment of POPS in Malawi. Pertaining to regulatory framework the inventory revealed that Malawi has:-

(i) No specific legislation is in place for the management of POPs in Malawi,
(ii) Disjointed pieces of legislation especially on pesticides and most available pieces of regulatory frameworks provide for general management;
(iii) The legislation does not provide for monitoring and enforcement of POPs,
(iv) No designated institutions are responsible for monitoring and regulating management of dioxins and furans releases.

3.3.1.2 Objectives, activities with target milestones for Legislation

Under this strategies specific actions have been planned and targeted to address issues ((i) – (iv) above) revealed in the various inventories regarding institution and regulatory functions with aim of achieving the following objectives:

(i) Update review and harmonize exist legislation and policies dealing with POPs;
(ii) Develop new regulations specific to POPs;
(iii) Strengthen monitoring and enforcement mechanisms; and
(iv) Designate relevant institution with specific roles and responsibilities on POPs.

Table 18 below gives an outline of objectives, activities with target milestones for Legislation

Table 18: Objectives, activities with target milestones for Legislation

Objectives	Activities	Measurable indicators	Timeline	Implementing /lead agencies	Resources/ Needs (USD)
1. Update, review and harmonize legislation dealing with POPs	1.1 Review and harmonize various Acts and policies	No of Acts Reviewed on POPs	2010	EAD/ Justice	50, 000
	1.2 Develop Guidelines on POPs management	Guidelines developed	2006-2008	EAD & sectoral, ministries	40, 000
	1.3 Identify institutional gaps to enforce POPs	Legislative gaps on POPs identified	2007	EAD & Sectoral Ministries	50, 000
	1.4 Enact the laws	Laws passed on POPs	2007 –2008	Parliament	30, 000
2. Develop new regulations on POPs	2.1 Identify gaps & deficiencies in existing regulation	Gaps & Deficiencies identified	2006	EAD & stakeholders	50, 000
	2. 2 Develop regulations addressing the gaps	New regulations developed	2008	EAD & Justice	80, 000
3. Strengthen monitoring & enforcement mechanism	3.1 Identify monitoring tools for POPs	Tools identified	2006	EAD & sectoral ministries private sector	50, 000
	3.2 Develop monitoring plans	Plan developed	2006		40, 000
	3.3 Develop enforcement mechanisms	Enforcement systems in place	2006 – 2025		40, 000
4 Designate relevant role and responsibilities on POPs	4.1 Rationalize roles and responsibilities on POPs	Specific role & responsibilities identified	2006-2007	EAD, sectoral ministries, industry, Private sector	30, 000
	4.2 Develop functional national and regional linkages	Linkages developed	2006-2007		30, 000
	4.3 Define roles and responsibilities on POPs	Institutional roles on POPs defined	2006-2007		50, 000
Subtotal					**540,000.00**

3.3.2 Activity: Measures To Reduce Or Eliminate Releases From Intentional Production And Use Of Pops

3.3.2.1 Background

The main objective of the plan is to address issues related to intentional production and use of POPs in order to protect human health and the environment from persistent organic pollutants. The specific objectives are:

a) To strengthen legal and administrative measures to stop production and importation of PCBs into the country and to manage POPs in a sound manner.
b) To build capacity to manage stockpiles in a safe, efficient and environmentally safe manner
c) To establish a POPs disposal program in order to manage stockpiles and wastes in an environmentally safe manner.
d) Prevent production and use of new chemicals that are persistent, bio-accumulate, have potential for long-range environmental transport and have adverse effects on human health and environment.

Article 3, Section 1 of the Convention requires that Parties prohibit or take legal and/or administrative measures necessary to eliminate production, use, import and export of POPs Pesticides listed in Annex A of the Convention. It also requires Parties to take legal and administrative measures necessary to restrict production and use in accordance with the provisions of Annex B of the Convention. Other requirements provided in Article 3 of the Convention include:

(i) Screening of new pesticides during registration;
(ii) Establishing conditions for import and export;
(iii) Implementing regular assessment of pesticides currently in use; and
(iv) Development of standards and guidelines to prevent/minimize human exposure and release into the environment.

The Government of Malawi has taken a number of steps or measures to contain the problem of environmental degradation from releases of intentional production and use of POPs pesticides and DDT. For example, Government discontinued the use of DDT for agricultural and public health purposes in the 1980s and presently uses pyrethroids for vector control. To consolidate these efforts, Malawi established a Pesticides Control Board mandated to regulate the import, export, use, sale, storage and disposal of pesticides. It issues import permits, sales and storage licenses, and maintains a public register of registered pesticides.

This Board established under the Pesticides Act, 2000 is now able to monitor the legislation of pesticides and ensure that toxic chemicals imported into the country are listed. However, there is no specific legislation that regulates POPs pesticides in Malawi. Important legislation that deal with chemicals include the Pesticides Act (2000), Environment Management Act (1996), Malawi Bureau of Standards Act (1987), Public Health Act (1947), the Pharmacy, Poisons and Medicines Act, the Local Government Act (1998) and Plant Protection Act (1969).

The inventory assessment conducted in August to February 2003 –2004 further revealed that PCBs oils and PCB contaminated equipment are still in use. Potentially there are 616,993 litres of oil that is suspected to be contaminated with PCBs. The number of electrical equipment thought to be contaminated with PCBs is 421; these are mainly transformers and oil circuit breakers. ESCOM, which owns, services and maintains the electrical equipment that use oils suspected to be contaminated with PCBs have inadequate capacity for effective management of PCBs oils and contaminated equipment and sites. Major PCB contaminated sites were found in paint storage areas, below leaking transformers and in transformer maintenance and storage

areas. Dulux, Valmore and Rainbow paints import about 1000, 500 and 300 litres of epoxy paint per year respectively.

The regulatory strengthening measures required to reduce or eliminate releases from intentional production and use of POPs have been addressed in subparagraph 3.3.1 in order to protect human health and environment. Operational and institution capacity building, coordination and collaboration with industry and manufacturers to adopt cleaner technology remain the core areas of focus.

3.3.2.2 Objectives

In this regard the NIP intents to achieve the following objectives for reduction and elimination of intentionally produced PCBs are:

(i) Preparing and applying guidelines for identification and labeling of equipment in use, decontamination of PCB-containing equipment and associated permit systems.
(ii) Supporting voluntary agreements with enterprises or industry groups on phasing out PCB- containing equipment.
(iii) Raising public awareness of these new products is of paramount importance.
(iv) Improve chemical handling and use

Table 19 provides objectives, activities, and milestones for reducing releases from intentional production and use of POPs

Table 19: Objectives, activities, milestones for reducing releases from intentional production and use of POPs

Objectives	Activities	Measurable indicators	Responsible Institution	Time frame	Resource needs (USD)
1. Prepare and apply guidelines for identification and labeling of equipment using PCB oils	1.1 Develop standards and guidelines on toxic chemicals and hazardous wastes.	Standards & guideline developed on toxic chemical & Hazardous waste	MBS & existing institutions	2006-2007	40, 000
	1.2 Prepare guidelines for identification and labeling of equipment using PCB oil	Guideline Prepared on PCBs	EAD ESCOM	2006-2007	40, 000
2. Support voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment.	2.1 Phasing out equipment containing 10% PCBs in volume over 5 liter	No of equipment with 10% PCBs Oils	Industry ESCOM	2007 - 2012	2, 000, 000
	2.2 Procure laboratory equipment for analytical tests	No & type of equipment for monitoring PCBs	MBS ESCOM	2008	300, 000
	2.3 Phase out equipment containing 0.05% - 5% PCBs	No of equipment with 10% PCBs Oils	Industry ESCOM	2007-2020	1, 000, 000
	2.4 Facilitate industry sign Voluntary agreements	No of Industries voluntary adopting alternatives to POPs	Private Sector	2006-2008	50, 000
3. Raising public awareness on the environmental and health impacts of POPs	3.1 Develop radio and TV programmes for raising awareness on POPs	Radio programs aired	EAD MOH Local Assemblies Technical Associations	2006 - 2015	80, 000
	3.2 Develop awareness messages for production of Newsletters, brochures, leaflets and magazines.	Production of print media	Media & Civil society	2007-2015	70, 000
	3.3 Integrate POPs issues in the school curriculum.	School Curriculum with POPs issue	Education Universities	2007 – 2008	200, 000
4. Improve chemical handling and use at enterprise and user levels	4.1 procure storage and repackaging materials for both new and obsolete POPs	Tonnage of packaging materials for POPs	Industry & enterprise, Labour, Pesticide Board, Pharmacy & Poison Board		500, 000
Subtotal					**4280000.00**

3.3.3 Activity: Production, import and export, use stockpiles and wastes of Annex A, POPs pesticide

3.3.3.1 Background

Article 3 of the Stockholm Convention requires Parties to prohibit the production and use, import and export of chemicals in Annex A part 1 POPs pesticides. It request parties to take appropriate measures for environmentally sound disposal of the same including products and articles that may have been contaminated by pesticides. Parties shall ensure that pesticides are:

- Handled collected transported and stored in an environmentally sound manner and disposed in such a way that POPs content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of POPs.
- POPS pesticides are not permitted to be subjected to disposal operations that may lead to recycling recovery reclamation
- Not transported across international boundaries without taking into account international rules and standards and guidelines.

In view of the above obligations, Malawi conducted an assessment to identify the extent of use, stockpile and waste containing chemicals listed in Annex A & B. Malawi as a country does not manufacture or produce chemicals. However, Malawi's economy heavily relies on agriculture. As a result the country continues to depend on the use of pesticides for the control of major insect pests and diseases that affect the production of crops and livestock. Because of quick results and action on the pests, pesticides still remain the pest control option that eradicates the problem at the shortest period of time. This makes the demand for pesticides in Malawi very high. It is therefore inevitable for the country to use pesticides including POPs where alternatives in terms of affordability, acceptability and availability to local farmers and entrepreneurs are not available. The types of pesticides that are used in Malawi include insecticides, herbicides, fungicides, nematicides, acaricides, viricides, bacteriacides and growth regulators.

All pesticides that are marketed in the country are imported either from the neighbouring countries or from overseas. There is always high demand for pesticides and as a result there is so much illegal trade of pesticides. There are a lot of unlicensed dealers and vendors selling pesticides even on the open markets. This has led to the uncontrolled entry as well as accumulation of stockpiles and obsolete pesticides in the country including Persistent Organic Pollutants (POPS), which are highly toxic, organic compounds. These include pesticides used to protect plants from plague insects (aldrin, dieldrin, endrin, heptachlor, mirex and toxaphene) and in control of vector-borne diseases (DDT); heat-resistant compounds used primarily in electrical equipment such as transformers (PCBs); and substances generated as by-products of incomplete combustion and chemical processes such as dioxins and furans (Stockholm Convention on Persistent Organic Pollutants, 2001).

The inventory assessment covered 211 sites in all the three regions of Malawi, of these 18 sites had POPs pesticides The results revealed the presence of chlordane as the commonly used POPs pesticide in Malawi .The surveys recorded 1.546 metric tonnes of chlordane, 50 liters of

toxaphene and less than 10 kg of DDT. Chlordane is used in termite control in construction, tea and coffee estates. Some estates and organizations are testing various pesticides as alternatives to chlordane. These alternatives include aldicarst, carbosulfan, and dursban. The results are inconclusive. There is need for more research to find out the most effective alternative pesticides and pest control strategies to chlordane.

Poor storage practices were noted as some containers had no labels and it was difficult to determine the actual pesticide, date of manufacture and source.

The survey recorded a total of 310.89 metric tonnes of obsolete pesticides (Ops) (Table3.2). These obsolete pesticides included organophosphates, pyrethroids, and carbamates; the southern region registered the highest accumulation of obsolete pesticides while the northern region gave the least.

3.3.3.2 Institutional Framework

To enhance the management of POPs pesticides some institutions should be designated focal points for environmental safety. These include the Pesticides Control Board, Environmental Affairs Department, Ministry of Health, Malawi Bureau of Standards, ESCOM, the University, and the City Assembly.

To strengthen regulatory measures for POPs management in Malawi, the Pesticides Control Board established by an Act of Parliament in 2000 monitors and regulates all pesticides imports into Malawi. Although the Pesticides Act is silent on POPs pesticides, it checks the importation of pesticides that may cause hazards to human health and the environment. Further, the Board ensures that (i) only safe pesticides are imported into the country, (ii) strictness in the safe use, storage, and even disposal of pesticides in general, (iii) Malawi government has timely and relevant advice on pesticides management, which include; procurement of required quantities to avoid accumulation of stockpiles.

3.3.3.3 Objectives

For an effective program on priority key areas, it is necessary to address the following objectives.

(i) To strengthen legislation for prohibition or elimination of production of Annex A POPS pesticides *(which has been addressed in 3.3.1 under legal frameworks)*
(ii) To establish an effective M&E systems for use, import of Annex A pesticides
(iii) To enhance the institutional and human capacity for sustainable management of POPs pesticides
(iv) To undertake research and development into alternatives to POPs pesticides

Table 20 outlines objectives, activities and target milestones for production, import and export, use stockpiles and wastes of Annex A, POPs pesticide.

Table 20: Objectives, Activities And Target Milestones for production, import and export, use stockpiles and wastes of Annex A, POPs pesticide

Objectives	Activities	Key performance indicators	Time Frame	Implementers	Resource / Needs (USD)
1.To establish and effective M&E systems for use, import and export, stockpiles and waste of Annex A pesticides	1.1 Develop mechanism for registering all imports and exports of chemicals	Register of imports and exports developed	2006-2007	Pesticide Board, EAD MRA	**20, 000**
	1.2 Develop protocols for disposal of chemical stockpile including POPS contaminated products & articles	Protocols for Chemical disposal in place	2006-2007	EAD Pesticide Board	**50, 000**
	1.3 Monitor disposal of chemical wastes including POPs & Illegal trade	Monitoring tools for chemical wastes available	2006-2026	EAD, sectoral ministries, Private sector, Police	**100, 000**
	1.4 Protect or treat all contaminated sites of Annex A POPS	Contaminated Sites Protected or treated	2006-2008	Private Sector	**400 000**
	1.5 Develop codes of practices and standards	Codes and standards developed on chemicals practices	2006 – 2008	MBS, EAD	**50, 000**
2. To enhance the institutional and human capacity for sustainable management of POPs pesticides	2.1 Dispose off all existing chemical stockpiles appropriately	Amount of Chemical stock pile disposed	2006-2007	MBS, EAD	**1, 000, 000**
	2.2 Organize National Multi-sectoral Committees on Chemical management in Malawi (NMCCM)	NMCCM formed	2006	EAD, OPC	5, 000
	2.3 Develop TORs for NMCCM	TORs developed	2006	NMCCM, EAD	1, 000
	2.4 Convene meetings for NMCCM & implement	Meetings conducted	2006-2025	**EAD NMCCM**	50, 000
	2.5 Develop short courses on chemical management in country and abroad	Personnel attended Chemical Short courses	2006-2007	Universities EAD	10, 000

Objectives	Activities	Key performance indicators	Time Frame	Implementers	Resource / Needs (USD)
	2.6 Procure relevant equipment for Chemical management	Equipment Procured	2006-2010	Industry	100, 000
	2.7 Effect mechanism for review, update & approval of revision licensed pesticides	Mechanism for approval effected	2006-2007	EAD, Pesticide Board, MBS	10, 000
3.To undertake research and development into alternatives to POPs pesticides	3.1 Introduce & implement studies on impacts of POPs contamination in Malawi	No of studies undertaken on POPs Impact relevant to Malawi	2006-2025	Research institution and Individuals	8, 000
	3.2 Secure grants for research on POPs Pesticide alternatives	No and amount of Grants Secured	20056-2025	EAD Universities & Research Institutions	50, 000
	3.3 Undertake BAT and BEP demonstrations in key agricultural programmes including Integrated Pest Management (IPM) and Integrated Vector Management (IVM) at household level.	No of sessions conducted on IPM and IVM or its equivalent.	2006-2025	Agriculture and Health & EAD	500, 000
Subtotal					**2, 344, 000.00**

3.3.4 Activity: Production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, Part II chemicals)

3.3.4.1 Background

Under Article 3 subparagraph 1 and Annex A require parties to prohibit and/or take the legal and administrative measures necessary to eliminate: (i) production and use of the chemicals listed in Annex A subject to the provisions of that Annex; and (ii) Its import and export of the chemicals listed in Annex A in accordance with the provisions of paragraph 2; Annex A part II further obligates parties to eliminate the use of polychlorinated biphenyls in equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) by 2025, subject to review by the Conference of the Parties taking action in accordance with the following priority-

Parties are also required to make determined efforts to identify, label and remove from use equipment containing PCBs.

An assessment of PCB containing equipment was conducted. The inventory revealed that PCBs oils and PCB contaminated equipment are still in use. Potentially there are 616,993 litres of oil, which is suspected to be contaminated with PCBs. The number of electrical equipment thought to be contaminated with PCBs is 421; these are mainly transformers and oil circuit breakers. ESCOM, which owns, services and maintains the electrical equipment that use oils suspected to be contaminated with PCBs have inadequate capacity for effective management of PCBs oils and contaminated equipment and sites. Major PCB contaminated sites were found in paint storage areas, below leaking transformers and in transformer maintenance and storage areas. Dulux, Valmore and Rainbow paints import about 1000, 500 and 300 litres of epoxy paint per year respectively. Malawi is therefore required to develop an activity plan for effective management of PCBs. Strengthening regulatory measures is required reducing or eliminating releases from intentional production and use of POPs in order to protect human health and environment. Important initiatives include:

(i) Strengthening the EMA for POPs management and associated enforcements.
(ii) Reviewing section 40 of the EMA to provide policy instruments relating to the sound management and handling of POPs pesticides, PCB oils, paints, equipment and wastes or contaminated materials, including purchase, use, containment, storage and disposal.
(iii) Enhancing human and institutional capacity of government departments and other institutions involved in the implementation of the Basel, Rotterdam and Stockholm conventions.
(iv) Reviewing EMA to include legal provision for regulation and assessment of new pesticides and industrial chemicals to prevent production and use of new pesticides and industrial chemicals that are persistent, bioaccumulate and have adverse effects.
(v) Providing incentives for adoption of clean technologies.

3.3.4.2 Objectives

In order to reduce and achieve ultimate elimination of PCBs use and prevent releases of the chemical into the environment, and to provide for environmentally sound disposal or final elimination of PCBs waste these are required:

(i) To update legislation and review the EMA to include legislation /regulation for identification, labeling and eventual notification of equipment containing PCBs above specified threshold concentrations and quantities (*which has been addressed in 3.3.1 under legal frameworks).*
(ii) To develop and implement a pro-active strategy for management of PCBs.
(iii) To develop and implement R&D programmes on PCBs.
(iv) To enhance human and institutional capacity for management of PCBs.

Table 21 outlines production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, Part II chemicals).

Table 21: Production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, Part II chemicals)

Objectives	Activities	Key performance Indicators	Time Frame	Implementers	Resource / Needs (USD)
1. To develop and implement a pro-active strategy for management of PCBs	1.1 Determine the use of PCBs and PCB containing materials	PCB material determined	2007-2009	ESCOM, EAD	**80, 000**
	1.2 Develop a database	Database developed	2006	EAD	**30, 000**
	1.3 Promote measures to human health	Health measure promoted	2006 - 2010	Health sector, CHAM. Private Clinics	**50, 000**
	1.4 identify and arrange for the disposal	Disposal arrangements identified	2006	EAD Local Assemblies, ESCOM	**500, 000**
	1.5 Develop and implement phase out programs	Phase out program in place	2006 - 2015	EAD,	**200, 000**
2. To develop and implement R&D programmes on PCBs	2.1 Identify suitable analytical capacity for PCBs	Analytical capacity identified	2006-2008	ESCOM, EAD	30, 000
	2.2 Establish reference methods for measuring content of PCBs in closed, partially closed and open applications.	Reference materials and methods established	2006-2007	MBS, EAD, ESCOM INDUSTRY	50, 000
	2.3 Determine presence and concentrations of PCBs in these applications and in new imported transformers oils of	PCBs in equipment identified and analyzed.	2006 - 2007	ESCOM, EAD	50, 000
	2.4 monitor and assess impact of PCBs in human and Environmental Media	Impacts detected & reported	2005 - 2025	EAD, ESCOM	60, 000
	2.5 Identify appropriate technology for disposal of PCBs.	Appropriate technology identified	2005 2012	Research institutions	100, 000
	2.6 Conduct studies on PCBs in selected communities including among the exposed workers	Studies Conducted	2006 – 2025	Universities	500, 000
3. To enhance human and institutional capacity for	3.1 To build facilities for safe disposal of all PCB and PCB containing equipment	Functional facilities in place	2006 – 2015	EAD Private sector MOS MOH	500, 000

management of PCBs	3.2 Place warning notices near equipment, especially where decommissioned ones are kept prior to disposal.	Warning signs and notices in place	2006 - 2025	EAD, ESCOM, Local Assembly	20, 000
	3.3 Organize training for personnel involve in handling of PCBs.	Training programme organized.	2006 – 2010	ESCOM, EAD Universities	20, 000
	3.4 Identifying and finalizing arrangements for the disposal of PCB and PCB containing equipment	Mechanism for disposal established.	2006-2012	EAD, ESCOM, Local Assembly	500, 000
	3.5 Procure packaging equipment /technologies for disposal.	Procedures for packaging for disposal Technology for disposal identified	2006-2007	ESCOM, EAD	500, 000
Subtotal					**2, 690, 000**

3.3.5 Activity: production, import and export, use, stockpiles and wastes of DDT

3.3.5.1 Background

Under articles 3 sub paragraph 2b of the Stockholm Convention requires all parties to eliminate production and use of DDT (Annex B, Part II) with the following exceptions:

(i) Production and use to meet the requirements for disease vector control programmes according to WHO Guidelines;
(ii) Production and use of DDT as an intermediate in the manufacturing of other substances (dicofol), and
(iii) The use of DDT until technically and economically feasible alternative products, practices or processes are available;

In Malawi, DDT was widely used in the cotton industry. From 1964 DDT was used to control of the major pests such as the cotton bollworms. The pesticide was used for nearly two decades in the major cotton growing areas of the country which includes Shire Valley, Phalombe plains; Salima; Henga valley and Karonga until its ban for agricultural purposes in 1985. The pesticide was imported from Zimbabwe, the United Kingdom and Germany as use of DDT was suspended for public health especially in the control of malaria. Since then pyrethroids are being utilized to control malaria.

The POPs inventory in Malawi further revealed that (i) some DDT is being sold to farmers on the open market in the central region; a total of 10kg of DDT was detected including 6.67 kg which was obsolete, (ii) DDT is used for spraying on vegetables against various pests, (iii) the Pesticides Control Board and thus the Board has processed no import permits of DDT, (iv) DDT

is controlled to a limited extent by the Pesticides Act, 2000 and the Plant Protection Regulations (1), which is under the Ministry of Agriculture, Irrigation and Food Security.

The Pesticide Act provides for Prior Informed Consent (PIC) procedure on the importation, exportation and use of plant protection substances according to the FAO code of conduct on the distribution and use of pesticides.

Although malaria is endemic in Malawi the country has not requested for exemption since the existing alternative are effective. Should the malaria vectors become or acquire resistance Malawi shall request exemption to use DDT. It is thus necessary to include this possibility in the work plan.

3.3.5.2 Objectives

The objective of the activity plan is to develop and implement strategies that will enable Malawi identify stockpiles and waste of DDT and manage the production import export and use of DDT

Malawi needs to

(i) Review and update inventory of contaminated sites and management of stockpiles
(ii) Develop and implement R&D into alternatives
(iii) Develop and implement an effective M&E system on usage and accumulation of DDT
(iv) Strengthen human and institution capacity
(v) Raise Awareness on stockpiles and waste of DDT

Table 22 outlines objectives, activities and target milestones for production, import and export, use, stockpiles and wastes of DDT.

Table 22: Objectives, activities and target milestones for production, import and export, use, stockpiles and wastes of DDT

Objectives	Activities	Key performance indicators	Time frame	Implementers	Resource / Needs/USD
1.0 Review and update inventory of contaminated sites and management of stockpiles	1.1 Undertake a periodic inventories of DDT use in Malawi	Inventory report	2006 –2025	EAD, MOH/Ministry of Agriculture, Relevant stakeholders	30, 000
	1.2 Monitor the sources of the chemical and prevent further accumulation.	Sources monitored	**2006 – 2025**		**20, 000**
	1.3 Produce report and distribution to all stakeholders	Information disseminated	2007- 2025		**20, 000**
2 Develop and implement R&D into alternatives	2.1 Identify, test and promote alternatives to DDT	Alternatives available	2006-2007	Universities Research institutions	**100, 000**
3 Develop and implement an effective M&E system on usage and accumulation of DDT	3.1 Identify and formulate appropriate indicators for monitoring DDT	Indicators identified	2006-2007	EAD, MOH/Ministry of Agriculture, Relevant stakeholders	**50, 000**
	3.2 Develop and update regularly data management systems for the Annex B chemicals	Data base established	2006-2025		**50, 000**
4. Strengthen the human and institution capacity	4.1 Train personnel involved in research and development on DDT	Personnel trained	**2007-2015**	EAD, MOH/Ministry of Agriculture, Relevant stakeholders	**80, 000**
	4.2 Identify and assign responsibilities to various stakeholders including NGOs	Responsibilities assigned	**2006-2007**		**30, 000**
	4.3Train inspectors on data collection management and reporting	A cadre of R&D personnel	**2006-2025**		**40, 000**
	4.4 Increase and support the R&D facilities in research institutions	Better equipped R&D facilities	**2007-2015**		**100, 000**
Subtotal					**520,000**

3.3.6 Activity: Register for specific exemptions and the continuing need for exemptions (Article 4)

3.3.6.1 Background

Article 4 of the Stockholm convention on POPs requires the establishment of POPs register for the purpose of identifying parties that have specific exemptions listed in Annex A or B. All registrations of specific exemptions are subject to periodic review. The table below provides

activities that will be undertaken to keep and update such records at the country level. Currently Malawi has not requested for exemption in any of the POPs chemicals. However continued use of chlordane requires that such an exemption may have to be applied until such a time an acceptable alternative has been approved. This is also the case for DDT, which could be used to control malaria vectors.

3.3.6.2 Objectives

The objective of this activity plan is to establish a system for registering for specific exemptions and continuing need for exemptions.

Table 23 outlines objectives, activities and milestones for register of specific exemptions and the continuing need for exemptions

Table 23 Objectives, activities and milestones for register of specific exemptions and the continuing need for exemptions

Objectives	Activities	Key performance indicators	Time Frame	Implementers	Resource/Needs (USD)
1.0 To establish system for registering specific exemptions and continuing need for exemptions	1.1 Organize stakeholder consultation for national prioritization of chemicals requiring exemptions	Stakeholder meetings	2006-2025	EAD MOH PCB MOA Stakeholders	**50, 000**
	1.2 Develop criteria and procedures for identification and selection of candidate chemicals for exemptions	Selection criteria in place	2006		**50, 000**
	1.3 Develop mechanisms for the notification of convention secretariat on specific exemptions required	Notification protocols available	2006		**30, 000**
	1.4 Establish registration centres to enlisting exemptions	Registration centres in place	2006		**30, 000**
	1.5 Undertake periodic review to assess need for continued exemptions or otherwise	Regular updates available	2006-2025		**50, 000**
Subtotal					**210,000**

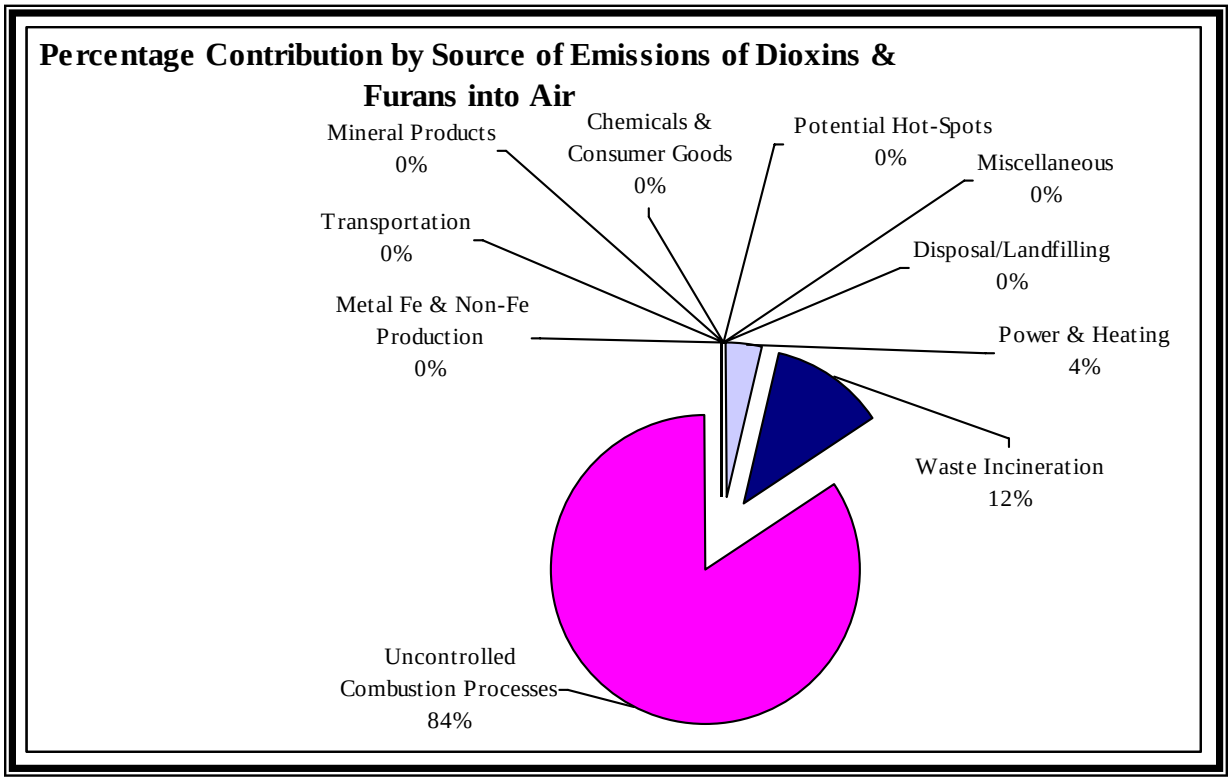
3.3.7: Activity: Releases from unintentional production of PCDDs/ PCDFs, HCB and PCBs

3.3.7.1 Background

Article 5 of the Stockholm requires Malawi to develop an action plan within two years of the date of entry into force to address PCDDs/ PCDFs, HCB and PCBs. This is to control and regulate the production of unintentional releases through promotion of best available technology and best environmental practices.

The inventory on unintentional production of PCDDs, PCDFs, HCB and PCBs releases showed that (i) emission of PCDDs/ PCDFs, HCB and PCBs in air was about 528.6g TEQ per annum, (ii) uncontrolled combustion is responsible for 84.2% of emissions in air while waste incineration contributes 12.0%, (iii) PCDDS/ PCDFs, HCB and PCBs in Malawi are emitted from various chemical and combustion processes and being deposited onto land and other surfaces, (iv) air receives 38% [366.7g TEQ/annum] of the emissions from uncontrolled combustion processes, waste incineration and land filling, (v) waste disposal through landfills accounts for the highest amount of contamination in air [84%] and in the residue category [99%], (v) major areas of concern are uncontrolled combustion sources especially in landfills and uncontrolled waste burning, (vi) no proper landfill management practices exist, and (vii) the Environment Management Act 1996 which provides for regulation of air pollution control, standards of emission from combustion and chemical processes lack regulations and enforcement of existing standards is weak. Due to inadequate capacity it was no possible to determine the HCB and PCBs emissions into the environment. Air receives 55.1% [528.6g TEQ/annum] while land and residue (ash). Figure 5 outlines Sources of PCDDs/PCDFs in air.

Fig 5. Sources of PCDDs/PCDFs in air



3.3.7.2 Objectives

The objective of this activity plan is to develop a strategy for effective management of furans, dioxins and PCBs in order to reduce emission due to dioxins and furans by 50% by 2020. The specific objectives are:

(i) Review and formulate policies /regulations on management of PCDD/PCDF consistent with the Stockholm Convention (*which has been addressed in 3.3.1 under legal frameworks)*;
(ii) Promote research and development on use of alternative methods of household fuel for cooking and or energy saving technology,
(iii) Build capacity to monitor, manage and control unintentional releases of POPs and achieve effective PCDD/PCDF management.
(iv) Install appropriate technology to reduce releases from dioxins and furans in target processes

Table 24 outlines objectives, activities and milestones for the reduction of PCDDs, PCDFs, HCB, and PCBs emissions.

Table 24 Objectives, Activities and milestones for the reduction of PCDDs, PCDFs, HCB, and PCBS emissions

Objectives	Activities	Key performance indicators	Time Frame	Implementers	Resource/Needs
1. Promote research and development on use of alternative methods of household fuel for cooking and or energy saving technology	1.1 Develop technology, import standards and procedures to screen outmoded technologies	Minimum standards	2006- 2008	MBS Universities Research institutions	100, 000
	1.2 Undertake a regular monitoring of releases	Levels of emissions	2006- 2015	Universities Research institutions	40, 000
	1.3 Seek and support research into alternative technologies	Active research in place	2006-2020	EAD Universities Research institutions	100, 000
	1.4 Phase out outmoded combustion and chemical processing equipment	No of outmoded equipment phased out	2006-2010	EAD ESCOM	80, 000
2. Build capacity to monitor, manage and control unintentional releases of POPs and achieve effective PCDD/PCDF management	2.1Organise skills enhancement courses on emission assessments	Trained staff well involved	2006-2020	EAD Universities Research institutions	80, 000
	2.2 Raise public awareness and education	Significant proportion of the population aware of POP	2006-2020	EAD ESCOM	60, 000
	2.3 Strengthen analytical ability of research laboratories	Research institutions well capacitated	2006-2020	EAD Universities Research institutions	100, 000
	2.4 Acquire equipment for the analysis of PCDD/PCDF, HCB, and PCBs		2006-2020	EAD Universities Research institutions	100, 000
	2.5 Develop and implement M&E systems sources and estimates of unintentional releases	M&E systems in place	2006-2020	EAD Universities Research institutions	40, 000
	2.6 Procure and institute more efficient technologies	Robust technologies installed and functional	2006 - 2025	EAD Universities Research institutions	500, 000
3. Install appropriate equipment to reduce releases from dioxins and furans in target processes	3.1 Identify key sites for replacement of equipment with excessive releases of dioxins and furans	Sites identified	2007 - 2015	EAD and relevant stakeholders	40, 000
	3.2 Install appropriate equipment in relevant facilities	Equipment installed	2008- 2015	Stakeholders	50, 000
Subtotal					**1,290,000**

3.3.8 Activity: Measures to reduce releases from stockpiles and wastes (Article 6)

3.3.8.1 Background

Article 6 of the Stockholm Convention requires Parties such as Malawi to develop measures to reduce or eliminate releases from stockpiles and wastes. Parties are therefore urged to develop appropriate strategies for identifying:

(i) Stockpiles containing chemicals listed in Annex A or Annex B
(ii) Products and articles in use and wastes contaminated with a chemical listed in Annex A, B, or C.

Presently, Article 5 deals with measures to reduce or eliminate releases of POPs from unintentional production and requires development of an Action Plan (AP) within two years of the Stockholm Convention coming into force. The Action Plan includes:

- An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration source categories identified in Annex C;
- An evaluation of efficacy of laws and policies of the AP relating to the management of such releases.

These are consistent with the conventions such as the Basel Convention which control of trans-boundary movements of hazardous wastes, the Rotterdam convention concerns the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, and the Stockholm Convention on POPs have been put in place. Regionally, the Power Institute of Eastern and Southern Africa (PIESA) whose membership includes electricity supply companies of almost all the SADC countries and some East African countries, adopted guidelines to assist member countries to manage PCBs, PCB-containing equipment and contaminated sites and wastes.

The Malawi inventory revealed (i) areas contaminated with pesticides were mainly agriculture fields especially of cotton and tea, pesticide stores of suppliers, (ii) sites contaminated with PCBs are ESCOM power stations where transformers are maintained and decommissioned, (iii) sites contaminated with dioxins and furans included all municipal landfills in the country, (iv) limited expertise and technologies to manage POPs contaminated sites and wastes, (v) weak institutional structures to support proper management of contaminated sites at international, regional and national levels, and (vi) absence of specific legislation to deal with POPs-contaminated sites: pieces of legislation tackle different aspects of pollution control while Pesticides Act enforcement is weak and erratic

3.3.8.2 Objectives

In order to reduce releases, Malawi needs a plan to achieve minimum releases. The objective is thus to develop and institute measures to reduce releases from stockpiles and wastes. Specifically to:

1. Establish and implement clean up and remediation schemes;

2. Strengthening institutional capacity to handle POPs stockpile and wastes.
3. Monitor storage and usage of chemical at enterprise level

Table 25 outlines objectives, activities and milestones for measures to reduce releases from stockpiles and wastes.

Table 25: Objectives, activities and milestones for measures to reduce releases from stockpiles and wastes

Objectives	**Activities**	**Key performance indicators**	**Time Frame**	**Implementers**	**Resource/Needs (USD)**
1. Establish and implement clean up and remediation schemes	1.1 Determine the levels of and extent of releases	Stockpiles effectively disposed off	2006-2025	EAD MBS Private sector MOH MOA Local authorities	60, 000
	1.2 Organise and undertake clean up of existing stockpiles and waste	Existing stockpiles and waste properly managed	2007-2007		100, 000
	1.3 Develop facilities and techniques for clean up and disposal of POPs stockpiles and wastes	Disposal facilities developed	2006 - 2025		800, 000
	1.4 Develop and implement remediation measures for stockpiles and wastes	Remediation measures introduced and being used	2006 - 2025		100, 000
	1.5 Establish models for handling stockpiles and wastes	Models of handling adopted	2008-2010		100, 000
2. Strengthening institutional capacity to handle POPs stockpile and wastes	2.1Train personnel managing and handling stockpiles and wastes	Adequate capacity developed	2007-2025	EAD Universities Private sector	80, 000
	2.2 Introduce management of POPs stockpiles and wastes in curricula	POPs integrated in curricula	2006-2010		100, 000
	2.3 Develop and implement awareness raising on POPs stockpiles and wastes	% of people aware hazards of POPs	2007-2025		60, 000
3.0 Monitor Stockpiles	3.1 Draw a stocking schedule for chemicals in warehouses	Schedule for monitoring chemical drawn	On going	Stakeholders	30, 000
Total					**1, 430, 000**

3.3.9 Identification of relevant stockpiles, articles in use and wastes

3.3.9.1 Background

Article 6 subparagraph 1b and annex A & B of the Stockholm Convention requires Parties to ensure that stockpiles consisting of or containing chemicals listed either in Annex A or Annex B and wastes, including products and articles upon becoming wastes, consisting of, containing or contaminated with a chemical listed in Annex A, B or C, are managed in a manner protective of human health and the environment, each Party shall:

Identify, to the extent practicable, stockpiles consisting of or containing chemicals listed either in Annex A or Annex B on the basis of the strategies referred to in subparagraph (a).

The inventory revealed that (i) 18 sites had 1.246 metric tones of chlordane, 50 liters of toxaphene and 10 kg of DDT. These POPs and obsolete pesticides are still being used in the country in the agriculture, forestry and construction industries. (ii) Malawi has 310.9 tonnes and 67,000 litres of obsolete non- POPs pesticides, which are improperly stored in most of the estates and warehouses, (iii) residue deposits of wastes constitute important sources of dioxins and furans, (iv) DDT and its derivatives were used in the major cotton growing areas of Malawi such as Karonga, Henga valley, Salima and the Shire valley, and (v) limited personnel and expertise exists for the management of the stockpiles, articles in use and wastes.

3.3.9.2 Objectives

The objective of this activity plan is to develop strategy for effective identification of stockpiles, articles in use and wastes. The specific objectives are:

(i) To identify and quantify POPs stockpiles, articles in use and wastes
(ii) Develop a M&E systems for effective identification of stockpiles, articles in use and wastes.

Table 26 gives an outline of objectives, activities and milestones for identification of relevant stockpiles, articles in use and wastes

Table 26 Objectives, activities and milestones for identification of relevant stockpiles, articles in use and wastes

Objective	Activities	Key performance indicators	Time frame	Implementers	Resource /Needs (USD)
1.To identify and quantify POPs stockpiles, articles in use and wastes	1.1 Develop guidelines for identifying stockpiles, articles in use and waste	Guidelines available and being used	**2006-2010**	EAD Universities PCB ESCOM MOH MOA Relevant Stakeholders	40, 000
	1.2 Train personnel on identification of POPs stockpiles	Trained personnel available	**2006-2010**		60, 000
	1.3 Organise and support surveys on identification	Survey reports available			60, 000
2. Develop and implement M & E tools for effective identification programme	2.1 Review, quantify and update list of stockpiles and wastes	Triennial updates available	**2006 – 2025**	EAD PCB Sectoral ministries Relevant Stakeholders NGOs	30, 000
	2.2 Organise regular and periodic surveys for updates	M& E systems and tools developed	2006 – 2025		100, 000
	2.3 Produce and disseminate results and databases on identification programme	Databases and report available Increased public awareness and involvement	2006 – 2025		80, 000
Total					**370, 000**

3.3.10 Activity: Manage stockpiles and appropriate measures for handling and disposal of articles in use

3.3.10.1 Background

Article 6 of the Stockholm Convention provides for Malawi in paragraph 1 sub (c) to manage and stockpiles, as appropriate, in efficient and environmental manner.

Subparagraph (d) take appropriate measures so that such wastes, including products and articles in use upon becoming wastes, are

(i) handled, collected, transported and stored in environmental manner
(ii) disposed of in such a way that POPs content is destroyed or irreversibly transformed…..
(iii) not permitted to be subjected to disposal operations
(iii) not transported across international boundaries without taking into account relevant international rules standards and guidelines

Malawi thus needs to institute appropriate measures for safe handling and disposal of articles in use. This option is necessary to achieve the country's obligations under the Stockholm.

The inventory showed that (i) large quantities of POPs pesticides and some traces of DDD remain unused in agriculture, forestry and construction industry for the control of termites and (ii) greater public concerns on the negative environmental and public health impacts of these stockpiles and articles in use. Consistent with a clean environment under the EMA and the Pesticides Act, Malawi requires an effective management system to handle articles in use. Malawi has not developed systems for effective management of stockpiles. This is compounded by the availability of limited capacity. The objective of this activity plan is to establish mechanisms for the management of stockpiles and handling articles in use.

3.3.10.2 Objectives

The specific objectives are two-fold:

(i) To manage stockpiles and handle articles in use in a safe, efficient and environmentally sound manner
(ii) To develop safe handling and disposal procedures of articles in use

Management options and action plans on this is issue, reference should be made to Section 3.3.3, 3.3.4 and 3.3.5

Table 27 outlines Objectives, activities and milestones for managing stockpiles, handling and disposal of articles in use.

Table 27 Objectives, activities and milestones for managing stockpiles, handling and disposal of articles in use.

Objectives	Activity	Key Performance Indicator	Time Frame	Implementing Agencies	Resource /Needs (USD)
1 To manage stockpiles in a safe, efficient and environmentally sound manner	1.1 Identify and establish proper storage and handling facilities for stockpiles and articles in use	Storage facilities in place Collection Facility in place Training manuals Workshops	2006	EAD ESCOM, MOH MOA PCB Civil society NGOs Assemblies	80, 000
	1.2 Establish collection facilities		2006-2010		80, 000
	1.3 Train personnel including NGOs in safe collection and storage of POPs/ stockpiles		**2006 -2009**		80, 000
2. To develop safe handling and disposal procedures of the POPs in use	2.1 Produce and disseminate disposal guidelines/protocols	Guidelines produced Receipt agencies Storage facilities established Permits and receipt agencies available	**2006**	EAD, ESCOM, Consultants and local government authorities Universities Civil society NGOs Industry	50, 000
	2.2 Identify recipient agent for disposal		**2006-2010**		20, 000
	2.3 Establish proper and handling storage facilities		2006- 2008		80, 000
	2.4 Seek trans-boundary permits for transportation and disposal		**2007-2025**		20, 000
Total					**410, 000**

3.3.11 Activity: Identification of contaminated sites (Annex A, B And C Chemicals) and remediation in an environmentally sound manner

3.3.11.1 Background

Articles 6(e) of the Stockholm convention requires that Parties develop appropriate strategies for the identification of sites contaminated with chemicals listed in Annex A, B or C and remediation of such sites in an environmentally sound manner. In order to strategise the implementation of the above obligations, Malawi conducted a survey on contaminated sites from August 2003 to February 2004. The survey was to identify and categorize contaminated sites, liability and determine existing capacities to deal with the situation. The survey established that Malawi does not have policies and guidelines to deal with contaminated sites especially those related to POPs. According to Contaminated Sites Management Working Group (CSMWG, 1995) of Canada, a contaminated site is defined as a site at which substances occur at a concentration above background levels and pose or are likely to pose an immediate or long-term hazard to human health or the environment, or exceeding levels specified in policies and regulations.

In the absence of policies and guidelines on POPs contaminated sites, for the purposes of the inventory, a contaminated site was therefore defined as an area where POPs are likely to be found in soil and water due to historical and current use of POPs. For PCBs, any site showing signs of oil leakage on the ground was considered as a possible contaminated site. The inventory revealed that Malawi neither has the expertise nor the technology to manage POPs contaminated areas.

(a) PCB contaminated sites. An inventory of PCBs was carried out in the industries that use materials likely to contain PCBs according to the general application and typical locations. The designations also referred to how easily the PCBs contained within the products can escape to the surrounding environment. The sites were therefore identified and grouped as follows:

(i) Contaminated sites with closed application of PCBs
(ii) Contaminated sites with semi-closed application of PCBs
(iii) Contaminated sites with open application of PCBs.
(iv) Other contaminated sites

Figure6: Closed application PCB contaminated site

Figure7: Workshop contaminated site

The inventory in Malawi revealed that a total of 189 sites, which were identified as contaminated: nearly 51% are in the South Region, 37% in Central and 12% in Northern Regions. Nearly 82.5% of the contaminated sites have transformers which were manufactured between 1936 and 1989 and are prone to contamination. Blantyre, the main commercial and oldest industrial city has the highest concentration of transformers (78); Blantyre also houses ESCOM, the electricity supplier. While Lilongwe recorded 24 transformers, Chikwawa, Zomba, Mwanza and Dedza had a total of twelve transformers. In an attempt, to reduce contamination form leakages, ESCOM stored waste oil in tankers, which until now was being used as a fuel. Currently waste oil from ESCOM transformers is being stored in drums stockpiled in the open in ESCOM premises. This has resulted in leakages hence the predominance of contaminated sites in ESCOM premises.

Damaged and decommissioned transformers are also stored in the open within ESCOM premises and some of the premises are close to rivers with the possibility of spreading the

contamination. This is not in accord with Stockholm Convention Article 6 that requires parties to reduce or eliminate releases of POPs. Empty oil drums in Malawi are collected by members of the public and put to various uses such as beer brewing and water storage. Lack of designated areas for storage of PCB contaminated material has resulted in some of the material finding their way into the municipal damping sites and therefore mixing with other waste products for disposal. Managing PCB-containing transformers is compounded by the stealing of the oils by the public who used it for mixing with diesel, cooking, etc (see newspaper attached). This is due inadequate awareness on handling of PCBs and their effects on health and the environment in Malawi. However, ESCOM produces articles on PCBs in its monthly newsletter as a way of raising awareness.

(b) Pesticides Contaminated Sites: Malawi identified quite a number of contaminated sites during the initial POPs inventory. However, capacity in terms of human resources and facilities to deal with contaminated sites is non-existent in Malawi. Now that the sites have been identified, Malawi needs to develop the needed capacities to deal with the identified POPs contaminated sites satisfactorily. Sites were reported contaminated with pesticides upon:

(i) Use of POPs pesticides in garden field, and
(ii) Spillage of POPs pesticides in warehouses, stores and in the environment.

Using the criteria above, Salima ADD; Shire Valley ADD; Phalombe; Mangochi; Balaka; Karonga; and Henga Valley were categorized as contaminated with pesticides. The storage areas that were considered to be contaminated sites were Limbe ADMARC; Zomba RDP; Lifuwu Research Station; Kasonjola Press Agriculture; Wimbe Press Agriculture; Chitedze Research Station; Santhe Press Agriculture; and Mkondezi Research Station.

(c) Furans and dioxins: Sites were labeled contaminated with dioxins and furans if the sites showed evidence of by-products of combustion or any chemical process involving raw material emitting dioxins and furans. The inventory revealed that the main source of furans and dioxins in Malawi is bush burning and incineration of domestic and health care waste. The public is very unaware about the possibility of producing furans and dioxins upon burning.

It is common for hospitals to burn obsolete drugs. This is due to lack of access to technologies on the safe disposal of hazardous wastes. An important problem concerns lack of facilities and expertise to monitor dioxins and furans. Malawi does not currently have hazardous waste incinerator facilities. About 30% of hospital waste incinerators are in operation and these do not have any installation of air cleaning equipments (NIP, 2002). This is further exacerbated by the fact that Malawi does not have emission limit values for unintentional POPs by-products such as furans and dioxins.

3.3.11.2 Objectives

The objective of the activity plan is to develop a strategy for effective identification of contaminated sites and implementing remediation practices. Specifically, to

(i) Update legislation to cover site assessment procedures, remediation criteria, future site use restrictions and site monitoring by 2022 *(Refer to 3.3.1)*
(ii) Develop site specific containment and/or remediation plans for high priority POPs contaminated sites, inclusive of detailed assessment and selection of public acceptable technology by 2010
(iii) Increase capacity and skills for better identification of contaminated sites and application of remedial measures.

Table 28 outlines objectives, activities and milestones for identification of contaminated sites (Annex A, B and C chemicals) and remediation in an environmentally sound manner.

Table 28: Objectives, activities and milestones for identification of contaminated sites (Annex A, B and C chemicals) and remediation in an environmentally sound manner

Objectives	Activity	Key Performance Indicator	Time Frame	Implementing Agencies	Resource /Needs (USD)
1. Develop site specific containment and/or remediation plans for high priority POPs contaminated sites,	1.1 Determine and prioritize contaminated sites at stakeholder workshop	An assessment and priority selection by the stakeholders	2006 - 2010	Malawi Bureau of Standards, EAD, ESCOM Agricultural research department. Universities Department of Local Government (local Authorities)	40, 000
	1.2 Undertake regular assessment of contamination of sites	Periodic assessment in place	2006-2025		100, 000
	1.3 Undertake corrective measures	Place mitigated	2006 - 2025	EAD	100, 000
2. Increase capacity and skills for better identification of contaminated sites and application of remedial measures	2.1 Undertake needs assessment and priorities capacity building initiatives	Needs Assessment	2006 - 2007	EAD UNIMA, CONGOMA Department of Local Government (local Authorities)	50, 000
	2.2 Organise training course	Cadre of trained personnel at all levels available	2006 2025		100, 000
	2.3 Facilitate training and research institutions	Enhancement of infrastructure in place	2007-2010		100, 000
	2.4 Facilitate and support local and international networking	Functional local and regional networks available by the end of 2006	2006-2008		50, 000
	2.5 Support research activities	Research implementation	2006 - 2025		100, 000
	2.6 Mobilize resources	Amount fund available	2007 2005	EAD stakeholders	100, 000
Subtotal					**740, 000**

3.3.12 Activity: Facilitating or undertaking information exchange and stakeholder involvement

3.3.12.1 Background

The Stockholm Convention under article 9 requires Parties to facilitate or undertake information exchange relevant to:

(i) Reduction or elimination of production, use and release of persistent organic pollutants;
(ii) Alternatives to POPs including information relating to their risks as well as social and economic costs; and

(iii) Information on health and safety of humans and the environment, which shall not be regarded as confidential.

The inventory showed that (i) information exchange on POPs and toxic substances among stakeholders was very limited, (ii) no strategy exists to increase information exchange, (iii), policies and legislation are not implemented aggressively to enhance information exchange and (iv) the various stakeholders including NGOs and the media reporters are not fully involved and capacitated to facilitate information exchange.

Malawi has established the National Focal point in the department of Environmental Affairs. The national focal point is directly answerable to the director of environmental affairs. The National Steering committee on POPs approves all activities under the national focal point. The NSC on POPs is composed of a senior officers in Health, agriculture, mines, natural resources and Environment, Environment & wildlife society, Revenue authority, Commerce, Trade and Industry, Malawi Chamber of Commerce and Industry, University, Malawi Bureau of Standard, ESCOM and a non governmental organization representatives including the Association of Professional Chemists and Chemical Engineers of Malawi. The National focal point is responsible for communicating with the Stockholm Convention secretariat all matters relating to the application of the obligation stipulated in the convention. However, at the moment it still remains a challenge to envisage information flow during the full implementation of the NIP. In this regard, Malawi aims at putting in place mechanisms for effecting multi- sectoral information flow and exchange on all matters relating to elimination and reduction measures for POPs. Implementation of the NIP requires greater and effective information exchange and stakeholder participation to achieve impact.

3.3.12.2 Objectives

The objective of the activity plan is to develop a strategy is to develop and ensure effective and efficient information exchange and stakeholder involvement under the plan. The specific objectives are:

(i) To develop and implement a strategy for greater stakeholder participation in information exchange
(ii) To strengthen national capacity for effective exchange of information.

Table 29 outlines objectives, activities and milestones for facilitating or undertaking information exchange and stakeholder involvement.

Table 29: Objectives, Activities And Milestones For Facilitating Or Undertaking Information Exchange And Stakeholder Involvement

Objectives	Activities	Key performance indicators	Time Frame	Implementers/ Collaborators	Resource Needs (USD)
1 To develop and implement a strategy for greater stakeholder participation in information exchange	1.1 Develop and agree on information exchange strategy for the country	Information exchange strategy Existence of more functional focal point Websites Databases	2006 -2008	EAD MACRA FECO COJEA CURE CIEN **Media houses**	30, 000
	1.2 Strengthen the information exchange focal point		2006-2008		30, 000
	1.3 Procure communication pieces of equipment and provide key information carriers and distributors		2006-2008		50, 000
	1.4 Organise regular stakeholder information exchange meetings		2006 -2025		100, 000
	1.5 Establish Internet website on POPs and develop various information systems including databases.		2006 02025		80, 000
2. To strengthen national capacity for effective exchange of information.	2.1 Undertake needs assessment of capacity building	Needs assessment Capacity building plan Network of stakeholders Capacitated institutions Regular review and information meetings	2005	EAD MACRA FECO COJEA CURE CIEN Universities Media houses	50, 000
	2.2 Develop and agree on capacity building strategy on information exchange		2006		40, 000
	2.3 Train NGOs, media associations and other stakeholders in better and more effective exchange of information techniques		2006-2025		100, 000
	2.4 Facilitate and support stakeholder networks on information exchange and support existing networks		2006-2025		80, 000
	2.5 Organise biannual meetings for all implementers and stakeholders to facilitate information sharing		2006-2025		100, 000
Subtotal					**1, 140, 000**

3.3.13 Activity: Public awareness, information and education (Article 10)

3.3.13.1 Background

Article 10 of the convention requests parties

1. Within their capabilities to promote and facilitate the following:
   (a) Awareness among its policy and decision makers with regard to persistent organic pollutants;

   (b) Provision to the public of all available information on persistent organic pollutants, taking into account paragraph 5 of Article 9; (c) Development and implementation, especially for women, children and the least educated, of educational and public awareness programmes on persistent organic pollutants, as well as on their health and environmental effects and on their alternatives;
   (d) Public participation in addressing persistent organic pollutants and their health and environmental effects and in developing adequate responses, including opportunities for providing input at the national level regarding implementation of this Convention;
   (e) Training of workers, scientists, educators and technical and managerial personnel;
   f) Development and exchange of educational and public awareness materials at the national and international levels; and
   (g) Development and implementation of education and training programmes at the national and international levels.

2. Each Party shall, within its capabilities, ensure that the public has access to the public information referred to in paragraph 1 and that the information is kept up-to-date.
3. Each Party shall, within its capabilities, encourage industry and professional users to promote and facilitate the provision of the information referred to in paragraph 1 at the national level and, as appropriate, sub-regional, regional and global levels.

4. In providing information on persistent organic pollutants and their alternatives, Parties may use safety data sheets, reports, mass media and other means of communication, and may establish information centres at national and regional levels.
5. Each Party shall give sympathetic consideration to developing mechanisms, such as pollutant release and transfer registers, for the collection and dissemination of information on estimates of the annual quantities of the chemicals listed in Annex A, B or C that are released or disposed of.

The Constitution of Malawi guarantees freedoms of opinion, expression, the press and access to information (Chapter IV Sections 34, 35, 36 and 37). In relation to responsible environmental management, it calls upon the state to prevent the degradation of the environment; provide a healthy living, learning and working environment for the people of Malawi; accord full recognition to the rights of future generations by means of environmental protection; and conserve and enhance the biological diversity of Malawi. (Chapter III Section 13(d)). In addition, relevant policies to public information that are in place include Malawi Communications Policy (1998), Malawi Information and Communications Technology (ICT) Policy (2003), the National Environmental Policy (NEP) (1996) while the Malawi Broadcasting Corporation Policy (MBCP) is in draft form. The ICT Policy (2003) replaced the Malawi Communications Policy, which did not adequately cover issues of information

technology. The policy seeks to harness the power of information and communications technology in order to facilitate and promote national development.

The communications infrastructure is very essential for the transmission of public information on issues related to the environment including POPs. Malawi developed a National Environmental Education and Communication (EE& C) Strategy (1996) for the promotion of EE and public awareness. The strategy describes EE scope, process and approaches in Malawi. The development of an Environmental Education Training Manual in 2001 as a supporting document to the implementation of the Environmental Education and Communication Strategy has assisted facilitators greatly to conduct environmental awareness programmes to various target groups such as journalists, musicians, dramatists, youth groups, women organizations, local leaders, as well as political leaders by facilitating the delivery of accurate information by trainers from different environment and natural resources management sectors. There is also continual monitoring of the state of the environment report (SOER) since the first was prepared in 1998 and the second edition was published in 2002.

Despite all the efforts to promote access to public information and environmental awareness creation, several challenges still exist. First, most public information is not user friendly as it is produced in English and in technical language when literacy level is very low being estimated at 64% in 1998. Since Malawians generally have a low reading culture they miss important information. Malawians are good at listening either verbally or through an electronic media. An assessment of environmental public information coverage in the country indicates that much of this information is about the green environment (forest and forestry resources), and the blue environment (water and water resources). Very little information is available about the brown environment (waste, sanitation and pollution) including that caused by POPs.

The study on POPs awareness, information and education indicated that (i) the general public is not aware of POPs; the rural masses do not have access to information on chemicals in general and POPs in particular. Lack of public awareness about POPs is also compounded by lack of trained staff dealing with persistent chemicals; (ii) there is inadequate training for the existing experienced staff. This makes it difficult for the staff especially extension staff to handle a new chemical for which they do not have enough information; (iii) chemical users and handlers have similar problems in information acquisition. However, ADMARC has instituted warning signs around/in its depots, which handle fumigation of maize and other cereal crops.

3.3.13.2 Objectives

The successful implementation of the Stockholm Convention on POPs in Malawi can only be achieved when the general population is aware, well informed and educated on the nature of POPs and their effects on human health and the environment. This will facilitate and enhance their commitment to achieving the objective. It is therefore important for action to be directed at promoting the continuous public awareness; information and training programmes on POPs. These efforts should be targeted at the policy and decision makers as well as the general public.. The objective for this activity plan is to develop and implement a proactive strategy for increased public awareness, information and education. Specifically,

1. To create awareness among the public, policy and decision makers including traditional authorities, women and children
2. To enhance the institutional capacity for public awareness, information and education

3. To design appropriate and implement public education programmes.
4. To promote and facilitate information dissemination.

Table 30 outlines objectives, activities and milestones for public awareness, information and education.

Table 30: Objectives, activities and milestones for public awareness, information and education

Objectives	Activities	Key performance indicator	Time frame	Key imple menters	Resource Needs (USD)
1. To create awareness among the public, policy and decision makers including traditional authorities, women and children	1.1 Identify relevant decision and policy makers/traditional authorities	Relevant Policy makers	2006	EAD EAD MACRA FECO COJEA CURE CIEN Universities Media houses Sectoral ministries	30, 000
	1.2 Organise workshops/seminars to sensitize various groups/stakeholders	Sensitization workshops conducted	2006 2008		80, 000
	1.3 To design appropriate and implement public education programmes.	Public awareness programs conducted	ongoi ng		100, 000
	1.4 Translate materials into local languages and different forms	Materials on POPs in local language	2007		80, 000
	1.5 Develop and support media education programs	Client specific programmes including for women & children	2006		80, 000
	1.6 Develop and produce awareness raising materials e.g. brochures, flyers, posters, newsletters etc on POPs.	Print materials produced	2006-2009		80, 000
2.To enhance the institutional capacity for public awareness, information and education	2.1 Undertake need assessment and prioritization	Needs assessment report	2006	EAD MACRA FECO COJEA CURE CIEN Universities Media houses Sectoral ministries MOEDRD	50, 000
	2.2 Develop and implement training and human resource development plan	Capacity building plan	2006		80, 000
	2.3 Develop and implement courses for various categories of personnel.	Training modules and material s produced	2006-2025		100, 000
	2.4 Train workers, scientists and development facilitators from all key stakeholders	Trained human resource available	2006-2025		150, 000
	2.5 Organise awareness raising workshops and seminars	Seminars conducted	2006-2025		80, 000
	2.6 Capacitate the focal points and training institutions	Institutions having better delivery systems	2006-2010		100, 000
	2.7. Introduce POPs education in school ad college curricula	Curricula incorporating POPs	2006-2008		120, 000
	2.8. Facilitate networking with regional and international partners	Functional networks	2006-2010		100, 000
Subtotal					**1, 230, 000**

3.3.14 Activity: Effectiveness Evaluation (Article 16)\

3.3.14.1 Background

Article 16 of the convention requires parties to establish mechanisms for providing comparable monitoring data on the presence of Annex A, B and C chemicals. This evaluation shall be conducted on the basis of available scientific, environmental, technical and economic information including national reports. The activities below provide details of actions to achieve the provisions of the Convention.

Malawi wishes to start implementation of the NIP immediately as soon as it is endorsed by government and approved by GEF for funding. This is expected to be late 2005 or early 2006 utmost. Mechanisms for evaluation will need to be established and tested where necessary for an effective tracking of activities and related impacts. Therefore, reports and monitoring of activities will be documented regularly and summaries biannually. Progress reports will be submitted annually to the National Council on Environment. These reports shall form the basis for submitting a consolidated report to the secretariat every five years for PCBs and every annually for the other POPs with exception of DDT which is currently not used in Malawi.

3.3.14.2 Objective

The objective of the activity plan is to develop and implement pro-active reporting systems. Specifically to

1. To strengthen technical capacity for evaluation
2. To conduct ad hoc surveys for impact evaluation
3. To formulate standard annual report formats for PCBs and other POPs

Table 31 provides objectives, activities and milestones for effectiveness evaluation (Article 16).

Table 31: Objectives, activities and milestones for effectiveness evaluation (Article 16)

Objectives	Activities	Key performance indicator	Time frame	Imple menters	Resource /Needs (USD)
1. To strengthen technical capacity for evaluation	1.1 Identify relevant indicators for national evaluation of POPs programs	Appropriate national indicators Checklist in place Criteria Developed Cadre of staff for effectiveness evaluation	2006-2007	EAD, Stakeholders Convention Secretariat Implementation agencies	60, 000
	1.2 Develop and implement checklist or format for evaluation		2006		50, 000
	1.3 Train scientists in effectiveness evaluation		2006-2007		100, 000
	1.4.Develop national performance evaluation criteria		2006-2007		60, 000
2. To conduct ad hoc surveys for impact evaluation	2.1 Conduct impact evaluation surveys on POPs	Surveys conducted Periodic reports showing monitoring performance Evaluation report	Periodic	EAD, PCB MOH MOA ESCOM District Assemblies Universities MBS Stakeholders	100, 000
	2.2 Mechanism for reporting established		2006-2007		50, 000
	2.3 Preparation of evaluation report		2010		60, 000
	2.4 Report on evaluation		2006 - 2025		40, 000
3. To formulate and implement standard report format for PCBs & other POPs	Design annual report formats	**Annual report format designed**	2006	**EAD**	10, 000
	Write & submit reports on POPs annually	**No of report submitted timely**	2006 2025		50, 000
	Submit PCB reports every five years	**Reports**	2010 2014 2018		100, 000
Subtotal					**680, 000**

3.3.15 Reporting

3.3.15.1 Background

The Stockholm Convention under Article 15 outlines the importance of reporting to the Conference of Parties (COP) on the measures taken to implement the provisions of the Convention and the effectiveness of the measures in meeting the objectives of the Convention. The Convention requires that each party should provide to the Secretariat:

(i) Statistical data on its total quantities of production, import and export of each of the chemicals.
(ii) To the extent practicable, a list of countries from which it has imported such substance and the countries to which it has exported each such substance.
(iii) And Annex A, part II subparagraph (g) of the convention requires that each Party to provide a report every five years on progress in eliminating Polychlorinated Biphenyls and submit it to the Conference of the Parties pursuant to article 15.

Malawi implements the reporting system consistent with the requirements of the Environment Management Act and the Pesticides Act. In accordance with the EMA the District Environmental Offices provide reports to the Environmental Affairs Department, which submit a consolidated report to the National Council on the Environment, Parliamentary Committee/ Cabinet Committee on the environment. EAD also obtain information from institutions, which deal with pesticides issues such as the PCB, ESCOM, UNIMA, MZUNI and estates.

In accordance with section 40 of the Pesticides Act the reporting procedure under the PCB starts with inspectors at entry points who gather information, compile data and subsequently report to the PCB Secretariat. The secretariat reports to the Board members during quarterly Board Meetings and the Registrar reports annually to SEARCH, FAO and UNEP. To consolidate these efforts, PCB is developing a database on pesticides registration. However, there are no specific reporting requirements and principles in Malawi associated with POPs.

3.3.15.2 Objectives

The objective of the action plan is to establish viable and dynamic reporting systems, which are periodically reviewed and updated to meet the challenges and needs of the Convention and Conference of Parties. The country therefore needs reporting procedures/guidelines for POPs releases and accumulation, assessment of impacts to human health and the environment, safety and toxicity potential of POPs and POPs pesticides, exposure to POPs, accumulation in water, soil, air and plants, emerging trends in the country and the region as well as research efforts relating to alternative technologies. Specifically,

(i) Update legislation to include reporting as a requirement for POPs
(ii) Develop and implement comprehensive POPs reporting systems and programmes
(iii) Strengthen institutional capacity for reporting POPs

Table 32 outlines objectives, activities and milestones for reporting.

Table 32: Objectives, activities and milestones for reporting

Objectives	**Activities**	**Key performance indicator**	**Timeframe**	Implementing agencies	**Resource / Needs (USD)**
1.0 Update all relevant legislation to include reporting	1.1 Determine opportunities for review	All legislation and polices updated and POPs monitoring included by 2008	2006-2007	EAD MOH MOA PCB Universities ESCOM Industry NGOs Media houses Stakeholders	60, 000
	1.2 Develop policy guidelines , regulations and enforcement mechanisms		2006		60, 000
	1.3 Prepare policy document and Bill		2006		500, 000
	1.4 Lobby Cabinet and Parliamentary Committee on Environment		2006		30, 000
2.0 Develop and implement comprehensive POPs reporting systems and programmes	2.1 Develop guidelines and standard reporting format for POPs and POPs pesticides	POPs reporting systems and programmes Databases Updated reporting strategy	2006	EAD MOH MOA PCB Universities ESCOM Industry NGOs Media houses Stakeholders	50, 000
	2.2 Identify and prioritize best reporting systems		2006		30, 000
	2.3 Establish and develop databases supportive of reporting systems		2006-2008		50, 000
	2.4 Establish an efficient and tractable reporting programme which is reviewed every four years		200602025		80, 000
3.0 Strengthen institutional capacity for reporting POPs	3.1 Establish reporting centers and capacitate them	POPs report incorporated into existing report units A cadre of competent staff in reporting trained and using their skills At least 50% of POPs Institutions are effectively contributing to Pops reporting process A quality assurance center functional Reporting system available and circulated to POPs reporting centers Annual reports	2007	EAD MOH MOA PCB Universities ESCOM Industry NGOs Media houses Stakeholders	60, 000
	3.2 Link national reporting POPs activity reporting to existing satellites sectoral ministry units in all partners institutions		2006-2007		150, 000
	3.3 Train staff in data collection processing, retrieval and reporting		2006-2025		90, 000
	3.4 Capacitate institutions in POPs data collection, processing, analysis retrieval and reporting		2006-2025		100, 000
	3.5 Establish a Quality Assurance Center POPs		2006-2007		150, 000
	3.6 Disseminate reporting systems to all POPs partners and stakeholders		2006		80, 000
	3.7 Develop and circulate annual monitoring reports		2006-2025		100, 000
Subtotal					**1,590,000**

3.3.16 Research, development and monitoring (Article 11)

3.3.16.1 Background

The Stockholm Convention under Article 11 (Research, development and monitoring) provides for Conference of Parties to undertake research, development and monitoring consistent with the objectives of the Convention. Specifically, the Conventions requires of each Party to:

- Encourage and/or undertake appropriate research, development, monitoring and cooperation pertaining to persistent organic pollutants
- Support and further develop, as appropriate, international programmes, networks and organizations aimed at defining, conducting, assessing and financing research, data collection and monitoring;
- Strengthen national scientific and technical research capabilities;
- Undertake research work geared towards alleviating the effects of persistent organic pollutants on reproductive health;
- Develop Research, development and monitoring strategy
- Disseminate results of their research, development and monitoring activities to the public on a regular basis;
- Cooperate with various partners on storage and maintenance information from Research and Development and monitoring
- Establish the impact of POPs on human health and environment;
- Develop clean up and remediation technologies

The inventory revealed that Malawi has undertaken limited research on POPs. It has a weak institutional and human capacity for research, development and monitoring of POPs. In addition, financial resources to support research, development and monitoring are limited. Little has been done in terms of research and development of alternative technologies. The inventory further revealed that there is no regulatory framework for research development and monitoring on POPs.

3.3.16.2 Objectives

The main objective of the action plan is to develop and implement Research and Development as well as monitoring strategy to meet requirements of the Convention. The specific objectives are:

(i) Update legislation to include research, development and monitoring of POPs *(refer 3.3.1)*
(ii) Develop a national strategy for research, development and monitoring of POPs
(iii) Build individual and institutional capacity for effective research, development and monitoring
(iv) Promote research on feasible and alternative technologies for replacing and disposal of POPs
(v) Investigate impact of POPs on human health and the environment
(vi) Promote the transfer and dissemination of Research, development and monitoring

Table 33 gives objectives, activities and milestones for research, development and monitoring.

Table 33: Objectives, activities and milestones for research, development and monitoring

Objectives	Activities	Responsible Institution	Time frame	Resources/Needs (USD)
1. Develop a national strategy for Research, development and monitoring of POPs	1.1 Organize consultative meetings of research, development and monitoring priorities	EAD, NRCM, Ministry of Industry Science and Technology, MBS, UNIMA- College of Medicine MOH, MOA, Universities, Research and Technology Development Institutions, Private Sector	**2006**	50, 000
	1.2 Develop a strategy paper for national agreement and endorsement		2006	30, 000
	1.3 Publish and distribute to all stakeholders		2006-7	30, 000
2. Build individual and institutional capacity for effective research, development and monitoring	2.1 Undertake needs assessment	EAD, NRCM, Ministry of Industry Science and Technology,,	2007	50, 000
	2.2 Organise a consultative workshop to prioritise capacity building needs	EAD , MOH, MOA, Research and Technology Development Institutions	2007-8	30, 000
	2.3 Develop a plan for training and institutional capacity building	Universities,	2007-8	100, 000
	2.4 Organize and support training and institutional development including for resource mobilization	**EAD** Private sector	2008 to 2015	100, 000
	2.5 Organise competitive research grants	Private Sector ARET Universities	2009 - 2015	500, 000
	2.6 Facilitate formation of R&D networks and working teams	Universities	2009	50, 000
	2.7 Identify & upgrade 3 laboratories capable of analyzing Annex A & B POPs chemicals		2008 - 2009	300, 000
3. Promote research on feasible and alternative technologies for replacing and disposal of POPs	3.1 Fund research into alternative technologies	EAD Toxic Chemical Management Unit	2009-2025	400, 000
	3.2 Foster partnership between the Private sector and research institutions	EAD, ARET ESCOM	2008 - 2015	50, 000
4. Investigate impact of POPs on human	4.1 Conduct toxicity studies on POPs	Universities Research institutions	2008 - 2025	100, 000

Objectives	Activities	Responsible Institution	Time frame	Resources/Needs (USD)
health and the environment	4.2 Develop standards and guidelines on toxicity levels of chemicals and hazardous wastes	MBS Universities Research institutions	2009	60, 000
	4.3 Determine the levels of accumulation of POPs in humans and the environment	MBS EHS Universities Research institutions	2009 - 2025	100, 000
	4.4 Determine the socio-economic benefits of POPs and alternatives	EP&D Universities Research institutions	2009 - 2025	100, 000
5. Promote the transfer and dissemination of Research, development and monitoring activities	5.1 Develop a strategy for dissemination and monitoring of research and development activities	EAD, Toxic Chemical Management Unit, MOH	2009 - 2025	100, 000
	5.2 Organize research dissemination fora	EAD, Toxic Chemical Management Unit, MOH Universities Research institutions	2009 - 2025	100, 000
	5.3 Support the publication of R&D results in various media forms	Toxic Chemical Management Unit, MOH Universities Research institutions	2009 - 2025	100, 000
Subtotal				**2, 350, 000**

3.3.17 Technical and financial assistance (Article 12 and 13)

3.3.17.1: Background

In article 12, the convention indicates that Parties recognize that rendering of timely and appropriate technical assistance in response to requests from developing country Parties and Parties with economies in transition is essential for the successful implementation of this Convention. Therefore Parties are required to cooperate to provide timely and appropriate technical assistance to developing country Parties and Parties with economies in transition, to assist them, taking into account their particular needs, to develop and strengthen their capacity to implement their obligations under this Convention. The Parties shall, in the context of this Article, take full account of the specific needs and special situation of least developed countries and Small Island developing states in their actions with regard to technical assistance.

In the thirteenth article the convention states that a mechanism for the provision of adequate and sustainable financial resources to developing country Parties and Parties with economies in transition on a grant or concessional basis to assist in their implementation of the Convention is hereby defined. The mechanism shall function under the authority, as appropriate, and guidance of, and be accountable to the Conference of the Parties for the purposes of this Convention. Its operation shall be entrusted to one or more entities, including existing international entities, as may be decided upon by the Conference of the Parties. The mechanism may also include other entities providing multilateral, regional and bilateral financial and technical assistance. Contributions to the mechanism shall be additional to other financial transfers to developing country Parties and Parties with economies in transition as reflected in, and in accordance with, paragraph 2.

Malawi is among the least developed countries with poor socio-economic indicators. The development of the National Implementation Plan has taken this into account. However, as a country, Malawi remains committed to support the plans within its financial and technical feasibility. Through the consultative process of developing the NIP, Malawi will source wherever practicable additional support from industry through providing incentives to willing entrepreneurs embarking on use of BEP and BATs in order to reduce the POPs impacts. Government will in turn be indirectly investing in the sound environmental management and ameliorating negative health impacts. Malawi Government will provide basic requirements (salaries, time allowance and health insurance) to personnel in the public sector to participate actively in the implementation programme.

Major capital investments provided in the NIP require external support. In this regard, Malawi will request GEF for technical assistance to support the inception phase of the POPs program (implementation 1-2 years) for developing monitoring mechanisms, technology transfer, training programs and research. Although much was undertaken to determine the extent of POPs problem in the country, the exercise was not exhaustive to cover all areas of importance due to capacity and technological deficiencies. Consequently, Malawi intends to address these areas.

3.3.17.2 Objectives

In order to facilitate and timely acquire technical assistance, Malawi has identified two objectives for this component.

1. To develop and implement human resource and technology development strategy
2. To diversify and mobilise financial resources for effective implementation of NIP determine appropriate arrangements for addressing gaps

Table 34 outlines objectives, activities and milestones for technical and financial assistance.

Table 34: Objectives, activities and milestones for technical and financial assistance

Objectives	Activities	Key performance indicator	Time frame	Key implementers	Resource /Needs USD)
1. To develop and implement human resource and technology development strategy	1.1 Id entity critical capacity gaps in human resources and technologies	Human resource and technology strategy Priority resource needs and projects **A 5-year plan**	2006	EAD, Relevant Stakeholders Universities Research institutions	50, 000
	1.2 Hold consultative meeting on NIP priority identified capacity gaps		2006- 2007		50, 000
	1.3 Develop internal and external arrangements for addressing the gaps		2006 -2007		30, 000
	1.4 Formulate a national 5 yr plan for instituting and supporting NIP implementation on human and technology		2007-2008		30, 000
2. To diversify and mobilise financial resources for effective implementation of NIP	2.1 Identify relevant sources of support	A directory of funding sources and guidelines A cadre of scientists for developing winning proposals A least 1 project funded very 3 years	2006-2007	EAD, Relevant Stakeholders Universities Research institutions	10, 000
	2.2 Increase skills of Malawian scientific community in writing winning project proposals and resource mobilization		2006-2010		30, 000
	2.3 Develop national projects and seek funding from various sources		2006-2025		60, 000
Subtotal					**260, 000**

3.3.18 Priority projects

At the national consultative stakeholder workshop, the key stakeholders identified priority project areas for immediate focus. These are:

(i) Creation of enabling environment supportive of POPs management

Review and harmonisation of the various pieces of legislation will be undertaken. Opportunities of a new policy/legislation and or strengthening existing legislation such as EMA (1996) and or Pesticides Act (200) will be delineated. Appropriate linkages and effective operational systems will be identified and strengthened.

(ii) Public awareness and information exchange

A concerted programme aimed at increasing public knowledge and awareness is required. The needs and activities for each category of the population will be developed and targeted. Various information outlets such as radio, drama, and jingles will be implemented. An information network and facilities such as newsletters in all key languages will be made available to the public. Websites will be developed and stationed at all the district authorities. A strong M&E strategy will be a key project component to determine the level of awareness and identify interventions for greater impact.

(iii) Strengthening institutional capacity

This project area concerns needs assessment of the various training, research and development institutions and evaluation of training programmes, school and college curricula. Existing curricula will be improved to incorporate knowledge and management of POPs. Training courses at various levels will be developed and implemented. . Capacitating of institutions through provision of equipment, accessories and consumables for R&D and supporting of effective monitoring, advocacy and information exchange will be undertaken. Ability of scientists in resource mobilisation will be determined and solutions. Increasing the capacity of enforcement systems and agencies will also be targeted. The capacities of the focal point and local authorities will be fully supported to ensure effective implementation.

(iv) Health and environmental impact of POPs

A plan for regular monitoring and evaluation of the impact of POPs use and accumulation on the human, aquatic and terrestrial resources will be delineated.

Deliberate attention on lactating and pregnant mothers and schools children will be targeted. Presence, behaviour and dynamics of these toxic substances and associated residues will be determined and understood.

(v) Management of POP obsoletes and stockpiles

The project will investigate the prevalence, existence of local management approaches, and delineated opportunities for transfer of obsoletes and stockpiles to industrialised countries for destruction.

(vi) Management of POPs wastes and contaminated sites

Various management options of wastes and contaminates including associated remediation approaches will be explored. All stakeholders including estate owners will be involved in identifying, testing and prioritisation of more effective management approaches.

(vii) POPs alternatives and technology transfer

A programme will be instituted to identify and or develop alternatives to POPs and transfer technologies to all users through joint testing, evaluation and prioritisation. Transformers and hospital incinerators will be deliberately targeted.

(viii) Local, regional and international networking

This project will entail identifying opportunities, facilitate and support networking formation and functioning to support policy development, research and development on POPs

Key stakeholders will be involved in the planning, development and implementation of these projects.

3.3.19: Implementation plan for persistent organic pollutants in Malawi (2006 –2030)

In Table 35 a detailed implementation plan matrix for persistent organic pollutants in Malawi (2006 –2030) is provided.

Table 35: Implementation plan matrix for persistent organic pollutants management in Malawi (2006 –2030)

Strategies and Objectives	IMPLEMENTATION YEARS																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1.0 Strengthen And Harmonize Institutional And Regulatory Measures																								
1.1 Update review and harmonize existing legislation and policies dealing with POPs																								
1.2 Develop new regulations specific to POPs																								
1.3 Strengthen monitoring and enforcement mechanisms																								
1.4 Designate relevant role and responsibilities on POPs																								
2.0 Eliminate Releases From Intentional Production And Use Of Pops																								
2.1 Preparing and applying guidelines for identification and labeling of equipment in use																								
2.2 Supporting voluntary agreements with enterprises or industry groups on phasing out PCB- containing equipment																								
2.3 Raising public awareness of these new products is of paramount importance.																								
2.4 Improve chemical handling and use																								
3.0 Production, import and export, use stockpiles and wastes of Annex A, POPs pesticide																								
3.1 To establish an effective M&E systems for use, import of Annex A pesticides																								
3.2 To enhance the institutional and human capacity for sustainable management of POPs pesticides																								
3.3 To undertake research and development into alternatives to POPs pesticides																								

Strategies and Objectives	IMPLEMENTATION YEARS																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
4.0 Production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs																								
4.1 To develop and implement a pro-active strategy for management of PCBs																								
4.2 To develop and implement R&D programmes on PCBs																								
4.3 To enhance human and institutional capacity for management of PCBs																								
5.0 Production, Import And Export, Use, Stockpiles And Wastes Of DDT																								
5.1 Develop and implement R&D into alternatives																								
5.2 Develop and implement an effective M&E system on usage and accumulation of DDT																								
5.3 Strengthen human and institution capacity																								
5.4 Raise Awareness on stockpiles and waste of DDT																								
5.5 Review and update inventory of contaminated sites and management of stockpiles																								
6.0 Register for specific exemptions and the continuing need for exemptions																								
6.1 Establish a system for registering for specific exemptions and continuing need for exemptions.																								
7.0 Releases From Unintentional Production Of PCDDS/ PCDFs, HCB And PCBs																								
7.1 Promote research and development on use of alternative methods of household fuel for cooking and or energy saving technology																								

Strategies and Objectives	IMPLEMENTATION YEARS																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7.2 Build capacity to monitor, manage and control unintentional releases of POPs and achieve effective PCDD/PCDF management.																								
7.3 Install appropriate technology to reduce releases from dioxins and furans in target processes																								
8.0 Measures To Reduce Releases From Stockpiles And Wastes																								
8.1 Establish and implement clean up and remediation schemes																								
8.2 Strengthening institutional capacity to handle POPs stockpile and wastes																								
8.9 Monitor storage and usage of chemical at enterprise level																								
9.0 Identification of relevant stockpiles, articles in use and wastes																								
9.1 To identify and quantify POPs stockpiles, articles in use and wastes																								
9.2 Develop an M&E systems for effective identification of stockpiles, articles in use and wastes.																								
10.0 Manage Stockpiles And Appropriate Measures For Handling And Disposal Of Articles In Use																								
10.1 To manage stockpiles and handle articles in use in a safe, efficient and environmentally sound manner																								
10.2 To develop safe handling and disposal procedures of articles in use																								
11.0 Identification Of Contaminated Sites (Annex A, B And C Chemicals) And Remediation In An Environmentally Sound Manner																								
11.1 Develop site specific containment and/or remediation plans for high priority POPs contaminated sites, inclusive of detailed assessment and selection of public acceptable technology by 2010																								

Strategies and Objectives	IMPLEMENTATION YEARS																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11.2 Increase capacity and skills for better identification of contaminated sites and application of remedial measures.																								
12.0 Facilitating Or Undertaking Information Exchange And Stakeholder Involvement																								
12.1 To develop and implement a strategy for greater stakeholder participation in information exchange																								
12.2 To strengthen national capacity for effective exchange of information.																								
13.0 Public Awareness, Information And Education																								
13.1 To create awareness among the public, policy and decision makers including traditional authorities, women and children																								
13.2 To enhance the institutional capacity for public awareness, information and education																								
14.0 Effectiveness Evaluation																								
14.1 To strengthen technical capacity for evaluation																								
14.2 To conduct ad hoc surveys for impact evaluation																								
14.3 To formulate and implement standard annual report formats for PCBs and other POPs																								
15.0 Reporting																								
15.1 Develop and implement comprehensive POPs reporting systems and programmes																								
15.2 Strengthen institutional capacity for reporting POPs																								

Strategies and Objectives	IMPLEMENTATION YEARS																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
15.3 Submit relevant reports timely																								
16.0 Research, development and monitoring																								
16.1Develop a national strategy for Research, development and monitoring of POPs																								
16.2 Build individual and institutional capacity for effective research, development and monitoring																								
16.3 Promote research on feasible and alternative technologies for replacing and disposal of POPs																								
16.4 Investigate impact of POPs on human health and the environment																								
16.5 Promote the transfer and dissemination of Research, development and monitoring																								
17.0 Technical and Financial Assistance (article 12 and 13)																								
17.1 To develop and implement human resource and technology development strategy																								
17.2To diversify and mobilise financial resources for effective implementation of NIP determine appropriate arrangements for addressing gaps																								

Chapter 4: Recommendations

The POPs National Implementation Plan for 2005 – 2020 (NIP) constitutes a comprehensive, strategic policy document whose objective is to develop and improve the optimal and most effective POPs management system while securing human health and environmental protection. Malawi will thus be meet its obligations under the Stockholm Convention on Persistent Organic Pollutants (the Stockholm Convention) signed 22 May 2001. The elaborated NIP for the period 2005 – 2020 will be updated regularly consistent with the special NIP revision and amendment procedure. The Malawi Governments and all its key partners are committed to translating the NIP into tangible actions from July, 2006 in order to prevent environmental degradation and associated impacts of POPs on human life. It is envisaged that GEF and key cooperating partners will support financially and technically the implementation of NIP. This contribution will complement local funding regimes provided by Parliament and the private sector.

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ANNEXES

Annex 1: Stakeholders at the national consultative workshop on the national implementation plan for the management of POPs held on 12 September 2005

Organizations

1. Agricultural Development and Marketing Corporation
2. Agriculture Research and Extension Trust
3. Association of Professional Chemists and Chemical Engineers of Malawi
4. Blantyre City Assembly
5. Bvumbwe Research. Station
6. Center for Environmental Policy and Advocacy
7. Chitedze Research Station
8. CURE
9. Department of Agriculture Research Services
10. Electricity Supply Corporation of Malawi
11. Environmental Affairs Department
12. FAO representative
13. Farmers Organization
14. Farmers Union of Malawi
15. Greenwigs
16. ILLOVO Ltd
17. Lilongwe City Assembly
18. Malawi Bureau of Standards
19. Malawi Environment Endowment Trust
20. Malawi Revenue Authority
21. Malawi Veterinary Association
22. Ministry of Agriculture
23. Ministry of Commerce and Industry
24. Ministry of Education
25. Ministry of Gender
26. Ministry of Health
27. Ministry of Justice
28. Ministry of Labour and Vocational Training
29. Ministry of Local Government
30. Ministry of Mines, Natural Resources and Environment
31. Ministry of Science and Technology
32. Ministry of Trade and Private Sector
33. Ministry of Water Development
34. Municipality of Zomba
35. Mzuzu City Assembly
36. NASFAM
37. National Construction Industry
38. National research Council of Malawi
39. Paint Manufacturers
40. Pesticides Suppliers Association of Malawi
41. Petroleum Control Commission of Malawi
42. Pharmacy, Medicines and Poisons Board
43. Rainbow Paints
44. Tobacco Association of Malawi
45. University of Malawi Bunda College of Agriculture
46. University of Malawi, Chancellor College
47. University of Malawi, the Malawi Polytechnic
48. University of Mzuzu
49. Wildlife and Environmental Society of Malawi

Annex 2: Stakeholders at the national consultative workshop on priority assessment and object setting held on September, 2004

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Annex 3: Stakeholders at the national consultative workshop on POPs inventories held in March, 2004

Name	Organization
1. M Nasho (Mrs.)	Deputy Minister, Min. of Natural Resources
2. G Mkondiwa	Principal Secretary, Min. of Natural Resources
3. R P Kabwaza	Director, Environ. Affairs Dept.
4. Dr A M Kamperewera	Deputy Director, Environ. Affairs Dept.
5. G C Jabu	Senior Lecturer, The Polytechnic
6. S M Chapima	Drag Analyst, Pharmacy Med. & Poisons Board
7. S P M Nyirenda	Research Officer, Lunyangwa Research
8. D R Chirombo	Mzuzu City Assembly
9. G Chaonamwene	Malawi Bureau of Std
10. G Z Phiri	Rainbow Paints
11. W Mandala	ARET
12. A C Nkhoma	FAO representative
13. O B Ching'oma	Zomba Mun. Assembly
15. A K Manda	NRCM
16. HKK Nyangulu	Min of Labour & VT
17. C Mkandawire	Farmers Union of MW
18. I Helema	Consumer Association of Malawi
19. B S Mando	Legal Advisor, Environ. Affairs Dept.
20. E D Njewa	Environ. Affairs Dept.
21. D G Bauleni	ESCOM Ltd
22. A T Daudi	Principal Secretary, Ministry of Agriculture
23. J S Meke Banda	Tobacco Ass. Of Malawi
24. H Lwesya	WESM
25. V P Mulula	Lilongwe City Assembly
26. Dr J Namangale	Dean of Science, Chancellor College
27. J G J Gausi	ADMARC
28. D F Namchenga	ADMARC
29. C Theka	Environ. Affairs Dept
30. T H H Maulana	Bvumbwe Res. Station
31. E H Kapeya	Bvumbwe Res. Station
32. Y A Agabu	Environ. Affairs Dept.
33. M K Mwanyongo	Environ. Affairs Dept.
34. C Phangaphanga	Commerce & Industry
35. T G Mbale	Environ. Affairs Dept.
36. R Lunduka	Bunda College
37. R Malunga	Petroleum Control Commission of Malawi
38. S P Mitini-Nkhoma	Blantyre City Assembly
39. R Banda	Television Malawi
40. P Masamba	MBC
41. D Chimwale	Television Malawi
42. JD K Saka	APCCEM
43. B T Tauzie	Ministry of Health
44. H M Kumwenda	Local Government
45. A K Masina	Min. of Health
46. MJ Makonombera	Blantyre City Assembly
47. S Sita	Min. of Natural Resources
48. L J Kampira	Environ. Affairs Dept.
49. B A E Chipezaani	Malawi Environment Endowment Trust
50. D Chokazinga	Malawi Bureau of Standards
51. P Nkhono	Greenwigs
52. K Gombo	ILLOVO Ltd

Annex 4: Stakeholders at the Inception Workshop for the project on POPs, June 2003

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Annex 5: Malawi's Steering Committee responsible for the overall implementation of POPs Project in Malawi

1. Secretary for Ministry of Mines, Natural Resources & Environment, Private Bag 350, **LILONGWE 3,** Mr. M. M. Mononga, Chairperson

2. Secretary for Agriculture, Irrigation and Food Security, P.O. Box 30797, **LILONGWE** 3, Dr. A. T. Daudi

3. Secretary for Commerce and Industry, P.O. Box 30366, **LILONGWE**

4. Secretary for Labour and Vocational Training, Private Bag 344, **LILONGWE 3** **Attention:** Mr. F. E. Y. Zenengeya

5. Dean of Science, University of Malawi, Chancellor College, P.O. Box 278 **ZOMBA**

6. The Chief Executive, Malawi Confederation of Chambers of Commerce and Industry, P.O. Box 258, **BLANTYRE,** Mr. C.L. Kaferapanjira

7. The General Manager, ESCOM, P. O. Box 2047, **BLANTYRE**

8. The Secretary General, Association of Professional Chemists & Chemical Engineers of Malawi (APCCEM), P.O. Box 33, **ZOMBA**

9. The Director General, Malawi Bureau of Standards, P.O. Box 30004, **BLANTYRE**

10. The Executive Secretary, CONGOMA, P.O. Box 480, **BLANTYRE**

11. Secretary for Health and Population Services, P.O. Box 30377, **LILONGWE** **Attention:** Mr. M. Tauze

12. The Assistant Director General, Malawi Revenue Authority, Private Bag 247, **BLANTYRE**

Secretariat

1. Director, Environmental Affairs Department, Private Bag 394 LILONGWE 3, Mr. R. P. Kabwaza

2. The National Project Coordinator, Mr. Lyson John Kampira, Environmental Affairs Department