Government of Malawi

ENVIRONMENTAL AFFAIRS DEPARTMENT

NATIONAL IMPLEMENTATION PLAN (NIP) FOR THE MANAGEMENT OF PERSISTENT ORGANIC POLLUTANTS (POPs)
2019 – 2023

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FOREWORD

Malawi signed the Stockholm Convention on Persistent Organic Pollutants (POPs) in May 2002 and ratified it in May 2009. One of the obligations of a Party to the Convention is to review and update, as appropriate, its implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties (COP) in accordance with Article 7(1) (c).

Malawi developed her first National Implementation Plan (NIP) in 2005, with financial assistance from the Global Environment Fund (GEF) and technical assistance from United Nations Industrial Development Organisation (UNIDO). Following the NIP development, some notable achievements were realised on reviewing legislation to incorporate management of POPs issues, capacity building, research and development, compliance and monitoring, information exchange and public awareness to encourage behavioural change.

These achievements include: development of the Environment Management (Waste Management and Sanitation) Regulations, and Environment Management (Chemicals and Toxic Substances) Regulations which provide for POPs issues, development of the National Waste Strategy, the Compliance and Monitoring Strategy, enhancement of the institutional and human capacity for sustainable management of POPs, pesticides, stockpiles and wastes for Polychlorinated Biphenyls (PCBs), establishment of a system for registering for specific exemptions and continuing need for exemptions, promotion of research and development on use of alternative methods of household fuel for cooking and or energy saving technology e.g. clean cook stoves, energy saver electric bulbs, monitoring of storage and usage of chemicals at enterprise level, development of safe handling and disposal procedures of articles in use and awareness creation among the public, policy and decision makers including traditional authorities, women and children on risks associated with POPs and POPs contaminated materials.

Despite the achievements outlined above, Malawi continued to face a number of challenges which necessitated the review and update of the 2005 NIP. In 2014, funds were received from GEF and technical assistance from United Nations Environment Programme (UN Environment) to implement the project "Review and Update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Malawi". The objectives of the project were to comply with Article 7 of the Convention and to build national capacity in updating NIPs. One of the major factors that has also necessitated the update of the NIP are the changes in obligations arising from amendments to the Convention or its annexes, including the addition of chemicals to Annexes A, B and C.

A Project Management Unit for the review and update of the NIP was put in place which consisted of a National Coordinating Committee (NCC) comprising members from various institutions involved in POPs management in Malawi, a Technical Advisor and Project Coordinator from the Environmental Affairs Department in the Ministry of Natural

Resources, Energy and Mining. National task teams were also formed to conduct assessments of the current status of POPs management in Malawi taking into consideration the new chemicals added to the Stockholm Convention (SC) annexes.

The revised NIP provides information on POPs management in Malawi since the 2005 NIP was developed. It has focused on key areas such as, legislative and institutional framework, capacity building, information exchange, public awareness and research and development. The updated NIP also provides the current status of management of specific POPs, which include pesticides, PCBs, UPOPs as well as baseline information for the new chemicals added to annexes A, B and C of the Stockholm Convention.

This NIP report provides guidance on the implementation measures that Malawi should take in order to effectively manage POPS. Government is committed to facilitating the implementation of the recommendations made in the NIP in order to protect human health and the environment in accordance with Malawi's sustainable development goals.

Government of Malawi is thankful for the financial and technical support provided by GEF and UN Environment to enable the NIP to be updated. Government is also thankful to all stakeholders who participated in the review and update of the NIP.

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SECRETARY FOR NATURAL RESOURCES, ENERGY AND MINING

ABBREVIATIONS AND ACRONYMS

AFFF	Aqueous Film Foaming Foam
ASR	Automotive Shredder Residues
EAD	Environmental Affairs Department
BAT	Best Available Technologies
BEP	Best Environmental Practices
CARG	Compound Annual Growth Rate
COMESA	Common Market for Eastern and Southern Africa
CoP	Conference of Parties
CRTs	Cathode Ray Tube
DDT	Dichloro-diphenyl-trichloroethane
DHRMD	Department of Human Resource Management and Development
DNA	Designated National Authority
EEE	Electric and Electronic Equipment
ELVs	Emission Limit Values
EMA	Environment Management Act
ENRM	Environment and Natural Resource Management
EoL	End of Life
ESCOM	Electricity Supply Commission of Malawi
ESIA	Environmental and Social Impact Assessment
ITU	International Telecommunications Union
MCCCI	Malawi Confederation of Chambers of Commerce and Industry
MACRA	Malawi Communications Regulatory Authority
MDA	Ministry, Department, Agency
MBS	Malawi Bureau of Standards
MEAs	Multilateral Environmental Agreements
MEPA	Malawi Environment Protection Agency
MoAIWD	Ministry of Agriculture, Irrigation and Water Development
MoFEPD	Ministry of Finance and Economic Planning Development
MoH	Ministry of Health
MoNREM	Ministry of Natural Resources, Energy and Mining
MRA	Malawi Revenue Authority
NCC	National Coordination Committee
NCHE	National Council for Higher Education
NCST	National Commission for Science and Technology
NIP	National Implementation Plan
NSO	National Statistics Office
OPC	Office of the President and Cabinet
PBDE	Pentabromodiphenyl Ether

PCB	Pesticides Control Board
PCBs	Polychlorinated Biphenyls
PCDDs	Polychlorinated Dibenzo-p-dioxins
PCDFs	Polychlorinated Dibenzofurans
PFC	Perfluorinated Compounds
PFOS	Perfluorooctane Sulfonic Acid
PIESA	Power Institute of East and Southern Africa
PMT	Pole Mounted Transformer
POPs	Persistent Organic Pollutants
SADC	Southern Africa Development Community
SAPP	Southern Africa Power Pool
UNEP	United Nations Environment Programme
UPOPs	Unintentional Persistent Organic Pollutants
WEEE	Waste of Electric and Electronic Equipment

EXECUTIVE SUMMARY

The 2005 National Implementation Plan (NIP) for the management of Persistent Organic Pollutants (POPs) in Malawi has been reviewed and updated in compliance with Article 7 of the Stockholm Convention taking into consideration the amendments to the Convention or its annexes, including the addition of chemicals to Annexes A, B or C.

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. Thereafter strategies were identified for effective management of POPs in Malawi to protect human health and the environment from their deleterious effects.

Assessment of POPs in country

The assessment of POPs pesticides was conducted through a national survey undertaken between August and December 2016. The survey determined the presence and uses of POPs pesticides in Malawi. About 90 sites including chemical companies, estates, supermarkets and produce markets were assessed.

Although a few pesticides are manufactured or formulated in the country, most of the pesticides are imported from various countries worldwide. However, Malawi does not manufacture POPs pesticides. The national inventory survey carried out in 2016 established that the country used POPs pesticides mainly between the 1960s to the 1980s. However, it was noted that chlordane was still in use for termite control mainly in the construction industry although the product was banned in 2016 on a phase-out approach. About 656 litres of chlordane were discovered during the survey.

DDT was historically used as a pesticide in Malawi since the 1960s largely on cotton to control major insect pests (MOAIFS, 1976). DDT was later used extensively in malaria vector control. DDT has been banned since 1984 and as such DDT was not found during the survey.

The survey identified 280.1 metric tonnes of obsolete pesticides countrywide most of which are safeguarded at Smallholder Farmers Fertilizer Revolving Fund of Malawi (SFFRFM) warehouses in Lilongwe and Blantyre under Pesticide Risk Reduction Project awaiting final disposal. Such pesticides include organophosphates, carbamates and pyrethroids.

The use of polychlorinated biphenyls (PCBs) in Malawi is mainly in the power generation industry. Equipment owned by the power supply company, Electricity Supply Corporation of Malawi (ESCOM), was identified as being most likely to contain PCBs. PCBs exist as components of insulating oils in transformers, capacitors and circuit breakers owned by the company. Currently, there

is no specific legislation dealing with handling and management of PCBs. However, general environmental management legislation dealing with management of chemicals and hazardous substances is applied to regulate management of PCBs. PCBs are listed in the chemicals and hazardous substances regulations as a class of chemicals that must be controlled but there are no specific requirements for their management. ESCOM as a member of Power Institute for East and Southern Africa (PIESA), Southern African Power Pool (SAPP) and Common Market for Eastern and Southern Africa (COMESA) utilizes guidelines developed by these institutions to manage PCBs.

The guidelines for SAPP require member countries to phase out use of equipment containing PCBs by 2025 and ESCOM is implementing this requirement. ESCOM has put in place a policy for discontinuing importation and use of equipment containing PCBs. During the NIP update inventory exercise, it was established that the existing equipment that is suspected to contain PCBs is generally very old and was installed before 1980; however, it is still functional. These include transformers, capacitors and circuit breakers.

Furthermore, oils from old transformers had already been recycled and reused when repairing transformers in operation and are still part of the ESCOM system grid. This means that oils containing PCBs are potentially within equipment that is still functional as part of the electricity supply grid. Therefore, transformers produced after 1990s might be contaminated by PCBs due to maintenance. The labels placed on transformers suspected to contain PCBs in the 2004 survey could not be found on most of the transformers.

Most of the waste oils removed from old equipment that is no longer within the power supply grid cannot be traced as it was common practice previously to sell used oil and non-functioning equipment to private buyers. Most of the circuit breakers currently within the power grid are gas-filled, with the old equipment having been removed and sold to private buyers. ESCOM still has stockpiles of obsolete transformers and used oils removed from transformers during maintenance and these need to be tested for PCB content.

The NIP update inventory exercise also determined that the sites potentially contaminated with PCBs are ESCOM transformer workshops in Blantyre, Lilongwe and Mzuzu. These sites are in open spaces without adequate drainage such that they pose risks to human health and the environment as they are exposed to the elements with runoff rainwater carrying spilled oils to surface water bodies and other open spaces. This has the potential to cause harm and serious risks to human health and the environment as the surrounding environment including rivers and agricultural lands are utilized by people and contain a wide range of flora and fauna. At Mzuzu Switchyard and Transformer station, over 250 obsolete transformers are stored at the premises awaiting auctioning to private buyers and scrap metal dealers which is the policy implemented by ESCOM to dispose of old equipment. Procedures need to be developed to ensure that the equipment does not contain PCBs as it would be difficult to ensure environmentally sound management and disposal of the equipment once purchased

by private buyers.

On the premises at Karonga Old Power Station, over 200 obsolete transformers are stored where they are marked as scrap awaiting auctioning to private buyers. In total, over 500 obsolete transformers have been taken out of the system and are kept in open spaces at Mzuzu, Rumphi, Karonga, Lilongwe and Blantyre Power Stations and at the transformer storage yard along Chikwawa road. The obsolete transformers have the potential to pollute the environment if they contain PCB contaminated oil as rainwater can transport any PCBs that may be contained in such equipment making the sites where these transformers are stored to be contaminated sites. Rainwater may also transport any residues in the transformer oils to nearby surface water bodies thereby presenting potential risk of exposure to PCBs for the general public.

Bwengu Transmission Substation had 29 drums (20l each) containing oil drained from transformers during repairs. Some of the drained oil was collected from very old transformers and therefore may potentially contain PCBs.

Malawi, together with eleven other countries in the Southern African Development Community (SADC) region, is currently implementing a project to eliminate use of PCBs containing equipment entitled "**Disposal of PCB oils contained in transformers and disposal of capacitors containing PCBs in Southern Africa**". Under this project, ESCOM will test all transformers and stockpiles of used oil to verify the presence of PCBs. The equipment and oils found to contain PCBs will be assessed to determine the concentration of PCBs and a program will be implemented for environmentally sound management and disposal of such equipment.

The NIP update inventory did not cover open applications such as sealants or paints and coatings that may contain PCBs. Information needs to be collected from sealants, paints and coatings, and manufacturers and importers to determine if their products are likely to contain PCBs. This would need to be followed by an analysis of samples to verify concentrations of PCBs in any of the materials and substances that may contain PCBs. The mining sector was assessed, and it is considered that there is no specific use of hydraulic equipment in the open pit mining.

The surveys established that the procedure for management of spillages and leakages during maintenance and repair of transformers on site is mainly by washing with degreaser or detergent and allowing the excess water to evaporate. The main concerns identified with spillages and leakages were at the transformer workshops and yards as spillages which resulted in contamination of soils with runoff water also carried the spillages onto surface water bodies.

An inventory of releases from unintentional production of Annex C chemicals was also undertaken for the years 2010 – 2017. The following were identified as the economic activities that were considered as significant sources of Unintentional POPs (UPOPs) emissions in Malawi:

- Waste Incineration: hazardous waste incineration, medical waste incineration and animal carcasses burning;
- Ferrous and non-ferrous metal production: foundries;
- Heat and power generation: fossil fuel power plants, biomass power plants, household heating and cooking using biomass;
- Production of mineral products: bricks, ceramics, and asphalt mixing;
- Transport: 4-stroke engines, 2-stroke engines and diesel engines;
- Open burning processes: biomass burning, waste burning and accidental fires;
- Production and use of chemicals and consumer goods: textile plants (per tonne textile) and leather plants;
- Miscellaneous processes: drying of biomass, crematoria, smoke houses, dry cleaning and tobacco smoking;
- Disposal: sewage and sewage treatment, open water dumping, composting and waste oil disposal; and.
- Contaminated sites and hotspots: use of PCB; and dumps of wastes/residues.

In general, releases are increasing with time mainly due to the increase in the rate of activities which increases with the rising population of the country. The total annual releases of dioxins and furans increased from 40.834g TEQ/a, in 2005 to 88.934g TEQ/a, in 2010 and 101.592g TEQ/a in 2017. The media which experienced the major releases was air ranging from 39.165g TEQ/a in 2005, 78.704g TEQ/a in 2010 and 89.026g TEQ/a in 2017. The media which experienced the least releases was water ranging from 0.000g TEQ/a in 2005, 0.039g TEQ/a, in 2010 and 0.074g TEQ/a in 2017.

The main areas (hotspots) for release of dioxins and furans were identified as Solid Waste Disposal Sites for Municipal Solid Waste for the cities of Blantyre, Lilongwe, Mzuzu and Zomba and other urban areas; water bodies in urban areas which are polluted by industrial effluent; garages and transformers where oil leaks and waste oil disposal result in dioxins and furans releases; and timber processing and electricity poles production sites.

Findings of the inventory show that UPOPs releases in Malawi are increasing every year with major contributors being waste disposal processes, incineration of medical waste, open burning processes, heat and power generation and the production of mineral products. Most of the releases are into air, products and residues.

Surveys were also conducted for new POPs including PFOS and POP-PBDEs. For PFOS, it was established that the country has a very small manufacturing industry that could use PFOS or its related substances in its manufacturing processes and identified the following as relevant stakeholders in the assessment exercise: carpets, chemical industries and products suppliers; retailers of commercial products; synthetic leather manufacturers, importers and retailers; textile manufacturers, importers and retailers; fire-fighting foams suppliers and users (aviation industry), fire-fighting training grounds and dump sites. The major gaps identified in the inventory of PFOS included lack of detailed data on

imports, poor inter-agency collaboration as well as ability to verify presence of PFOS in suspected products, thereby impacting results of inventory.

The inventory of POP-PBDEs in electric and electronic equipment (EEE) determined that Malawi does not manufacture any EEE. However new and second hand EEE is imported by private importers and large-scale importers mainly from Asian countries such as China, Japan, Hong Kong, India and Korea and from the Middle East (mainly from the United Arab Emirates), the USA and Europe and within Africa mainly from South Africa. Products containing POP-PBDE in current use and stock in Malawi, are mostly found in older appliances especially Cable Ray Tube (CRTs) computers and televisions. Most EEEs will probably be found at offices, in the households of private consumers and at educational institutions which tend to keep appliances for a long period of time. EEEs are also kept at repair shops for extended periods of time.

In terms of waste of electric and electronic equipment (WEEE), it is estimated that in the period 2018 and 2022, between 8.69 and 11.66 million devices (mobile phones, computers and TV sets) will become e-waste in Malawi. Most devices will be mobile phones due to the high mobile penetration and the exponential growth it has had in the last decade, compared to computers and TV sets, as such, mobile phones will represent above 95% of total e-waste devices during this period, i.e., between 8.41 and 11.24 million devices. E-waste in terms of EEE devices that have reached their end-of-life (EoL) will grow at a compound annual growth rate (CAGR) of 14.3%, between 2018 and 2022.

The inventory of PBDEs was very challenging due to several reasons including the lack of national data and statistics on PBDEs and poor communication infrastructure among stakeholders, which made it difficult to obtain data that would have assisted in establishing the baseline for POPs-PBDEs.

The action plans presented in the NIP are identified national priorities to ensure a safe environment and healthy nation. Implementation of the NIP is expected to commence in July 2019 up until 2023. The investment required is estimated at US$11, 472,000 for a five-year period. Key project areas, which Malawi has prioritized, include:

- Creation of an enabling environment supportive of POPs management;
- Public awareness and information exchange;
- Health and environmental impact assessment of POPs;
- Strengthening institutional capacity;
- Management of POPs pesticides and obsolete stockpiles;
- Management of POPs wastes and contaminated sites;
- POPs alternatives and technology transfer; and
- Local, regional and international networking.

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1. Country Profile

1.1.1. Geo-demography and Socio-economy

Malawi is in Southern Africa and is bordered by Tanzania in the north, Mozambique in the east, south and southeast, and Zambia in the west. The country's total geographical 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. The major water body in the country is Lake Malawi, which is to the southernmost of the African Rift Valley.

The estimated population of Malawi in 2018 was 19.16 million. Approximately 80% of the population is based in the rural areas where the main economic activity is subsistence farming which uses a large amount of agro-chemicals. Most of Malawi's population relies heavily on capital derived from natural resources, including forestry and fisheries. The economy of Malawi is agro-based, and it contributes 39% to the Gross Domestic Product (GDP) and adds significantly to national and household food and nutrition security. More than 85% of rural households are engaged in the agricultural sector. Of the 85%, women provide 70% of the workforce and produce 80% of food for home consumption. The involvement of women in agriculture and other industrial activities may likely expose them to the hazards of chemicals and pollutants more than men.

1.1.2. Relevance of the 2019 NIP to National and International Development Agenda

The management of Malawi's environment and natural resources is critical to achieving poverty reduction, good health and sustainable economic growth as outlined in the Malawi Growth and Development Strategy III and the Sustainable Development Goals. There has been a general increase in environmental degradation owing to poor farming practices and other unsustainable land use practices including excessive use of agro-chemicals.

The 2019 National Implementation Plan (NIP) for Persistent Organic Pollutants has been aligned to key priority areas in the Malawi Growth and Development Strategy III (MGDS III) after recognizing its huge potential to contribute to some of the goals. By contributing to the MGDS III, the 2019 NIP will also help in achieving the 2030 Sustainable Development Goals (SDGs).

SDG 3, SDG 6, SDG 14, and SDG 15

SDG 3 requires nations to promote good health for their citizens. The 2019 NIP outlines measures for ensuring that production, importation and use of POPs in Malawi is minimized in order to reduce any health risks, which may emanate from them. The NIP also outlines measures for ensuring that releases from POPs and POPs contaminated materials are eliminated (refer to implementation tables). The successful implementation of the plan will significantly contribute to good health through minimization of health risks.

SDG 6 calls for provision of clean water and sanitation. Improper use and disposal of POPs and POPs contaminated materials has significantly contributed to water pollution and has compromised household and public sanitation. The NIP outlines measures which will ensure that pollution from POPs is minimized in the short term and eradicated in the long term.

SDG 14 calls for nations to protect and sustainably use all forms of water and marine resources. It calls for protection and sustainable exploitation of life in water. In line with the NIP, protection of life in water implies ensuring that POPs and other chemicals do not impede any form of life in water. The 2019 NIP will significantly ensure that water bodies are safe from POPs contamination hence protecting biological processes in the water bodies.

SDG 15 requires nations to protect, restore and promote sustainable use of terrestrial ecosystems. The 2019 NIP outlines measures for preventing pollution which may cause ecosystem deterioration. It also outlines measures for environmental remediation and restoration from POPs contamination.

1.2. Institutional, Policy and Legal Framework

There are various institutions which are mandated to manage chemicals in Malawi. These institutions are involved in chemicals management at various stages of the chemicals' lifecycle ranging from production, importation, transportation, distribution, marketing, use/handling, storage as well as disposal.

1.2.1. Major Institutions

1.2.1.1 Environmental Affairs Department (EAD)

The Environment Affairs Department is responsible for the protection and management of the environment and the conservation and sustainable utilization of natural resources. This includes regulation of chemicals, including POPs, to ensure that they do not have detrimental impacts on the environment and human health. The Department is the focal point for the Basel, Rotterdam, and Stockholm Conventions, and Strategic Approach to Chemicals Management and will be focal point for the Minamata Convention which Malawi is in the process of ratifying.

1.2.1.2 Ministry of Agriculture, Irrigation and Water Development

The mandate of the Ministry of Agriculture, Irrigation and Water Development includes provision of advisory services in the use of fertilizers and pesticides with regard to efficient usage for farmers to maximize crop yields. In the case of pesticides, the Ministry, in conjunction with farmers, jointly conducts sprays for migratory pests such as locusts and army worms. The role and responsibility of the Ministry includes provision of advice and information to users and farmers on lifecycle management of chemicals and pesticides including disposal.

1.2.1.3 Pesticides Control Board

The mandate of the Board is derived from the Pesticides Act. The Board is responsible for importation, exportation, manufacture, distribution, storage, disposal, sales, repackaging and use of all pesticides in Malawi. Other responsibilities include registering pesticides, maintaining a register of pesticides, and issuing of certificates and permits. The role of the Board includes provision of information on pesticides quantities, usage, incidents and case studies. Table 1 provides a list of all institutions that play a role in various activities related to chemicals.

Table 1: List of institutions that play a role in various activities related to chemicals

Name of Institution	Role
Environmental Affairs Department	Adopting and promoting best available techniques/best environmental practices (BAT/BEP)
	Developing and enforcing emission limit values (ELVs)
	Monitoring and reporting of emissions
	Developing and enforcing limit values for releases to land and water
	Monitoring and maintaining inventories and reporting on releases
	Identifying, assessing and compiling an inventory of contaminated sites
	Monitoring and reporting
	Recommending remediation measures for sites
	Mobilizing resources from multilateral, regional, and bilateral partners
	Collecting and disseminating information on annual quantities of POPs and POPs compounds emitted, released, or disposed; and other information specified
	Reporting to the COP on progress in implementing Convention obligations
	Sharing information on the health and safety of humans and the environment as non-confidential
	Representing the Government of Malawi at the COP, including voting, if and when required
	Determining how future Convention annex amendments will be ratified
	Participating in dispute resolution processes specified if needed
Ministry of Industry, Trade and Tourism	Controlling of import and export
	Controlling of import and export of products with POPs containing products
	Licensing
	Monitoring trade in POPs containing products
	Regulating import, export, possession, distribution, use and disposal of chemicals
Ministry of Home Affairs	Enforcing action for smuggled products
Ministry of Labour	Enforcing Occupational Safety and Health standards
	Adopting BAT/BEP for promoting occupation safety and health at work

Name of Institution	Role
	places
Ministry of Information	Dissemination of information
Malawi Revenue Authority-Customs Department	Enforcing import and export regulations
Malawi Bureau of Standards	Controlling quality of goods entering the country
	Adopting BAT/BEP in collaboration with relevant institutions
	Monitoring and implementation of standards on chemicals
	Monitoring equipment and manufacturing processes
	Developing standards on POPs
	Setting water quality standards in collaboration with relevant institutions
Pesticides Control Board	Phasing out of pesticides, biocides, and topical antiseptics containing POPs
Ministry of Local Government	Adopting and using best available techniques/best environmental practices (BAT/BEP) in the incineration of municipal waste Implementation of relevant initiatives
Water Resources Department	Identifying sources of POPs releases, maintain an inventory and reporting Water quality monitoring
Ministry of Foreign Affairs and International Corporation	Facilitating ratification
Ministry of Justice and Constitutional Affairs	Facilitating ratification
	Vetting of proposed regulations
Academia	Assisting identification of contaminated sites
	Conducting research and publications
Private Sector	POPs storage
CAMA	Conducting awareness on consumer products containing POPs
CSOs	Conducting public awareness on POPs

1.2.2. Policies, Acts and Regulations and Enforcement Mechanisms

The 2019 NIP also included an assessment of various legislation on or relating to chemicals in order to derive a general picture on the progress of improving the regulatory framework for chemicals in Malawi. The assessment revealed that Malawi is making strides in developing regulations on POPs.

The assessment showed that Malawi has several pieces of sectoral legislation for specific areas of

chemicals management in the country. Specifically, the Environment Management Act has provisions for pollution control and regulation of wastes; the Pesticides Act and its regulations cover importation, exportation, manufacture, distribution, storage, disposal, sales, repackaging and use of all pesticides in Malawi; the Fisheries Conservation and Management Act provides for mandatory monitoring and control of pollution of various water bodies from toxic chemicals/substances including POPs and also provides for penalties for both pollution and failure to remove pollutants; the Industrial Licensing Act provides for licensing of industries involved in (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 Occupational Safety, Health and Welfare Act has provisions for the safety and welfare of employees handling hazardous substances.

The Malawi Bureau of Standards Act developed and implemented standards including standards on chemicals. In addition, there is other legislation in place which is relevant to chemicals, including: The Plant Protection Act and Seed Act for POPs pesticides; Public Health Act, for human health issues; and the Pharmacy, Medicines and Poisons Board Act.

The 2005 NIP also revealed that the legislation on chemicals did not provide for monitoring and enforcement of POPs and no designated institutions were assigned responsibilities for monitoring and managing POPs. However, the 2019 NIP review found that responsibilities for monitoring and regulating POPs have been assigned to relevant agencies as shown in Table 1.

The 2005 NIP had various strategies to be undertaken to address the issues mentioned above. The 2019 NIP review assessed the progress made in each strategy and adopted the same strategies in order to ensure continuity and sustain the gains made during implementation of the 2005 NIP. These strategies included:

a) Update, review and harmonization of existing legislation and policies dealing with POPs;
b) Develop new regulations specific to POPs;
c) Strengthen monitoring and enforcement mechanisms;

Since the 2005 NIP, the Government has undertaken initiatives to achieve the strategies mentioned above.

Strategy 1: Updating, Review and Harmonization of existing policies and legislation on POPs
Under this strategy, the following legislation has been updated and reviewed since 2005;

Water Resources Act No.2 of 2013
The purpose of the Water Resources Act, 2013 is to provide for the management, conservation, use and control of water resources for the acquisition and regulation of rights to use water. Sections 88 and 89 of the Act provide for the prevention and control of water pollution. The provisions of the Act do not specifically mention POPs. Section 89 does refer to "an activity or process that…has caused or is likely to cause pollution to water sources". This could allow for the implementation of

Article 3 of the Stockholm Convention that aims to reduce or eliminate releases from intentional production and use. The Act is also relevant to Article 5 of the Stockholm Convention on measures to reduce or eliminate releases from unintentional production of POPs and POPs compounds to water. Therefore, the Act, although it does not specifically mention POPs, can be used for the management of POPs.

Environment Management Act No.19 of 2017

The Environment Management Act of 2017 repeals the Environment Management Act No.23 of 1996. The Act is the framework legislation for environmental management, and it provides for various environmental issues including waste management, hazardous substances and polluting activities.

Section 59 of the Act requires the Malawi Environment Protection Authority (MEPA) in consultation with a relevant lead agency, to establish criteria for classification of toxic and hazardous substances in accordance with their toxicity and the hazards they present to human health and the environment.

The Act also provides that the Authority in consultation with relevant lead agencies should issue guidelines and prescribe measures for the management of toxic and hazardous substances, which shall include guidelines and measures on:

a) registration, labeling, packaging and advertising of chemicals and materials;
b) control of imports and exports of toxic and hazardous chemicals and materials;
c) distribution, storage, transportation and handling of chemicals and materials;
d) monitoring the effects of chemicals and materials and their residue on human health and the environment;
e) disposal of expired and surplus chemicals and materials; and
f) restricting and banning of extremely toxic and hazardous chemicals and materials.

In the Act, "hazardous substance" is defined as any chemical, waste, gas or gaseous matter, plant, animal or micro-organism which can cause harm to human health or the environment. Toxic substances are not defined in the Act. However, POPs can be defined as hazardous or toxic substances and therefore the provisions of section 59 can include POPs.

Section 60 provides that a person shall not discharge any hazardous substance in any waters or any other segment of the environment except in accordance with the guidelines prescribed by the Authority in consultation with a relevant lead agency. If a person discharges a hazardous substance in any waters or any other segment of the environment, such a person commits an offence. These provisions are also broad enough to include POPs.

The Act also has an entire section dealing with pollution and generally prohibits the discharge of pollutants into the environment. "Pollution" is defined in the Act as 'any direct or indirect alteration of the physical, thermal, chemical or biological environment caused by the discharge, emission or

deposition of waste or a pollutant into the environment in such amounts and for such duration and under such conditions as to cause an actual or potential danger to the environment'. The definition is broad enough to include POPs discharged, emitted or deposited into the environment.

Strategy 2: Development of POP Specific Regulations

The 2005 NIP recommended development of new regulations specific to POPs. Government has developed regulations on waste management and sanitation and on chemicals and toxic substances.

Environment Management (Waste Management and Sanitation) Regulations, 2008

The Regulations are based on the provisions of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal to which Malawi is a party. These Regulations provide for management of general or municipal solid and liquid waste, solid waste recycling and recycling facilities, management of hazardous wastes, transportation and storage of waste, waste disposal site or plant and transboundary movement of wastes.

Management of hazardous waste is dealt with by Part IV of the Regulations. Hazardous wastes are defined as any waste which has been identified in the Seventh Schedule [of the Regulations] or any waste having the characteristics defined in the Eighth Schedule [of the Regulations]. The definition and the Eight Schedule are based on the Basel Convention. According to Regulation 32, the Director of Environmental Affairs is required, from time to time, to publish in the Government Gazette and in at least one (1) of the local newspapers of daily circulation, a list of wastes which fit in categories specified under the Seventh Schedule or which have characteristics specified in the Eighth Schedule which are hazardous and need to be controlled.

Regulation 33 and 34 provide for requirements and leaflets for containers or packages of hazardous wastes. Regulation 35 requires every industry to develop a compliance code which shall outline the industry goals for (a) waste reduction and minimization; (b) waste treatment on site; and (c) disposal plans. Regulation 36 provides that no industry, business or medical facility can discharge any hazardous waste in any state into the environment unless such wastes have been treated in accordance with acceptable international methods that are approved by a competent local authority in consultation with the Director. For hazardous wastes to be disposed of in a disposal site or plant, such facility must be approved and licensed for that purpose. Regulations 57 to 59 deal with prior informed consent procedure.

The provisions of these regulations do not refer to POPs wastes, but they do refer to hazardous wastes which can include POPs wastes. These regulations are currently being amended to ensure that they specifically address POPs.

Environment Management (Chemicals and Toxic Substances) Regulations 2008

The Regulations apply to any person in Malawi whose undertaking involves or includes the manufacturing, repackaging, importation, exportation, transportation, distribution, sale or other mode of handling toxic substances and chemicals and in respect of any activity in relation to toxic

substances and chemicals which involves a risk of harm to human health or the environment.

The Regulations define a "chemical" as a chemical substance in any form whether by itself or in a mixture or preparation whether manufactured or obtained from nature and includes such substances used as industrial chemicals, for consumer use but excludes pesticides and fertilizers, medicines and drugs and for the purposes of these Regulations includes toxic chemicals. "Chemical wastes" are defined as any unwanted or waste chemical or chemical formulation generated from any process which can cause danger to both human health and the environment.

The Regulations require any person who intends to engage in the business of manufacturing, repackaging, importing, exporting, transporting, distributing, sale or other mode of handling chemicals and toxic substances to obtain a license from the Environmental Affairs Department. The Regulations contain procedures for restricting the use of a chemical product including an assessment of whether the chemical causes or is likely to cause adverse effects to human health, animals, plants or the environment.

In addition to giving duties to the public and businesses, the Regulations also give duties to local authorities and medical facilities. Local authorities are required, by the Regulations, to make by-laws for management of chemicals and toxic substances and chemical wastes in their respective area of jurisdiction. Such by-laws should ensure that the disposal method of chemical wastes is in an environmentally sound manner. Industries or medical facilities have a duty not to discharge any chemical wastes in any state into the environment unless such wastes have been treated in accordance with acceptable international methods that are approved by the Director of Environmental Affairs in consultation with the relevant local authority.

A person who has a license to own or operate a chemical waste or plant must ensure that highly toxic or hazardous chemical wastes are disposed of or treated in accordance with conditions specified in the license or in accordance with any general guidelines issued by the Director in consultation with the Director responsible for local government.

Every person who operates a toxic substance or chemical wastes disposal site or treatment plant is required to take all necessary measures to prevent pollution from sites or plants including the erection of necessary works and taking mitigation measures.

The chemicals regulations do not specifically refer to POPs. However, these regulations contain the most comprehensive provisions on management of chemicals and toxic substances in Malawi. The provisions mentioned above can be applied to POPs management. These regulations are currently being amended to ensure that they specifically address POPs.

Strategy 3: Strengthened Monitoring and Enforcement Mechanisms

The 2005 NIP recommended that Malawi should adopt various tools for strengthening monitoring and enforcement mechanisms. These included the issuance of licenses and permits, conducting

inspections for compliance monitoring and taking enforcement actions in instances of non-compliance.

The Water Resources Act, Environment Management Act, and Chemicals and Wastes Regulations provide for various mechanisms to strengthen monitoring and enforcement.

Enforcement Mechanisms

a) Licenses and Permits

The Chemicals Regulations of 2008 which deal with management of toxic substances and chemicals emphasize the licensing requirements to engage in the business of manufacturing, repackaging, importing, exporting, transporting, distributing, sale or other mode of handling chemicals and toxic substances. The Waste Management Regulations of 2008 also provide for licensing requirements to engage in certain activities involving waste such as storage, disposal and export. These provisions give effect to the recommendations of the 2005 NIP which amongst other things required licensing of industries involved in hazardous chemical waste processing. These licenses are currently being processed by the Environmental Affairs Department in the Ministry of Natural Resources, Energy and Mining but will eventually be migrated to the Malawi Environment Protection Authority.

b) Inspections

The provisions of the Water Resources Act and Environment Management Act also call for inspections to be conducted to determine compliance with licenses issued and with the provisions of legislation. Inspections are done by institutions that issue specific licenses under the mandate of legislation that they use to issue the licenses.

c) Enforcement Action

Enforcement action takes many different forms. In Malawi, most legislation on environment and natural resources give an administrative agency (Ministry, Department or Agency) the regulatory powers on several issues, including enforcement, to achieve the legislative mandate. For example, an Act may specify that the relevant MDA may issue a warning letter when there has been a violation of law. Such administrative actions enable the MDA to respond to a violation of law in a quicker and less costly manner which is flexible, in proportion and appropriate to the violation. This is because administrative actions are taken at institutional level. Administrative actions in Malawi include:

- requiring a person to take a particular action
- formal advisory or warning letters requiring future compliance
- varying, or imposing further conditions on permits, licenses or approvals
- suspending, revoking or cancelling permits, licenses or approvals;
- orders to correct a contravention (such as environmental protection orders); and
- forfeiture

If there is non-compliance with an administrative action then a regulatory authority or other institution trying to enforce compliance may proceed to take a matter to court for civil or criminal remedies.

Some ENRM and related legislations enable regulatory authorities to apply for civil court orders requiring a person to do something or to stop committing an offence, or to remedy or rectify the consequences of an offence.

The most commonly referred to enforcement practice for violations of environment and natural resources legislation in Malawi is criminal enforcement. All ENRM and related legislation provides that a person found guilty of committing a criminal offence may receive a fine; and/or imprisonment.

Criminal enforcement action is generally used when a person or a facility has knowingly or willfully committed a serious or major violation against the law. The Water Resources Act of 2013, Environment Management Act of 2016, and chemicals and wastes regulations provide for criminal enforcement action. For example, the Environment Management Act provides that it is an offence to discharge, emit or deposit polluting substances into the environment and the sanctions for the offence are provided for in the Act.

Malawi has made significant progress in achieving the strategies relating to legislation that were mentioned in the 2005 NIP. The assessment has established that Malawi has sufficient legislation to effectively implement the obligations of the Stockholm Convention and amendment of the ongoing chemicals and wastes Regulations will further enable Malawi to monitor POPs effectively.

International Instruments: The Stockholm Convention

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. It deals with issues such as measures to reduce or eliminate releases of Persistent Organic Pollutants (POPs), processes of adding more POPs and technical and financial assistance to manage POPs.

POPs are a class of chemical 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. Initially the following twelve chemicals were proven to exhibit POPs characteristics:

- Intentionally produced pesticides: (i.e. aldrin, dieldrin, DDT, endrin, chlordane, hexachlorobenzene, mirex, toxaphene and heptachlor).
- industrial chemicals: which are polychlorinated biphenyls (PCBs) and hexachlorobenzene
- unintentionally produced emissions of certain industrial and combustion processes: hexachlorobenzene, polychlorinated dibenzo-*p*-dioxins, polychlorinated dibenzofurans (PCDD/PCDF), and PCBs

Since 2009, the following sixteen new POPs have been added to the Convention:

- Pesticides: alpha hexachlorocyclohexane, beta hexachlorocyclohexane, chlodecone, lindane, pentachlorobenzene, pentachlrophenol and its salts and esters, technical endosulfan and its related isomers
- Industrial chemicals: decabromodiphenyl ether (commercial mixture, c-decaBDE), hexabromobiphenyl, hexabromocyclododecane, hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octabromodiphenyl ether), hexachlorobutadiene, pentachlorobenzene, perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl floride, polychlorinated naphthalenes, short-chain chlorinated paraffins (SCCPs), tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether)
- Unintentional production: pentachlorobenzene and polychlorinated naphthalenes

Malawi signed the Convention in May 2002 and ratified it in May 2009. One of the obligations of a Party to the Convention is to review and update, as appropriate, its implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties in accordance with Article 7(1) I.

1.3. Methodology for Developing the 2019 NIP

Malawi developed her first National Implementation Plan in 2005, with financial assistance from the Global Environment Fund (GEF) and technical assistance from United Nations Industrial Development Organisation (UNIDO). In 2014, funds were received from GEF and technical assistance from United Nations Environment Programme (UN Environment) to implement the project **Review and Update of the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Malawi.**

The objectives of the project were to comply with Article 7 of the Convention by updating the National Implementation Plans (NIPs) on Persistent Organic Pollutants and to build national capacity in updating NIPs. One of the major factors that has necessitated the update of the NIP are the changes in obligations arising from amendments to the Convention or its annexes, including the addition of chemicals to Annexes A, B or C.

Upon receiving the financial assistance, a Project Planning Management Unit for the review and update of the NIP was put in place which consisted of a National Coordinating Committee (NCC), Technical Advisor and Project Coordinator.

The NCC provided policy oversight of the project whose membership comprised 11 members from the following institutions: Ministry of Health, Ministry of Labour, Ministry of Industry and Trade, Ministry of Natural Resources, Energy and Mining, Pesticides Control Board, Malawi Bureau of Standards (MBS), University of Malawi, Electricity Supply Corporation of Malawi (ESCOM), Malawi Confederation of Chambers of Commerce and Industry (MCCCI), CropLife Malawi and Malawi Revenue Authority (MRA).

A technical advisor was appointed to oversee the technical processes for updating the NIP. A Project Coordinator was responsible for the day to day running of the project, including liaising with UN Environment.

National task teams were also formed to conduct inventory surveys in key hotspot areas across the country.

CHAPTER 2

PROGRESS OF THE 2005 NATIONAL IMPLEMENTATION PLAN

The 2005 NIP made some notable improvements in the management of POPs in Malawi. Being the first action plan in this regard, the 2005 NIP facilitated the rolling out of several legislative, institutional and technical measures to address gaps in the management of POPs in the country. However, the plan did not achieve all the intended milestones due to a various factors. Therefore, significant improvements are still required in certain key areas in order to meet the provisions of the Stockholm Convention Articles. At the same time there are several emerging issues that need to be addressed to ensure that biological and environmental risks from POPs are effectively managed. This chapter reviews the progress made in the implementation of the previous NIP and draws out some key lessons.

2.1. Overview of Planned Outcomes

In 2005, the following strategic outcomes were set in line with the various articles of the Stockholm Convention:

i. Development and implementation of measures for ensuring that management of POPs is carried out in accordance with the provisions of the Stockholm Convention;
ii. Enhanced institutional capacity for proper handling and management of POPs;
iii. Enhanced awareness on POPs related risks and mitigation measures; and
iv. Enhanced communication and knowledge management.

2.2. Major Achievements from the 2005 NIP

Upon the development of the first NIP in 2005, some notable achievements have been realised following the implementation of the strategy. Below were the major highlights of achievements:

i. Development of the Environment Management (Waste Management and Sanitation) Regulations, and Environment Management (Chemicals and Toxic Substances) Regulations;
ii. Development of the Compliance and Monitoring Strategy;
iii. Enhancement of the institutional and human capacity for sustainable management of POPs pesticides;
iv. Enhancement of the human and institutional capacity for management of PCBs;
v. Established a system for registering for specific exemptions and continuing need for exemptions;
vi. Promotion of research and development on use of alternative methods of household fuel for cooking and or energy saving technology e.g. clean cook stoves, energy saver electric bulbs;
vii. Enhancement of capacity in monitoring, management and control unintentional releases of POPs and achieve effective PCDD/PCDF management;
viii. Monitoring of storage and usage of chemicals at enterprise level;

ix. Strengthening of institutional capacity in handling POPs stockpile and wastes;
x. Identification and quantification of POPs stockpiles, articles in use and wastes;
xi. Management of stockpiles and handle articles in use in a safe, efficient and environmentally sound manner;
xii. Development of safe handling and disposal procedures of articles in use;
xiii. Development and implementation of a strategy for greater stakeholder participation in information exchange;
xiv. Creation of awareness among the public, policy and decision makers including traditional authorities, women and children on risks associated with POPs and POPs contaminated materials; and
xv. Enhancement of institutional capacity for public awareness, information and education.

2.2. Challenges Encountered

Despite the achievements outlined above, the Ministry continued to face several challenges which the 2017 – 2022 Strategic Plan endeavors to address. The following are some of the key challenges that were encountered:

- ✓ Inadequate provisions and guidelines to enforce some measures in management of POPs pesticides, PCBs and other new POPs;
- ✓ Failure to control importation of POPs containing products at the borders due to lack of knowledge by the customs officers on pesticides importation requirements;
- ✓ Continued importation of POPs containing products by the importers due to lack of knowledge;
- ✓ Low public awareness on banned and approved pesticides and health and environmental risks associated with obsolete POPs Pesticides;
- ✓ Lack of continuity in capacity building to enhance skills in management of POPs pesticides;
- ✓ Increased cases of undeclared pesticides ingredients;
- ✓ Lack of specialized skills and appropriate analytical equipment;
- ✓ Weak enforcement on existing legislation;
- ✓ Poor disposal of wastes due to lack of designated waste disposal facilities;
- ✓ Poor storage and reuse of empty containers for domestic purposes;
- ✓ Limited mechanisms for information exchange; and
- ✓ Low access to available information resources.

2.3. Lessons Learnt

The following lessons can be drawn from the 2005 NIP:

i. Institutional and sectoral coordination is crucial in ensuring proper management of POPs;
ii. Sharing of data amongst institutions is key
iii. Proper documentation of products is vital
iv. Ability to verify POPs in products is also crucial

CHAPTER 3

SITUATION ANALYSIS

3.1. Current status of POPs

3.1.1. Current Status of POPs Pesticides

a) Characteristics of POPs Pesticides

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

b) Production of POPs Pesticides

The survey revealed that Malawi still does not manufacture pesticides including POPs. Thus, all pesticides marketed and/or used in the country are imported either from the neighboring countries or from overseas. There is however, a high demand for pesticides, and as a result there is high illegal trade of pesticides.

The national inventory survey carried out in 2016 established that the country had been using POPs pesticides mainly from 1960s to 1980s. However, it was noted that chlordane is still in use for termite control mainly in the construction industry although the product was banned in 2016 on a phase-out approach. About 656 litres of chlordane were discovered during the survey.

c) Current stocks and usage of POPs pesticides

The inventory showed that POPs pesticides are no longer being used in the country apart from the construction industry which has continued to use chlordane for the control of termites. Currently, some estates and organizations are testing various alternatives such as aldicarst, carbosulfan, and dursban to replace chlordane. Government is still committed to gradually phase out the use of all POPs pesticides.

The survey further identified 280.1 metric tons of obsolete pesticides countrywide most of which are safeguarded at Smallholder Farmers Fertilizer Revolving Fund of Malawi (SFFRFM) warehouses in Lilongwe and Blantyre under Pesticide Risk Reduction Project awaiting final disposal. Such pesticides include organophosphates, carbamates and pyrethroids.

DDT was historically used as a pesticide in Malawi since the 1960s largely on cotton to control major insect pests (MOAIFS, 1976). DDT was later used extensively in malaria vector control. DDT has been banned since 1984 and therefore DDT was not found during the assessment. Table 2 presents a summary of current status of POPs pesticides in Malawi.

Table 2: Status of POPs pesticides in Malawi as at December 2016

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 2016	Chemical is persistent. Safer alternatives preferred. Was under restricted use from 1985 to 2016.
Dieldrin	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
DDT	Banned since 1984	Chemical is persistent. Other effective and safer alternatives such 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.
Lindane	Banned since 1972	Chemical is persistent. Safer alternatives preferred.
Alpha hexachlorocyclohexane	Not registered	Chemical is persistent. Safer alternatives preferred.
Beta hexachlorocyclohexane	Not registered	Chemical is persistent. Safer alternatives preferred.
Endosulfan	Banned since 2016	Chemical is persistent. Safer alternatives preferred.
Pentachlorobenzene	Not registered	Chemical is persistent. Safer alternatives preferred.
Chlordecone	Not registered in Malawi	Chemical is persistent. Safer alternatives preferred.
PFOS pesticide	Not registered in Malawi	Chemical is persistent. Safer alternatives preferred.
Toxaphene	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Pentachlorophenol and its salts and esters	Not registered in Malawi	Chemical is persistent. Safer alternatives preferred.

Although the use of some POPs pesticides was banned in the country, illegal use and trading of POPs is continuing. Some unlicensed dealers and vendors sell POPs pesticides on open markets. This practice has facilitated the entry of POPs into the country. During the survey, however, the quantities and distribution of these pesticides were not established.

The assessment of POPs pesticides was conducted through a national survey undertaken between August and December 2016. The survey determined the presence and uses of POPs pesticides in Malawi. About 90 sites including chemical companies, estates, supermarkets and produce markets were visited. Sites where POPs pesticides were found in Malawi are shown in Table 3.

Table 3: Sites where POPs pesticides were found in Malawi

Site		Chlordane Quantity(litres)
Fajo Investments		5
Farmers Organization Limited		14
Limbe Agriculture Trading Company		14
Sana Hardware		10
MS Trading		4
Variety General Dealers		20
D&D General Suppliers		30
Plusten General Suppliers		21
Randera Company		50
HH Wholesalers		1
Hardware Basics		9
Genuine Hardware		2
Kumilonde Modern Agriculture		12
Ask Enterprises		14
R&G Agriculture		5
EDFA Agro dealer Zomba		3
Farmers World Limited	Mponela	9
	Madisi	19
	Salima	97
	Mqocha	9
	Bulala	8
	Chingangawa	6
	Edingeni	3
	Bolero	8
	Muzalangwe	4
	Mphelembe	6
	Euthini	3
	Mzimba	7
	Nkhata Bay	40
	Mzuzu 1	1
	Chintheche	38
	Mthyolo	25
	Dwambazi	5
	Enukweni	2

	Phwezi	8
	Uliwa	9
	Karonga 1	14
	Karonga 2	19
	Nyungwe	9
	Chitipa	34
	Kapoka	2
	Wirilo	5
	Area 4	121
	Area 23	17
	Area 2B	8
	Area 25	91
TOTAL		**837**

Present major achievements in dealing with POPs include replacement of chlordane for the control of termites and other soil pests in the construction industry with safer alternatives such as Soil Guard.

3.1.2. Current Status of POP PBDEs

a) Characteristics of POP PBDEs

Malawi conducted an inventory of PBDEs listed in 2009 in the Stockholm Convention (POP PBDEs) to establish the country baseline and take stock of the country situation in relation to POP PBDEs and the volume of materials impacted by POP PBDEs. The focus of the inventory was on articles that can contain POP PBDEs especially waste from electrical and electronic equipment (WEEE). The inventory also considered electric and electronic equipment (EEE), transport sector and furniture and insulation materials for buildings, to a limited extent.

b) Production of POP PBDEs

The inventory of POP PBDEs in EEE determined that Malawi does not manufacture EEE. However new and second hand EEE is imported by private importers and large-scale importers mainly from Asian countries such as China, Japan, Hong Kong, India and Korea and from the Middle East (mainly from the United Arab Emirates), the USA and Europe and within Africa mainly from South Africa.

In terms of products containing POP PBDE in current use and stock, in Malawi POP PBDEs in EEE are mostly found in older appliances especially Cable Ray Tubes (CRTs) computers and televisions. Most EEEs will probably be found at offices, in the households of private consumers and at educational institutions which tend to keep appliances for a long period of time. EEEs are also kept at repair shops for extended periods of time.

The inventory of PBDEs was challenging due to several reasons including lack of national data and statistics on PBDEs and poor communication infrastructure among stakeholders, which made it difficult to obtain data that would have assisted in establishing the baseline for POP PBDEs.

c) Current Stock and Usage of POP PBDEs

In terms of statistics on EEE in stock or currently used, the inventory focused on computers, TVs and mobile phones. A Malawian Survey on Access and Usage of ICT Services in Malawi conducted in 2014 estimated that 3.0% of households had computers while the International Telecommunications Union (ITU) estimated 5.2%. ITU statistics also provide that the proportion of households with a TV set increased from 3.0% in 2002 to 8.7% in 2011. Since 2011, the only information source available on this data was the 2014 Survey which provided that the proportion of households that owned a working TV set was 10.9% in 2014. There were more TVs in urban areas (46 percent) than in rural areas (6 percent). Mobile phones have become the main ICT device within Malawian households to access ICT services. Forty-five percent of households have access to mobile phones, compared to 10.9% for TV sets, and 1.4% and 2.6% for desktops and laptops, respectively.

Following the Tier I Initial Assessment (Secretariat of the Stockholm Convention 2015), the estimated range of c-OctaBDEs amount in-use/stored EEE was 13t – 37t. Considering that c-OctaBDE contain 54% of POP-PBDEs (Secretariat of the Stockholm Convention 2015), the total POP-PBDE can be estimated to 6.9 t to 20.2 t. These POP PBDEs are contained in approx. 14712t of CRT casings polymeric fraction.

The estimated amount range of c-OctaBDEs in the WEEE generated in 2016 was 0.43t – 7.2t. Considering that c-OctaBDE contain 54% of POP PBDEs (hexaBDE and heptaBDE) the POP PBDE content in WEEE plastic can be estimated to 0.23t to 3.9t. These are contained in 2850t of polymeric fraction (largely polyurethane foam in seats, head/arm rest and ceilings)

The POP PBDE Guidelines provide that cars and other vehicles such as trucks and buses are the major portion of the transport sector containing the largest volume of PO PBDEs. Therefore, the focus for the inventory was on vehicles which were produced and used in the period from approximately 1975 to 2004. The findings of the inventory of POP PBDEs in the transport sector determined that Malawi does not manufacture vehicles but imports second hand ones mainly from Asian countries, especially Japan. Statistics on the number of vehicles imported into Malawi from Asian countries in the period from approximately 1975 to 2004 were unavailable. However, it is likely that some of these vehicles are still in use in Malawi. In 2007 Malawi had 8 vehicles per 1000 people. The total amount of POP PBDEs in registered vehicles in 2014 is estimated to 0.26t contained in 520t of PUR foam.

Some parts of the EEEs are recycled and the non-recycled parts as well as products that have reached end of life are disposed in uncontrolled dumpsites which are periodically burned thereby

releasing toxic substances.

d) Future Outlook of POP PBDEs

In terms of WEEE, it is estimated that between 2018 and 2022, between 8.69 and 11.66 devices (mobile phones, computers and TV sets) will become e-waste in Malawi. Most devices will be mobile phones due to the high mobile penetration and the exponential growth it has had in the last decade, compared to computers and TV sets, as such, mobile phones will represent above 95% of total e-waste devices during this period, i.e., between 8.41 and 11.24 million devices. E-waste in terms of EEE devices that have reached their end-of-life (EoL) will grow at a compound annual growth rate (CAGR) of 14.3%, between 2018 and 2022.

In most countries the wastes from end of life vehicles (ELV) containing the POP PBDEs fraction (the Automotive Shredder Residues (ASR) or the seats and other polymer parts) have been and are mainly disposed to landfills or dump sites or incinerated. Malawi does not have formal landfills or dumpsites and incinerators, and it does not have formal car dismantlers or recyclers and therefore there was no information on vehicles disposed to landfills/dumps or treated by incineration and other thermal processes. When most vehicles reach their end of life they are stripped down in garages for reusable parts and metal recycling. The non-metallic and unsold parts are usually found lying on the ground within the garage premises, others burnt in open air and thrown away in informal disposal sites. These provide various pathways of associated POP PBDEs into the environment. The locations of these garages differ as some are in business areas while some are informal because they are in private homes. This practice results in pollution at and around the sites.

In Malawi, when vehicles reach their end of life (normally after being used for several years) they are stripped down in garages for reusable parts and metal recycling. The non-metallic and unsold parts including seats are usually found lying on the ground within the garage premises, others burnt in open air and thrown away in informal disposal sites. These provide various pathways of associated POP PBDEs into the environment. No information was available on the recycling of PBDE containing polyurethane from end of life vehicles.

3.1.3. Current status of PFOS

a) Characteristics of PFOS

Perfluorooctane sulfonic acid is a fully fluorinated anion, which is commonly used as a salt in some applications or incorporated into larger polymers. PFOS, its salts and PFOSF belong to the group of chemicals called perfluorinated compounds (PFC). Their unique physical properties, being both fat and water repelling, have made them popular in several products. PFOS is very persistent and has substantial bioaccumulations and biomagnifying properties, although it does not follow the classic pattern of other POPs by partitioning into fatty tissues; instead it binds to proteins in the blood and liver. It has a capacity to undergo long-range transport and also fulfils the toxicity criteria of the Stockholm Convention. PFOS and PFOS-related substances can be released to the

environment from manufacturing processes and during their use in industrial and consumer applications, as well as from disposal of the chemicals or products and articles.

b) Production of PFOS

In general, Malawi is a net importer of almost all products and goods as well as chemicals found in the country and has a very small manufacturing industry that could use PFOS or its related substances. In this respect, the following were identified as relevant stakeholders in the assessment of PFOS: carpets, chemical industries and products suppliers; retailers of commercial products; synthetic leather manufacturers, importers and retailers; textile manufacturers, importers and retailers; fire-fighting foams suppliers and users (aviation industry), fire-fighting training grounds and dump sites.

c) Current Stocks and Usage of POP PBDEs

The inventory was unable to determine quantities of products that could potentially contain PFOS due to poor data capturing and management at the Malawi Revenue Authority and National Statistics Offices.

The inventory established that the major brand of fire-fighting foams used in Malawi is the Aqueous Film Foaming Foam (AFFF) which comes in concentrations of 3% or 6%; imported mainly from India and South Africa. At the time of the inventory, there were 3, 154 litres of AFFF in stock at the Civil Aviation Department and just 75 litres at the Lilongwe City Assembly. It was also established that any foam that was nearing its expiry dates was used in fire-fighting training and such training used up to 40 litres of AFFF. Other methods of disposal for AFFF nearing expiry dates included the cleaning of hose pipes.

Fire-fighting services were interviewed about past use of AFFF foams in fire events. A few major fire incidents were recalled as having used great amounts of foam including those at the Central Medical Stores and Rainbow Paints. However, specific data on quantities used historically and currently were not available.

d) Future Outlook of PFOS

Malawi does not have waste treatment facility sites, and therefore the potentially contaminated sites are the dumping sites situated in most places in the country. Disposal of waste remains and will continue to be a major challenge as there is a lack of proper and adequate disposal sites. The sites for waste disposal are located at 5 miles in Zomba City, Area 38 in Lilongwe City, Mzedi in Blantyre City, Nsilo in Mzuzu City and Katili in Karonga among others and these are potentially contaminated with PFOS. Investigations and observations at the landfills and compost areas indicate that 85% of the total waste collected is organic matter and only 15% includes the rest of wastes.

Other potentially contaminated sites would be the Civil Aviation Fire Fighting Training ground at

Kamuzu and Chileka International Airports as well as the Lilongwe City Assembly Fire Department Yard, the Blantrye City Assembly Fire Department Yard.

The major gaps identified in this inventory included lack of detailed data on imports, poor inter-agency collaboration as well as ability to verify presence of PFOS in suspected products, thereby impacting results of inventory.

3.1.4. Current Status of Annex C Chemicals (PCCD/PCDF, HCB and PCBs)

a) Characteristics of Annex C Chemicals: Dioxins and Furans

Malawi also undertook an inventory of releases from unintentional production of Annex C chemicals. The inventory for Unintentional POPs (UPOPs) for the years 2010 – 2017 was carried out using the United Nations Environment Programme (UNEP) "Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs under Article 5 of the Stockholm Convention (January 2013)" **(UNEP, 2013)**. The toolkit was used for identifying the sources of dioxins and furans in Malawi. The 2005 data was used as baseline.

The following were identified as the economic activities that were considered as significant sources of UPOPs emissions in Malawi.

1. **Waste Incineration**: hazardous waste incineration, medical waste incineration and animal carcasses burning.
2. **Ferrous and non-ferrous metal production:** foundries.
3. **Heat and power generation:** fossil fuel power plants, biomass power plants, household heating and cooking using biomass.
4. **Production of mineral products:** bricks, ceramics, and asphalt mixing.
5. **Transport:** 4-stroke engines, 2-stroke engines and diesel engines.
6. **Open burning processes:** biomass burning, waste burning and accidental fires.
7. **Production and use of chemicals and consumer goods:** textile plants (per tonne textile) and leather plants.
8. **Miscellaneous processes:** drying of biomass, crematoria, smoke houses, dry cleaning and tobacco smoking.
9. **Disposal:** sewage and sewage treatment, open water dumping, composting and waste oil disposal.
10. **Contaminated sites and hotspots:** use of PCB; and dumps of wastes/residues.

b) Production/release of Annex C Chemicals

The total releases to all media for the years 2010 – 2017 and with 2005 as baseline are summarised in

Table 4 and
Figure 1.

Table 4: Summary of dioxin and furans releases

Year	Annual Releases (g TEQ/a)					Total
	Air	Water	Land	Product	Residue	
2005	39.165	0.000	0.591	0.652	0.427	40.834
2010	78.704	0.039	0.915	0.382	8.904	88.943
2011	74.020	0.060	1.036	0.403	10.013	85.532
2012	83.290	0.062	1.1164	0.425	9.067	93.960
2013	86.817	0.064	1.239	0.448	10.356	98.924
2014	89.542	0.066	1.127	0.523	12.038	103.296
2015	90.687	0.068	1.175	0.489	11.474	103.892
2016	88.107	0.072	1.102	0.523	11.582	101.386
2017	89.026	0.075	1.127	0.550	10.815	101.592

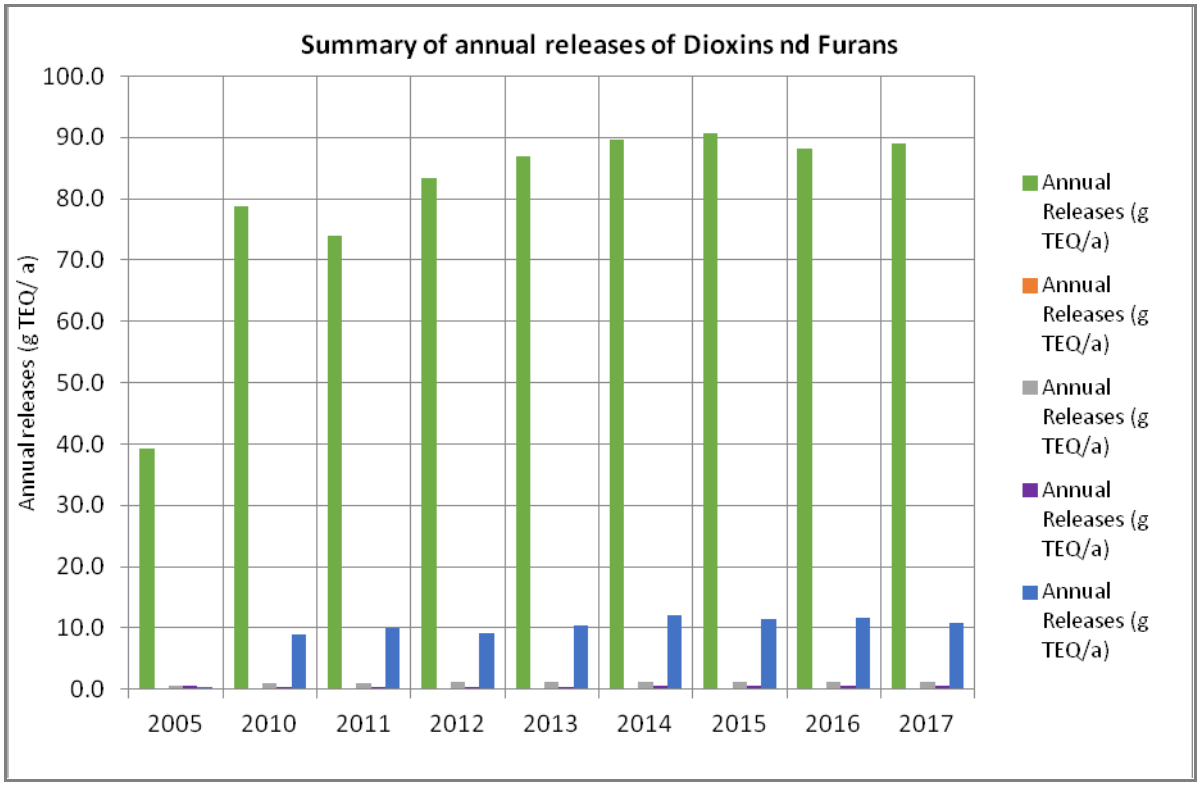

Figure 1: Summary of dioxin and furans releases

The highest release of dioxins and furans was in 2015 with a value of 103.892g TEQ/a, closely followed by releases in 2014 at 103.292g TEQ/a, whereas the lowest releases were in 2005 at 40.834g TEQ/a. In terms of the media which experienced the highest release of UPOPs was air in

2015 at 90.687g TEQ/a while the lowest release was to water at 0.000g TEQ/a in 2005. The reduction in total releases from 103.892g TEQ/a in 2015 to 101.592g TEQ/a in 2017 was mainly due to reduction of releases to air from 90.687g TEQ/a in 2015 to 89.026g TEQ/a in 2017. This was attributed to the reduction in the total number of patients that were treated in the health facilities which reduced by almost 30 percent during the period.

In general, releases were increasing with time mainly due to increased economic activities which increased with the rising population of the country. It is seen that throughout the years the greatest burden of dioxins and furans releases is to air and in residues whereas the least are to water followed by releases in product. The main contributing factors for the high releases to air, products and residues were waste disposal activities, miscellaneous activities, open burning activities, heat and power generation, production of mineral products and waste incineration.

Between 2005 and 2010, annual release of dioxins and furans increased steadily as shown in Figure 2.

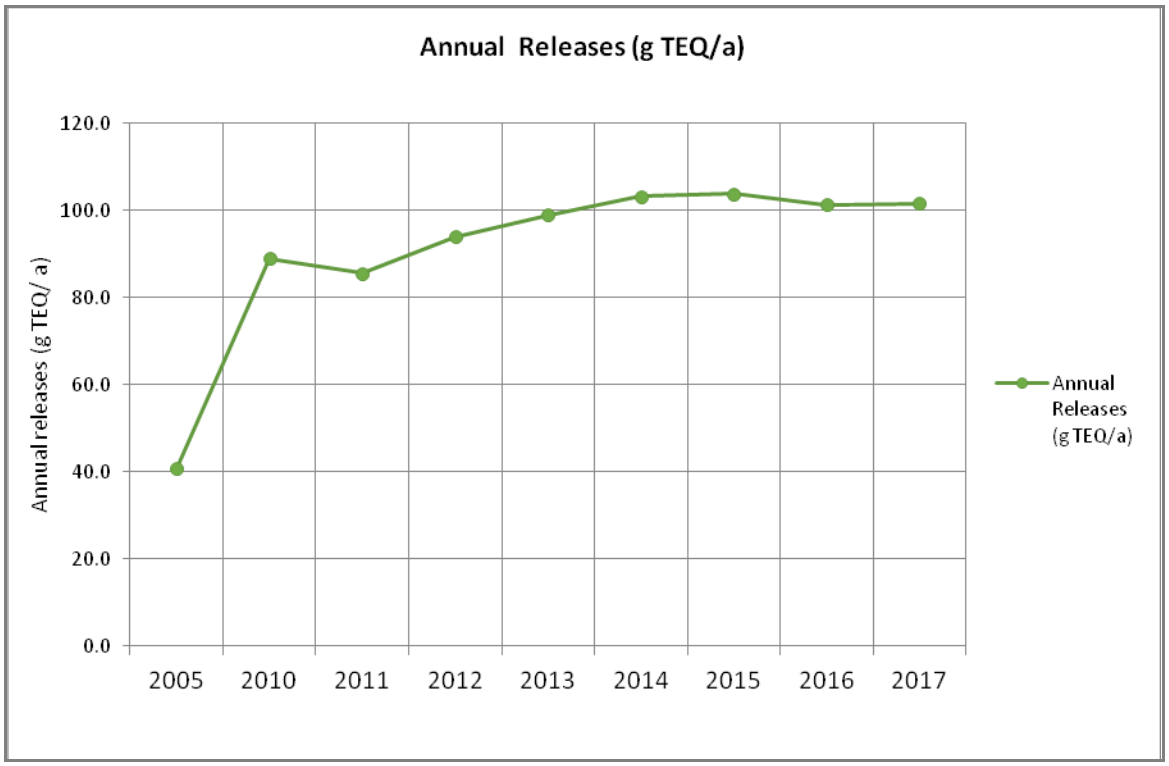

Figure 2: Trends of annual releases of dioxins and furans

c) Future Outlook

It is seen that the trend of the total annual releases of dioxins and furans is increasing every year except for 2016 and 2017 where the releases are down as compared to the previous years 2014 and 2015. This is not surprising considering that one of the most important factors affecting the activity rates for most of the activities is population. Therefore, as the population continues to grow, the emissions will keep on increasing unless measures are put in place to change processes, materials

and practices aimed at minimising the releases of dioxins and furans into the environment.

Uncontrolled domestic waste burning accounts for 34.7% (183.3g TEQ) releases into the air and 99.78% (366.5g 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 presently not controlled. Incineration of animal carcasses, which is presently not controlled, is responsible for 11.4% (60.0g 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 and their frequent burning releases furans and dioxins into residential areas. People and the environment are thus at great 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 whose efficiencies are very poor and thus contribute great 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. Furthermore, 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.

3.2 Other POPs Management Related Issues

3.2.1 Future production, use, and releases of POPs – requirements for exemptions

Malawi presently does not manufacture any POPs chemicals. Future production, use, and releases of POPs are not anticipated for Annex A and Annex B chemicals. However, exemptions for DDT may be considered in future for malaria vector control.

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

In Malawi, very limited information exists on human health impacts directly linked to POPs. The assessment established that health impacts of POPs are not well established and

documented. Data pertaining to POPs health and environmental impacts does 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. In the past, the farming communities were exposed to POPs pesticides including DDT, aldrin and dieldrin due to their use in farming activities, forestry plantations and construction industry. With frequent contact with PCB containing oils and equipment in the electricity industry in the country, the workers were also exposed.

Malawi has undertaken several studies to determine the presence of some of the POPs in the environment. In Malawi, Kamperewera et al (2000) established relatively high levels of aldrin, lindane, heptachlor 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 values for drinking water ($0.03 gl L^{-1}$). 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 chemicals 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 study by Banda (2004) showed that organochlorine residues exist in both water and sediments of the Lunyangwa Basin but not clearly defined patterns of seasonal or spatial variation.

3.2.3 Current level of information, awareness, and education among target groups; existing systems to communicate such information to the various groups

The updated NIP assessment revealed that there is still limited 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 has 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 still 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.

3.2.4 Mechanism to report under Article 15 on measures taken to implement the provisions of the Convention and for information exchange with other Parties to the Convention

Mechanisms have been developed for Malawi to report under Article 15 of measures taken to implement the provisions of the Convention and for information exchange with other Parties to the Convention. Information exchange with other parties is mainly done at international or regional

workshops as well as meetings such as the Conference of Parties.

3.2.5 Relevant activities of non-governmental stakeholders

NGOs have emerged as major partners in development and conservation activities particularly through enhancing education and awareness-raising among the public. NGOs are helping in the designing and implementation of policies, programmes and action plans, and setting out specifications for Environmental and Social Impact Assessments (ESIAs) 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. However, there is very limited NGO participation in chemicals and POPs issues.

3.2.6 Overview of technical infrastructure for POPs assessment, measurement, analysis, alternatives and prevention measures, management, research and development – linkage to international programmes and projects

Malawi has built a strong and vibrant scientific and technology infrastructure to support research and development endeavours on POPs assessment, measurements, analysis, alternatives and prevention measures. Some expertise to support national efforts 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. 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. However, there is no noticeable linkage to international programs and projects related to POPs.

There is currently no infrastructure for handling POPs stockpiles and waste in the country. To date, no obsolete POPs or stockpiles have been disposed of in Malawi as there are no facilities for POPs or other hazardous waste disposal.

The country has limited capacity to undertake remediation of contaminated sites. The University of Malawi programmes on environmental sciences at undergraduate and postgraduate levels need to incorporate this component. The recruitment of personnel with such knowledge by local authorities will enhance the Authorities capacity in this area.

3.2.7 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 accidents, negligence at workplace or home, non-compliance to occupational safety guidelines and using POPs products. Vulnerable groups 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 acutely or chronically, can be associated with a wide range of health effects ranging from illness to death. Since women provide 70 percent of the agricultural workforce and produce 80 percent of food, they are more likely to be exposed to POPs pesticides.

3.2.8 Systems for the assessment and listing of new chemicals

The country has put in place structures for the assessment and listing of new chemicals. The EAD has a national chemicals committee responsible for industrial chemicals while the PCB is responsible for agricultural pesticides. In the event that a chemical is of concern to the country, the two institutions, through the national and official contact points, transmit the information to the Secretariat after national consultation.

3.2.9 System for the assessment and regulation of chemicals already in the market

The EAD and PCB are responsible for the management and regulation of chemicals and pesticides in the country. Systems have been in put place in terms of which users are provided a platform for presenting concerns about chemicals or pesticides which trigger investigations. The investigations include collection of samples and testing at certified laboratories and then appropriate action follows include withdrawal of products from the market.

3.3 Achievements of the 2005 NIP

The inventory also took stock of the progress of the 2005 NIP by assessing the implementation of the strategies and objectives that were put in place. Although the progress cannot be quantified statistically, it is vital to provide a qualitative feedback of each strategy and objectives. Details of the implementation status are provided in Table 5.

Table 5: Implementation status of 2005 NIP

Strategies and Objectives	Implementation Status
1.0 Strengthen And Harmonize Institutional And Regulatory Measures	
1.1 Update review and harmonize existing legislation and policies dealing with POPs	The Environment Management Act, Pesticides Act and the Water Resources Act have been updated to incorporate issues related to POPs
1.2 Develop new regulations specific to POPs	Environment Management (Waste Management and Sanitation) Regulations and Environment Management (Chemicals and Toxic Substances) Regulations were developed in 2008 and are currently being reviewed to incorporate issues of POPs
1.3 Strengthen monitoring and enforcement mechanisms	Compliance and monitoring strategy developed
1.4 Designate relevant role and responsibilities on POPs	EAD and PCB designated as focal points for industrial chemicals and pesticides respectively
2.0 Eliminate Releases From Intentional Production And Use Of Pops	
2.1 Preparing and applying guidelines for identification and labelling of equipment in use	Not yet implemented
2.2 Supporting voluntary agreements with enterprises or industry groups on phasing out PCB- containing equipment	Not yet implemented
2.3 Raising public awareness of these new products is of paramount importance.	Ongoing
2.4 Improve chemical handling and use	Ongoing
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	Not yet implemented
3.2 To enhance the institutional and human capacity for sustainable management of POPs pesticides	Partially implemented
3.3 To undertake research and development into alternatives to POPs pesticides	Not yet implemented

Strategies and Objectives	Implementation Status
4.0 Production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs	
4.1 Develop and implement a pro-active strategy for management of PCBs	Partially implemented
4.2 Develop and implement R&D programmes on PCBs	Not yet implemented
4.3 Enhance human and institutional capacity for management of PCBs	Ongoing through short and long term trainings
5.0 Production, Import And Export, Use, Stockpiles	
5.1 Develop and implement R&D into alternatives of DDT	Not done because there is no DDT use in Malawi
5.2 Develop and implement an effective M&E system on usage and accumulation of DDT	Not done because there is no DDT use in Malawi
5.3 Strengthen human and institution capacity	Not done because there is no DDT use in Malawi
5.4 Raise Awareness on stockpiles and waste of DDT	Not done because there is no DDT use in Malawi
5.5 Review and update inventory of contaminated sites and management of stockpiles	Not done because there is no DDT use in Malawi
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	Implemented
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	Ongoing development and promotion of fuel efficient technologies e.g. clean cook stoves, energy saver electric bulbs
7.2 Build capacity to monitor, manage and control unintentional releases of POPs and achieve effective PCDD/PCDF management.	Ongoing
7.3 Install appropriate technology to reduce releases from dioxins and furans in target processes	Not yet implemented

Strategies and Objectives	Implementation Status
8.0 Measures To Reduce Releases From Stockpiles	
8.1 Establish and implement clean up and remediation schemes	Not yet implemented
8.2 Strengthening institutional capacity to handle POPs stockpile and wastes	Ongoing
8.3 Monitor storage and usage of chemical at enterprise level	Ongoing
9.0 Identification of relevant stockpiles, articles in use and wastes	
9.1 Identify and quantify POPs stockpiles, articles in use and wastes	Partially implemented
9.2 Develop systems for effective identification of stockpiles, articles in use and wastes.	Not yet implemented
10.0 Manage Stockpiles And Appropriate Measures For Handling And Disposal Of Articles In Use	
10.1 Manage stockpiles and handle articles in use in a safe, efficient and environmentally sound manner	Partially implemented
10.2 Develop safe handling and disposal procedures of articles in use	Partially implemented
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	Not yet implemented
11.2 Increase capacity and skills for better identification of contaminated sites and application of remedial measures	Not yet implemented
12.0 Facilitating Or Undertaking Information Exchange And Stakeholder Involvement	
12.1 Develop and implement a strategy for greater stakeholder participation in information exchange	Strategy developed but not fully implemented

Strategies and Objectives	Implementation Status
12.2 Strengthen national capacity for effective exchange of information.	Ongoing
13.0 Public Awareness, Information And Education	
13.1 Create awareness among the public, policy and decision makers including traditional authorities, women and children	Ongoing
13.2 Enhance the institutional capacity for public awareness, information and education	Ongoing
14.0 Effectiveness Evaluation	
14.1 Strengthen technical capacity for evaluation	Not yet implemented
14.2 Conduct ad hoc surveys for impact evaluation	Not yet implemented
14.3 Formulate and implement standard annual report formats for PCBs and other POPs	Not yet implemented
15.0 Reporting	
15.1 Develop and implement comprehensive POPs reporting systems and programmes	Not yet implemented
15.2 Strengthen institutional capacity for reporting POPs	Partially implemented
15.3 Submit relevant reports timely	Partially implemented
16.0 Research, development and monitoring	
16.1Develop a national strategy for research, development and monitoring of POPs	Not yet implemented
16.2 Build individual and institutional capacity for effective research, development and monitoring	Partially implemented
16.3 Promote research on feasible and alternative technologies for replacing and disposal of POPs	Partially implemented

Strategies and Objectives	Implementation Status
16.4 Investigate impact of POPs on human health and the environment	Partially implemented
16.5 Promote the transfer and dissemination of Research, development and monitoring.	Partially done
17.0 Technical and Financial Assistance (article 12 and 13)	
17.1 Develop and implement human resource and technology development strategy	Partially done

3.3 Gap Analysis for the 2019 NIP

The inventory identified gaps and deficiencies that exist and pose a challenge to the effective management of POPs in Malawi. Some of the gaps and deficiencies are weaknesses of the current institutional, policy and legal systems while others are external threats that impede the effective operations of institutions and effective implementation of policies and legislation. Most of the gaps and deficiencies contributed significantly to the implementation failure of some of the objectives of the 2005 NIP in line with the provisions of the Articles. Details of the gaps observed are presented in Table 6.

Table 6: Gaps and deficiencies in the management of POPs

New POPs			
Convention requirements	**Inventory findings**	**Gaps and deficiencies**	**Recommendations to address Gaps and deficiencies**
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes	• No monitoring, control and management schemes • Unavailability of environmentally sound disposal methods/facilities	• No monitoring, control and management schemes • Unavailability of environmentally sound disposal methods/facilities	• Strengthening technical and infrastructural capacity
Article 9: Information exchange	• Poor information exchange • Reluctance of institutions to share relevant information • Lack of information on new POPs	• Lack of understanding on new POPs related products	• Strengthening technical understanding and capacity of new POPs

Article 10: Public information, awareness and education	• Low public awareness	• Inadequate awareness raising programmes for the general public	• Development and implementation of communication strategy and communication messages
	• Poor information dissemination • Inadequate information	• Poor communication infrastructure • Inadequate financial resources allocated to support awareness raising programmes for the public	• Development and implementation of resource mobilization strategy
Article 11: Research development and monitoring	• No local research programmes on new POPs	• Lack of monitoring schemes • Inadequate technical and financial resources to allow research	• Put in place monitoring schemes • Development and implementation of resource mobilization strategy
POPs Pesticides			

Article 3: Measures to reduce or eliminate releases from intentional production and use	The survey identified chlordane as the only POPs pesticide that is still in use. However, there is a substantial decrease in the amount of chlordane being imported and used compared to the amount identified by the previous inventory	• Low awareness among importers and customs officers on pesticides importation requirements	• Conduct periodic training for importers and customs officers
		• Low public awareness on banned and approved pesticides	• Conduct regular public awareness campaigns on banned and approved pesticides and alternatives
	Malawi has, effective 2016, banned importation of POPs pesticides	• Lack of awareness and promotion of alternatives • Inadequate provisions and guidelines to control donations especially during emergencies. • Ineffective border control systems	• Develop and implement guidelines on donations • Tighten border controls
	Production and use of all new POPs pesticides has been banned	• Lack of continued education to update skills to evaluate technical data submitted during registration	• Conduct continuous training to update skills to evaluate technical data submitted during registration

		• Inability to identify and verify pesticides and their contents or formulations • Lack of specialized skills and appropriate analytical equipment for analysis	• Develop and enhance specialized skills and appropriate analytical equipment for analysis
	• Uncoordinated monitoring of pesticides	• Inadequate skills and lack of appropriate tools and equipment for monitoring	• Enhance monitoring skills
	• Weak enforcement on existing legislation • Limited reporting of obsolete stocks • Inadequate assessment of currently used pesticides • Inadequate monitoring tools and equipment	• Inadequate training on pesticides inspectorate services • Lack of collaboration among relevant institutions (joint monitoring) • Existing legislation lack specific provisions on POPs • Inadequate monitoring tools and equipment	• Procure appropriate tools and equipment for monitoring • Conduct joint monitoring • Update existing legislation • Conduct regular training on pesticides inspectorate services

	Inadequate guidelines on importation, registration, labelling and certification/licensing	• 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 • Inadequate awareness on the existing standards and guidelines	• Develop guidelines on risk minimization procedures on handling, transportation, storage and disposal of obsolete stocks • Develop national standards or guidelines for Maximum Residue Limits (MRLs) to assess exposure to POPs • Promote awareness on existing standards and guidelines
Article 6: Measures to reduce or eliminate releases from stockpiles and wastes	• Poor storage facilities • Reuse of empty pesticide containers for domestic purposes	• Lack of designated waste storage facilities. • Weak enforcement mechanisms • Lack of temporary storage facilities at traders/distributors • Lack of guidelines on safe storage establishment	• Construct designated waste storage facilities • Enhance enforcement mechanisms • Require traders and distributors to establish temporary storage facilities in accordance with guidelines • Develop guidelines on safe storage establishment
	No exact types and quantities of POPs pesticides were identified	• Lack of appropriate skills for identification of stockpiles	• Conduct regular training on identification of stockpiles

		• Improper handling and storage including record keeping • Lack of guidelines and SOPs for identification and measurements	• Develop guidelines and procedures for proper handling and storage • Develop guidelines and procedures for identification and measurement
	• Poor procurement practices • There is no monitoring system for importation and use	• Lack of special procurement systems for pesticides • Lack of monitoring system for importation and use	• Develop special procurement systems (regulations, procedures, etc) for pesticides • Establish monitoring systems for pesticide importation and use
	A few sites were suspected to be contaminated	• Lack of guidelines on assessment and remediation of contaminated sites • Lack of capacity to undertake remediation of contaminated sites	• Develop guidelines for assessment and remediation • Enhance capacity for undertaking remediation of contaminated sites
Article 9: Information exchange	• Limited research on POPs pesticides	• Lack of information on POPs pesticides	• Promote research on POPs pesticides
	• Limited mechanisms for information exchange	• Inadequate collaboration and coordination amongst relevant organizations leading to poor information exchange and data keeping	• Establish collaboration and coordination mechanisms for effective information exchange and data keeping

		• Lack of information and knowledge management systems	• Develop information and knowledge management systems
	Limited research and promotion of integrated pest management (IPM) & Integrated vector management (IVM)	• Lack of capacity to ascertain suitability of alternatives and assess their risks to human health and the environment	• Build capacity to ascertain suitability of alternatives and assess their risks to human health and the environment
		• Lack of awareness on the alternatives including their risks and benefits	• Raise awareness on alternatives including their risks and benefits • Promote IPM and IVM
Article 10: Public information, awareness and education	• Untrained custom officers, inspectors, pesticides dealers • Limited awareness and education programs on POPs • Basic training is provided to pesticides sellers and pest control operators through seminars, pest management courses	• Inadequate capacity to raise awareness on POPs • Lack of specific education and training programs on POPs	• Develop and implement a communication strategy • Develop and implement an education and training program on POPs

Article 11: Research, development and monitoring	There is limited post-registration surveillance	• Inadequate human capacity i.e. number and specialised skills, equipment and financial resources to monitor registered pesticides • Weak information flow to relevant stakeholders about POPs pesticides use and their effects • Lack of collaboration among regulatory institutions	• Develop adequate human capacity in relevant institutions • Develop new and strengthen existing information exchange mechanisms • Enhance collaboration among regulatory institutions
	• No data on the residue levels of pesticides including POPs in water, air, soil, breast milk and animal fat • No monitoring of effects of POPs pesticides in humans and environment	• Inadequate specialized skills, and financial resources to carry out monitoring • Lack of programs and specific procedures for monitoring of POPs pesticides releases and their effects on human health and environment.	• Enhance specialised skills for monitoring • Mobilise financial resources for adequate monitoring
		• Lack of laboratory and appreciate analytical equipment	• Develop and implement programs and specific procedures for monitoring of POPs pesticides releases and their effects on human health and environment

			• Establish specialised laboratory with appropriate analytical equipment
	No data on transport, fate and transformation of POPs	• Lack of research on environment transport, fate and transformation of POPs • Lack of research, dissemination and awareness on presence of alternatives to end users	• Promote research on environment transport, fate and transformation of POPs • Promote research, dissemination and awareness on presence of alternatives to end users
	• Alternatives of POPs pesticides could be accepted if available and affordable • Illegal trade of POPs pesticides exists because they are considered to be relatively cheap and believed to be the most effective	• Lack of mechanisms for documenting and sharing indigenous knowledge and practices • Lack of comparative cost studies on alternatives • Lack of socio-economic and cultural studies on the acceptability on alternatives	• Establish mechanisms for documenting and sharing indigenous knowledge and practices • Conduct comparative cost studies on alternatives • Conduct socio-cultural studies on alternatives
PCB Oils and Equipment			

Article 3: Requires Parties to reduce or eliminate releases from intentional production and use	• Oils and equipment suspected to contain PCBs had previously been imported with some still operational	• Schemes for monitoring potential releases of PCBs not present	• Develop schemes for monitoring PCBs for sites with related equipment
	• ESCOM not effectively implementing measures for managing equipment and oil stockpiles suspected to contain PCBs	• Lack of environmentally sound storage and disposal facilities for disused equipment and oils	• Establish appropriate storage facilities for disused PCB contaminated equipment & oils
	• Guidelines available from SAPP and PIESA for the effective management and disposal of oils and equipment containing PCBs	• Inadequate technical capacity for management of PCBs	• Implement training program on PCB management
	• Malawi (EAD and ESCOM) currently participating in a Southern Africa regional project for the elimination and environmentally sound disposal of PCBs and PCB containing equipment	• Inadequate financial resources to allow use of alternatives to PCBs	• Develop long term phase-out plans for PCBs and for use of alternatives

Article 6: Measures to reduce or eliminate releases from stockpiles and wastes.	• No monitoring, control and management schemes • Leaking equipment • Improperly managed wastes	• Lack of environmentally sound storage and disposal facilities for disused equipment and oils • Inadequate technical capacity for management of PCBs • Inadequate financial resources to allow use of alternatives to PCBs	• Establish appropriate storage facilities for disused PCB contaminated equipment & oils • Implement training program on PCB management • Develop long-term phase out plans for PCBs and for use of alternatives
	• Unavailability of environmentally sound disposal methods/facilities for oils and equipment suspected to be contaminated with PCBs • Some potentially PCB contaminated sites are close to surface water bodies		
Article 9: Information exchange	• Inadequate dissemination of information on PCBs	• Inadequate information generation and exchange	• Create platform for information exchange and awareness

	• SAPP website provides access to guidelines for management of PCBs	• Poor access to available information resources	• Improve access to available information resources
Article 10: Public information, awareness and education.	• Inadequate awareness raising programmes for • Limited access to the communication infrastructure • Inadequate financial resources allocated to support awareness raising programmes for the public	• Low public awareness • Poor information dissemination • Inadequate information access	• Implement awareness campaigns • Develop materials and platforms for information dissemination
Article 11: Research development and monitoring.	No local research programmes on alternatives to use of PCBs	• Lack of PCBs health related monitoring schemes • Inadequate financial resources to allow research on alternatives to PCBs	• Establish PCB health related schemes with relevant institutions • Identify innovative ways for seeking assistance in research for alternatives

CHAPTER 4

THE 2019 - 2023 NATIONAL IMPLEMENTATION PLAN

4.1. Policy Statement

Malawi is committed to the effective implementation of the provisions and obligations of the Stockholm Convention on POPs. 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 revised NIP 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 national and international sustainable development goals.

4.2.Key Strategies Underpinning the NIP

4.2.1. National Inter-Sectoral Coordination

The implementation of this plan will continue to be spearheaded by the National Chemicals Committee (NCC). The NCC will hold regular meetings to ensure that the NIP is being implemented effectively and in accordance with its principles. The sectoral institutions implementing various activities under the revised NIP will be required to submit annual reports to the NCC.

4.2.2. Data Management and Information Sharing

Data management and information sharing is a critical implementation step of the NIP. Data on environmental issues 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 needs 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. It is also necessary to identify and build capacity of information and technology experts who will maintain the database and process information for decision-making. Deliberate efforts 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.

4.2.3. 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. 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 and or joint 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 policies and regulations whenever necessary. The lead agency will be EAD in facilitating the formulation of regulations through the guidance of Ministry of Justice. EAD will liaise with relevant stakeholders such as health, agriculture and commerce to ensure that legal provisions are in line and provide mutual support to chemical management.

4.2.4. Capacity Building

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 and curriculum to develop relevant skills in the country. Long-term measures would include certain aspects of BEPs and BATs of chemical management in generic or basic training and postgraduate courses with emphasis on developing competencies.

4.2.5. Monitoring, Reporting and Reviewing of NIP

Reporting will form the core functions of all implementers. Annual reports will be submitted to the Focal Point by 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 focal point will consolidate the various reports noting key areas and relating to key milestones and will transmit them to the Stockholm Convention Secretariat.

4.2.6. Research and Development

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 impacts of POPs where applicable such as cleaning up. Implementers will seek technical advice from time to time on issues related to use of BEPs and BATs. Industry and civil society will be encouraged to disseminate new and innovative approaches, which have been proved in Malawi.

4.2.7. Monitoring and Evaluation

Monitoring and Evaluation is an integral part of the NIP implementation process. Individual implementers will carry out monitoring and evaluation of the various activities, but independent monitoring and evaluation shall be carried out from time to time. A team of experts will be constituted to carry out the independent monitoring and evaluation.

The effective implementation of the Stockholm Convention on POPs in Malawi will be guided by the following key principles:

a) Integrated approach based on synergies between waste management and chemicals conventions and integration in national plans;

b) Involvement of the community and stakeholders, and transparency in the decision-making process in POPs management;

c) Sustainable management of POPs aiming at prevention and mitigation of the risks to human health and the environment;

d) Comprehensive application of BAT and BEP, wherever technically feasible and affordable; and

e) Application of the polluter pays principle for damages caused and of extended producer and importer responsibility for articles containing POPs.

4.3. Implementation Outline

4.3.1. Strategic Objectives, Outcomes and Outcome Targets

In line with Malawi's national planning system, the 2019 - 2023 NIP has been designed to reflect the tangible outcomes that will be realized at the end of implementation period. The plan has identified strategic objectives which will drive the strategic direction of the national implementation plan towards the achievement of the Stockholm Convention requirements and contribution to national environmental and public health management goals. In line with the objectives, the plan has further determined outcomes and outputs to be achieved during the implementation period as outlined in Table 7.

Table 7: Strategic objectives, outcomes and outcome targets

NO.	STRATIGIC OBJECTIVE(S)	STRATEGIC OUTCOME(S)	OUTCOME TARGET(S)
1	To ensure that all institutional and regulatory measures relevant to POPs management are harmonized	All relevant institutional and regulatory measures harmonised	80% of institutional and regulatory measures harmonized by 2023
2	To reduce/eliminate releases from intentional production and use of POPs	Releases from intentional production and use of POPs reduced/eliminated	Releases from intentional production and use of POPs reduced by 90% by 2023
3	To eliminate the production, exportation and use of PCBs and equipment containing PCBs	Production, importation, exportation, and use of PCBs and equipment containing PCBs eliminated	100% elimination of production, importation, exportation, and use of PCBs and equipment containing PCBs by 2023
4	To prohibit and eventually eliminate the production, importation, export and use of stockpiles and wastes of POPs pesticides	Production, import, export, and use stockpiles and wastes of POPs pesticide prohibited	Production, import, export, and use stockpiles and wastes of POPs pesticide reduced by 60% by 2023
5	To ensure that all exemptions and continued exemptions are registered	Measures enforced for Register for specific exemptions and continued exemptions	100% registration of specific and continued exemptions by 2023
6	To reduce unintentional production of PCDDs/PCDF, HCBs and PCBs	Unintentional production of PCDDs/ PCDFs, HCB and PCBs reduced	60% reduction in unintentional production of PCDDs/ PCDFs, HCB and PCBs by 2023
7	To reduce releases from stockpiles and wastes	Releases from stockpiles and wastes reduced	90% reduction of releases from stockpiles and wastes by 2023
8	To improve the management, handling and disposal of stockpiles	Improved management, handling and disposal of stockpiles	Management, handling and disposal of stockpiles improved by 80% by 2023
9	To reduce environmental contamination arising from POPs	Environmental contamination due to POPs reduced	40% of POPs contaminated sites remediated in an environmentally sound manner by 2023
10	To improve information exchange and stakeholder involvement	Improved Information exchange and stakeholder involvement	Information exchange and stakeholder involvement improved by 90% by 2023
11	To raise awareness among policy and decision makers, stakeholders, interested groups and the general public	Public awareness, information dissemination and education improved	90% of key stakeholders, interested groups and members of the public have their awareness and skills for POPs management

NO.	STRATIGIC OBJECTIVE(S)	STRATEGIC OUTCOME(S)	OUTCOME TARGET(S)
			increased by 2023
12	To strengthen and enhance the monitoring and evaluation of the presence of POPs	Monitoring and evaluation of the presence of POPs improved	Institutional capacity for monitoring and evaluation of presence of POPs improved by 75% by 2023. Increased level of public investments to at least 30% of total annual budget by 2023
13	To develop/improve national capacity for reporting POPs management programs	National Capacity for reporting of POPs management programs improved	National capacity for reporting of POPs management programs improved by 90% by 2023
14	To promote research, development and monitoring on POPs	Research, development and monitoring promoted	Research, development and monitoring enhanced by 2023
15	To improve technical and financial capacity for the management of POPs	Technical and financial capacity for the management of POPs strengthened	Technical and financial capacity for the management of POPs increased by 90% by 2023

4.3.2. Outputs and Output Targets

An outline of outputs and outputs target for each outcome of the Stockholm convention are illustrated below. The outputs show the expected progression of the implementation of the NIP. Table 8 presents an annual uutput target for harmonization of institutional and regulatory measures.

Strategic Objective 1: To ensure that all institutional and regulatory measures relevant to POPs management are harmonized

Table 8: Output target for harmonization of institutional and regulatory measures

Strategic Outcome		**All relevant Institutional and regulatory measures harmonised**					**Total budget per output (USSD)**
Outcome Target		**80% of Institutional and regulatory measures harmonized by 2023**					
Output Description		**Output Targets (Milestones Per Financial Year)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Legislation dealing with POPs reviewed and harmonized	Legislation dealing with POPs reviewed and harmonised	Legislation dealing with POPs updated	Legislation dealing with POPs in use	Legislation dealing with POPs in use	Legislation dealing with POPs reviewed	95,000
Output 2	New regulations on POPs developed	New regulations on POPs developed	New regulations on POPs developed	New regulations on POPs implemented	New regulations on POPs implemented	New regulations on POPs reviewed	40,000
Output 3	Monitoring & enforcement mechanism strengthened	Monitoring & enforcement mechanism in place	Monitoring & enforcement mechanism in place	Monitoring & enforcement mechanism in place	Monitoring & enforcement mechanism in place	Monitoring & enforcement mechanism in place	32,000
Output 4	Relevant role and responsibilities on POPs designated	Designate relevant role and responsibilities on POPs	Relevant role and responsibilities on POPs in use	Relevant role and responsibilities on POPs in use	Relevant role and responsibilities on POPs in use	Relevant role and responsibilities on POPs reviewed	10,000

Strategic Objective 2: To reduce/eliminate releases from intentional production and use of POPs.

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 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. Table 9 presents output targets for the elimination of releases from intentional production and use of POPs.

Table 9: Output targets for the elimination of releases from intentional production and use of POPs

STRATEGIC OUTCOME		**Releases from intentional production and use of POPs reduced/eliminated**					**Total resources per output (USSD)**
OUTCOME TARGET		**Releases from intentional production and use of POPs reduced by 90% by 2023**					
OUTPUT DESCRIPTION		**Output Targets (Milestones Per Financial Year)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output	Releases from intentional production and use of POPs reduced	35% reduction of releases from intentional production and use of POPs	55% reduction of releases from intentional production and use of POPs	75% reduction of releases from intentional production and use of POPs	85% reduction of releases from intentional production and use of POPs	95% reduction of releases from intentional production and use of POPs	180,000

Strategic Objective 3: To eliminate the production, exportation and use of PCBs and equipment containing PCBs.

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.

During the NIP update inventory exercise, it was established that the existing equipment that is suspected to contain PCBs is generally very old and was installed before 1980; however, it is still functional. This includes transformers, capacitors and circuit breakers.

Furthermore, oils from old transformers had already been recycled and reused in the repair of transformers in operation and still part of the ESCOM system grid. This means that PCB oils are potentially within equipment that is still functional as part of the electricity supply grid. Therefore, transformers produced after 1990s might be impacted by PCBs due to maintenance. Table 10 presents status of production, exportation and use of PCBs and equipment containing PCBs in the country.

Table 10: Status of production, exportation and use of PCBs and equipment containing PCBs in the country

STRATEGIC OUTCOME		**Production, importation, exportation, and use of PCBs and equipment containing PCBs eliminated**					**Total resources per output (USSD)**
OUTCOME TARGET		**100% elimination of production, importation, exportation, and use of PCBs and equipment containing PCBs by 2023.**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Guidelines for identification and labelling of equipment using PCB oils developed	Develop guidelines for identification and labelling of equipment using PCB oils developed	60% compliance in use of guidelines for identification and labelling of equipment using PCB oils	80% compliance in use of guidelines for identification and labelling of equipment using PCB oils	90% compliance in use of guidelines for identification and labelling of equipment using PCB oils	100% compliance in use of guidelines for identification and labelling of equipment using PCB oils	80,000
Output 2	Voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment strengthened	100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing Equipment	100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment	100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment	100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment	100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment	1,305,000

STRATEGIC OUTCOME		Production, importation, exportation, and use of PCBs and equipment containing PCBs eliminated					Total resources per output (USSD)
OUTCOME TARGET		100% elimination of production, importation, exportation, and use of PCBs and equipment containing PCBs by 2023.					
OUTPUT DESCRIPTION		OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)					
		2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	
Output 3	Public awareness on the environmental and health impacts of POPs increased	Increase public awareness on the environmental and health impacts of POPs by 10%	Increase public awareness on the environmental and health impacts of POPs by 10%	Increase public awareness on the environmental and health impacts of POPs by 10%	Increase public awareness on the environmental and health impacts of POPs by 10%	Increase public awareness on the environmental and health impacts of POPs by 10%	470,000
Output 4	Control of the import and export of PCBs containing equipment strengthened		Importation of PCBs containing equipment improved reduced by 20%	Importation of PCBs containing equipment improved reduced by 40%	Importation of PCBs containing equipment improved reduced by 60%	Importation of PCBs containing equipment improved reduced by 100%	50,000

Strategic Objective 4: To prohibit and eventually eliminate the production, importation, export and use of stockpiles and wastes of POPs pesticides.

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.

In view of the obligations under Article 3, Malawi conducted an assessment to identify the extent of use, stockpile and waste containing chemicals listed in Annex A & B. One of the key findings was that the country uses pesticides including POPs where alternatives in terms of affordability, acceptability and availability to local farmers and entrepreneurs are not available.

The inventory assessment revealed that chlordane is still the most commonly used POPs pesticide in Malawi. However, importation of chlordane has been banned since 2016 and its use is being phased out while endosulfan has been banned for import and use. Table 11 outlines objectives, activities and target milestones for production, import and export, use stockpiles and wastes of Annex A, POPs pesticides.

Table 11: Output targets for ensuring prohibition of the production, import, export and use of stockpiles and wastes of POPs pesticides

STRATEGIC OUTCOME		**Production, import, export, and use stockpiles and wastes of POPs pesticide prohibited**					**Total budget per output (USSD)**
OUTCOME TARGET		**Production, import, export, and use stockpiles and wastes of POPs pesticide reduced by 60% by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	An effective system for use, import and export of POPs pesticides established	An effective system for use, import and export of POPs pesticides established	An effective system for use, import and export of POPs pesticides in place	An effective system for use, import and export of POPs pesticides in place	An effective system for use, import and export of POPs pesticides in place	An effective system for use, import and export of POPs pesticides evaluated and updated	110,000

Strategic Objective 5: To ensure that all exemptions and continued exemptions are registered.

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. Table 12 presents output targets for ensuring registration of exemptions and continued exemptions.

Table 12: Output targets for ensuring registration of exemptions and continued exemptions

STRATEGIC OUTCOME		Measures enforced for Register for specific exemptions and continued exemptions					Total budget per output (USSD)
OUTCOME TARGET		100% registration of specific exemptions measures by 2023					
OUTPUT DESCRIPTION		OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)					
		2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	
Output 1	Systems for registering specific exemptions and continuing need for exemptions established	Systems for registering specific exemptions and continuing need for exemptions established	Systems for registering specific exemptions and continuing need for exemptions in use	Systems for registering specific exemptions and continuing need for exemptions in use	Systems for registering specific exemptions and continuing need for exemptions in use	Systems for registering specific exemptions and continuing need for exemptions in use	80,000

Strategic Objective 6: To reduce unintentional production of PCDDs/PCDF, HCBs and PCBs.

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

The findings of the inventory show that UPOPs releases in Malawi is increasing every year with the major contributors being waste disposal processes, incineration of medical waste, open burning processes, heat and power generation and the production of mineral products. Most of the releases are into air, products and residues. There is little knowledge and awareness by institutions, companies and organisations with regards to the importance and impacts of POPs and on the need for reporting their activity data. Table 13 presents output targets for reducing unintentional production of PCDDs/HCBs and PCBs.

Table 13: Output targets for reducing unintentional production of PCDDs/HCBs and PCBs

STRATEGIC OUTCOME		**Unintentional production of PCDDs/ PCDFs, HCB and PCBs reduced**					**Total budget per output (USSD)**
OUTCOME TARGET		**80% reduction in unintentional production of PCDDs/ PCDFs, HCB and PCBs by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Uncontrolled burning prevented	Uncontrolled burning prevented	Uncontrolled burning prevented	Uncontrolled burning prevented	Uncontrolled burning prevented	Uncontrolled burning prevention evaluated	620,000

Strategic Objective 7: To reduce releases from stockpiles and wastes

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

- Stockpiles containing chemicals listed in Annex A or Annex B
- 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 conventions such as the Basel Convention which control trans-boundary movements of hazardous wastes, the Rotterdam Convention which deals with the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade. 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 possibly 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. Table 14 provides details of output targets for the reduction of releases from stockpiles and wastes.

Table 14: Output targets for the reduction of releases from stockpiles and wastes

STRATEGIC OUTCOME		Releases from stockpiles and wastes reduced					Total budget per output (USSD)
OUTCOME TARGET		90% reduction of releases from stockpiles and wastes by 2023					
OUTPUT DESCRIPTION		OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)					
		2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	
Output 1	Guidelines for identification and assessment of stockpiles and waste developed	Guidelines for identification and assessment of stockpiles and waste developed	Guidelines for identification and assessment of stockpiles and waste in use	Guidelines for identification and assessment of stockpiles and waste in use	Guidelines for identification and assessment of stockpiles and waste in use	Guidelines for identification and assessment of stockpiles and waste reviewed	80,000
Output 2	Awareness on the environmental and health impacts of stockpiles and waste increased	Awareness on the environmental and health impacts of stockpiles and waste increased	Awareness on the environmental and health impacts of stockpiles and waste increased	Awareness on the environmental and health impacts of stockpiles and waste increased	Awareness on the environmental and health impacts of stockpiles and waste increased	Awareness on the environmental and health impacts of stockpiles and waste increased	470,000
Output 3	Chemical handling and use at enterprise and user levels improved	Chemical handling and use at enterprise and user levels improved	Chemical handling and use at enterprise and user levels improved	Chemical handling and use at enterprise and user levels improved	Chemical handling and use at enterprise and user levels improved	Chemical handling and use at enterprise and user levels improved	50,000

Strategic Objective 8: To improve the management, handling and disposal of stockpiles.

Article 6 paragraph 1 (c) of the Stockholm Convention provides for the management of stockpiles, as appropriate, in efficient and environmentally sound manner. Subparagraph (d) requires the taking of appropriate measures so that such wastes, including products and articles in use, upon becoming wastes, are:

- handled, collected, transported and stored in environmental manner
- disposed of in such a way that POPs content is destroyed or irreversibly transformed
- not permitted to be subjected to disposal operations
- not transported across international boundaries without considering relevant international rules standards and guidelines

Malawi therefore 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 Convention. 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. Details of the output targets for improving the management, handling and disposal of stockpiles are provided in Table 15.

Table 15: Output targets for improving the management, handling and disposal of stockpiles

STRATEGIC OUTCOME		**Improved management, handling and disposal of stockpiles.**					**Total budget per output (USSD)**
OUTCOME TARGET		**Management, handling and disposal of stockpiles improved by 80% by 2023.**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Stockpiles managed in a safe, efficient and environmentally sound manner	Stockpiles managed in a safe, efficient and environmentally sound manner	Stockpiles managed in a safe, efficient and environmentally sound manner	Stockpiles managed in a safe, efficient and environmentally sound manner	Stockpiles managed in a safe, efficient and environmentally sound manner	Stockpiles managed in a safe, efficient and environmentally sound manner	1,180,000

Strategic Objective 9: To reduce environmental contamination arising from POPs.

Article 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.

The survey results revealed that Smallholder Farmers Fertilizer Revolving Fund of Malawi warehouses in Lilongwe and Blantyre and ADMARC depots are the main potentially POPs pesticides contaminated sites. In terms of PCBs, ESCOM transformer workshops in Blantyre, Lilongwe and Mzuzu are the main contaminated sites. The dumping sites at Msilo in Mzuzu, Mzedi in Blantyre, Area 38 in Lilongwe, Katiri in Karonga and Five miles in Zomba are potentially UPOPs and industrial chemicals contaminated sites. Table 16 outlines objectives, activities and milestones for identification of contaminated sites (Annex A, B and C chemicals) and remediation in an environmentally sound manner.

Table 16: Output targets for reducing environmental contamination from POPs

STRATEGIC OUTCOME		**Environmental Contamination due to POPs reduced.**					**Total budget per output (USSD)**
OUTCOME TARGET		**40% of POPs contaminated sites remediated in an environmentally sound manner by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Selected contaminated sites remediated in an environmentally sound manner improved	100% of selected contaminated sites assessed and ready for remediation	30% of selected contaminated sites remediated and ready for re-use	60% of selected contaminated sites remediated and ready for re-use	80% of selected contaminated sites remediated and ready for re-use	90% of selected contaminated sites remediated and ready for re-use	2,180,000

Strategic Objective 10: To improve information exchange and stakeholder involvement.

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

- Reduction or elimination of production use and release of persistent organic pollutants;
- Alternatives to POPs including information relating to their risks as well as social and economic costs; and
- 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 the various stakeholders including NGOs and the media reporters are not fully involved and capacitated to facilitate information exchange. Table 17 provides details of output targets for improving information exchange and stakeholder involvement.

Table 17: Output targets for improving information exchange and stakeholder involvement

STRATEGIC OUTCOME		**Improved Information exchange and stakeholder involvement**					**Total budget per output (USSD)**
OUTCOME TARGET		**Information exchange and stakeholder involvement improved by 90% by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Information exchange and stakeholder involvement strengthened	Information exchange and stakeholder engagement strategy developed	Information exchange and stakeholder engagement strategy disseminated	Information exchange and stakeholder engagement strategy implemented	Information exchange and stakeholder engagement strategy implemented	Information exchange and stakeholder engagement strategy implemented and reviewed	100,000

Strategic Objective 11: To raise awareness among policy and decision makers, stakeholders, interested groups and the general public.

The study on POPs awareness, information and education indicated that (i) the general public is not fully aware of POPs; the rural masses do not have adequate 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. An outline of output targets for increasing public awareness, information dissemination and education is provided in Table 18.

Table 18: Output targets for increasing public awareness, information dissemination and education

STRATEGIC OUTCOME		**Public awareness, information dissemination and education improved**					**Total budget per output (USSD)**
OUTCOME TARGET		**90% of key stakeholders, interested groups and members of the public have their awareness and skills for POPs management increased by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Awareness among the public, policy and decision makers increased	Awareness among the public, policy and decision makers increased by 10%	Awareness among the public, policy and decision makers increased by 15%	Awareness among the public, policy and decision makers increased by 20%	Awareness among the public, policy and decision makers increased by 30%	Awareness among the public, policy and decision makers increased by 35%	850,000
Output 2	Institutional capacity for public awareness information and education improved	Institutional capacity for public awareness information and education improved	Institutional capacity for public awareness information and education improved	Institutional capacity for public awareness information and education improved	Institutional capacity for public awareness information and education improved	Institutional capacity for public awareness information and education improved	100,000

Strategic Objective 12: To strengthen and enhance the monitoring and evaluation of the presence of POPs.

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 based on available scientific, environmental, technical and economic information including national reports. Details of the output targets for the improvement of monitoring and evaluation of the presence of POPs are provided in Table 19.

Table 19: Output targets for improvement of monitoring and evaluation of presence of POPs

STRATEGIC OUTCOME		**Monitoring and evaluation of the presence of POPs improved**					**Total budget per output (USSD)**
OUTCOME TARGET		**Institutional Capacity for Monitoring and Evaluation of the presence of POPs improved by 75% by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Technical capacity for effectiveness evaluation increased	Technical capacity for effectiveness evaluation increased by 20%	Technical capacity for effectiveness evaluation increased by 40%	Technical capacity for effectiveness evaluation increased by 60%	Technical capacity for effectiveness evaluation increased by 80%	Technical capacity for effectiveness evaluation increased by 75%	750,000

Strategic Objective 13: To develop/improve national capacity for reporting POPs management programs.

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.

In order to meet reporting obligations to the COP, Malawi will also endeavour to enhance technical and institutional capacity to ensure that institutional and national reports are generated and consolidated in preparation for submission to the COP. Output targets for the improvement of national capacity for reporting on POPs are provided in Table 20.

Table 20: Output targets for improvement of national capacity for reporting on POPs

STRATEGIC OUTCOME		**National Capacity for reporting of POPs management programs improved**					**Total budget per output (USSD)**
OUTCOME TARGET		**National capacity for reporting of POPs management programs improved by 90% by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Capacity for reporting of POPs management programmes improved	Capacity for reporting of POPs management programmes improved	Capacity for reporting of POPs management programmes improved	Capacity for reporting of POPs management programmes improved	Capacity for reporting of POPs management programmes improved	Capacity for reporting of POPs management programmes improved	50,000

Strategic Objective 14: To promote research, development and monitoring on POPs

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; and
- 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. Table 21 provides output targets for the enhancement of research, development and monitoring.

Table 21: Output targets for enhancement of research, development and monitoring

STRATEGIC OUTCOME		**Research, development and monitoring promoted**					**Total budget per output (USSD)**
OUTCOME TARGET		**Research, development and monitoring enhanced by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	National program for research, development and monitoring of POPs developed	National program for research, development and monitoring of POPs developed	National program for research, development and monitoring of POPs developed	National program for research, development and monitoring of POPs developed	National program for research, development and monitoring of POPs developed	National program for research, development and monitoring of POPs developed	80,000
Output 2	Individual and institutional capacity for effective research, development and monitoring improved	Individual and institutional capacity for effective research, development and monitoring improved	Individual and institutional capacity for effective research, development and monitoring improved	Individual and institutional capacity for effective research, development and monitoring improved	Individual and institutional capacity for effective research, development and monitoring improved	Individual and institutional capacity for effective research, development and monitoring improved	325,000

Strategic Objective 15: To improve Technical and Financial Capacity for the management of POPs.

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 as outlined in Article 12. Table 22 provides details of output targets for the strengthening of technical and financial capacity.

Table 22: Output targets for strengthening of technical and financial capacity

STRATEGIC OUTCOME		**Technical and financial capacity for the management of POPs strengthened**					**Total budget per output (USSD)**
OUTCOME TARGET		**Technical and financial capacity for the management of POPs increased by 90% by 2023**					
OUTPUT DESCRIPTION		**OUTPUT TARGETS (MILESTONES PER FINANCIAL YEAR)**					
		2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	
Output 1	Technical and financial capacity for the management of POPs strengthened	75% of technical and financial capacity for the management of POPs	85% of technical and financial capacity for the management of POPs	90% of technical and financial capacity for the management of POPs	95% of technical and financial capacity for the management of POPs	95% of technical and financial capacity for the management of POPs	1,040,000
Output 2	Funding mobilisation plan for implementation of the NIP developed	Funding mobilisation plan for implementation of the NIP developed	Funding mobilisation plan for implementation of the NIP in use	Funding mobilisation plan for implementation of the NIP in use	Funding mobilisation plan for implementation of the NIP in use	Funding mobilisation plan for implementation of the NIP reviewed	105,000

4.3.3. The National Implementation Framework

The NIP will be implemented with respect to specific articles of the Stockholm Convention that it intends to address. Each article will address specific objectives which will bring the outcome achieved through various outputs of the activities.

The Frame of Actions presents a list of activities under each output. At the start of each implementation year an annual work plan will be developed to outline the specific activities that will be implemented in every quarter of the year. The annual work plan will also specify the target to be achieved for each activity. A detailed implementation matrix for NIP is provided in Table 23.

Table 23: Detailedimplementation matrix

Strategic Outcome 1: All relevant Institutional and regulatory measures harmonised				
Outcome Target: Harmonised Institutional and regulatory measures by 2023				
Output 1.1.: All stand-alone Acts and Regulations on chemicals harmonized by June 2023				
Output Target: 80% of stand-alone Acts and Regulations on chemicals harmonized by 2020				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
1.1.1. Review and harmonize various Policies and Acts	EAD; Ministry of Agriculture, PCB; Ministry of Justice	No. of Policies, and Acts reviewed	All relevant Acts and Policies	2019 - 2020
1.1.2. Develop guidelines and SOPs on management of existing and new POPs including for e-waste	EAD	No. of guidelines and SOPs	Depending on need	2019 - 2020
1.1.3. Enact the laws	Parliament; OPC	No. of Acts passed and gazetted	Depending on No. of laws reviewed/developed	2019 - 2020
1.1.4. Develop Policy on E-waste	EAD, MACRA	Policy	1	2019 - 2020
Output 1.2.: Existing relevant regulations on POPs reviewed				
Output Target: 100% of existing relevant regulations on POPs reviewed by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
1.2.1. Carry out gap analysis on existing regulations	EAD	No. of regulations reviewed	All relevant existing regulations	2019 - 2020
1.2.2. Develop regulations addressing the gaps	EAD/Justice	No. of new regulations developed	Depending on need (based on gap analysis report)	2019 - 2020
Output 1.3.: Monitoring & enforcement tools and mechanisms strengthened or put in place				
Output Target: All (100%) of Monitoring & enforcement tools and mechanisms strengthened or put in place by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
3.1.1. Identify monitoring tools for POPs	EAD	No. of tools identified	Depending on need	2019 - 2020
3.1.2. Develop monitoring plans	EAD	No. of plans	1	2019 - 2020

		developed		
3.1.3. Develop enforcement mechanisms	EAD	Enforcement systems in place	Depending of need	2019 - 2020
Output 1.4.: Roles and responsibilities of institutions defined				
Output Target: 100% of key institutions have their roles and responsibilities clearly defined by 2020				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
1.4.1. Identify institutions with critical roles and responsibilities on POPs	EAD	No. of institutions identified	10	2019
1.4.2. Develop functional national and regional linkages	EAD	Linkages developed	N/A	2019
1.4.3. Define roles and responsibilities on POPs	EAD	No. of institutions with roles on POPs defined	10	2019
Strategic Outcome 2: Releases from intentional production and use of POPs reduced/eliminated				
Outcome Target: Releases from intentional production and use of POPs reduced by 90% by 2023				
Output 2.1.: Releases from intentional production and use of POPs reduced				
Output Target: 20% average annual reduction of releases from intentional production and use of POPs by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
2.1.1. Develop and implement a harmonized regulatory system for regulating production and use of chemicals	EAD; PCB; Ministry of Industry and Trade; Ministry of Labour; relevant stakeholders	Availability of regulatory system	1	2019 - 2023
2.1.2. Conduct inspections and monitoring to check on level of releases	EAD; PCB; Ministry of Industry and Trade; Ministry of Labour; Relevant stakeholders	No. of Inspections	20	2019 - 2023
2.1.2. Conduct M&E of regulatory system	EAD; PCB; Ministry of Industry and Trade; Ministry of Labour;	No. of M&E's	10 (semi-annually)	2019 - 2023

	Relevant stakeholders			
Strategic Outcome 3: Production, importation, exportation, and use of PCBs and equipment containing PCBs eliminated				
Outcome Target: 100% elimination of production, importation, exportation, and use of PCBs and equipment containing PCBs by 2023				
Output 3.1.: Guidelines for identification and labelling of equipment using PCB oils developed				
Output Target: Guidelines and Standards for identification and labelling of equipment using PCB oils developed by 2019				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
3.1.1. Develop standards for assessment/evaluation of toxic chemicals and hazardous wastes	EAD; MBS; ESCOM; Other relevant stakeholders	Standards available	Depending on need	2019
3.1.2. Prepare guidelines for identification and labelling of equipment using PCB oils	EAD; MBS; ESCOM; Other relevant stakeholders	Guidelines available	Depending on need	2019
3.1.3. Conduct inspections and monitoring to enforce standards.	EAD ESCOM	Guidelines on PCBs	16 (Quarterly)	2020-2023
Output 3.2.: Voluntary agreements with enterprises or industry groups on phasing out PCB containing equipment supported				
Output Target: 100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing Equipment by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
3.2.1. Phasing out equipment containing 10% PCBs in volume over 5 litres	EAD; Ministry of Trade; ESCOM	No. of equipment	-	Ongoing
3.2.2. Procure laboratory equipment for analytical tests	MBS; ESCOM	No & type of equipment for monitoring PCBs	Depending on need	2019 - 2021
3.2.3. Phase out equipment containing 0.05% - 5% PCBs	EAD; Ministry of Trade; ESCOM	No. of equipment with 0.05% - 5% PCBs oils	-	Ongoing
3.2.4. Facilitate signing of voluntary	EAD; ESCOM; MCCCI	No. of agreements	Depending on need	2021 - 2023

agreements on phasing out of PCB containing equipment		signed		
Output 3.3.: Public awareness on the environmental and health impacts of POPs increased				
Output Target: 85% of key stakeholders and interested groups are aware of the environmental and health impacts of POPs by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
3.3.1. Develop radio and TV programmes for raising awareness on POPs	EAD, MoH, Local Assemblies, Media Houses, Ministry of Information	No. of programs/ frequency of broadcasts	Depending on need	Ongoing
3.3.2. Develop awareness messages for production of newsletters, brochures, leaflets and magazines	EAD; Media & Civil society	Availability of messages	Depending on need	Ongoing
3.3.3. Integrate POPs issues in the school curricula	Ministry of Education, NCHE; Universities	POPs issues integrated into School curricula	2 curricula (1 secondary and 1 tertiary)	2021 - 2023
Output 3.4.: Chemical handling and use at enterprise and user levels improved				
Output Target: 85% of traders and users aware of and able to adopt proper chemical handling practices by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
3.4.1. Develop user-friendly guidelines for handling and use of chemicals	EAD, MBS, Industry, Labour, PCB	Guidelines available	Depending on need	2019 - 2020
Strategic Outcome 4: Production, import, export, and use stockpiles and wastes of POPs pesticide prohibited				
Outcome Target: Production, import, export, and use stockpiles and wastes of POPs pesticide reduced by 60% by 2023				
Output 4.1.: An effective system for monitoring the use, importation and export of POPs pesticides established				
Output Target: 80% of POPs pesticides that are used, imported and exported are monitored by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
4.1.1. Develop mechanisms for registering all imports and exports of chemicals	PCB EAD MRA-Customs	Percentage of chemicals registered	80%	2020 - 2023

4.1.2. Develop and implement a harmonized system for tracking Annex A pesticides	PCB; EAD; MRA-Customs	Harmonized Tracking System available	1	2020 - 2023
4.1.3. Develop guidelines, protocols and procedures for disposal of chemicals including POPs contaminated products & articles	EAD; MBS; PCB	Guidelines, protocols and procedures available	Depending on need	2019 - 2020
Strategic Outcome 5: Measures enforced for Register for specific exemptions and continued exemptions				
Outcome Target: 100% registration of specific and continued exemptions by 2023				
Output 5.1.: System for registering specific exemptions and continuing need for exemptions established				
Output Target: 100% registration of specific and continued exemptions by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
5.1.1. Develop guidelines and procedures for identification and selection of candidate chemicals for exemptions	EAD, MoH, PCB, MoAIWD, MBS	Guidelines and procedures available	Depending on need	2019 - 2020
5.1.2. Undertake periodic review to assess need for continued exemptions or otherwise	EAD, MoH, PCB, MoAIWD, MBS	No. of reviews	16 (quarterly)	2020 - 2023
Strategic Outcome 6: Unintentional production of PCDDs/ PCDFs, HCB and PCBs reduced				
Outcome Target: 80% reduction in unintentional production of PCDDs/ PCDFs, HCB and PCBs by 2023				
Output 6.1.: Uncontrolled burning reduced				
Output Target: Incidences of uncontrolled burning reduced by 80% by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
6.1.1. Develop legislation, standards and procedures to control burning. (Legislation to cover: waste management, need to install emissions monitoring device in industries,	EAD, PCB, MBS, Local Authorities, Ministry for Justice, Ministry of Health	Legislation, standards and procedures available	Depending on need	2020 - 2021

e.t.c.)				
6.1.2. Develop and implement a harmonized monitoring program for UPOPs emissions	EAD, PCB, MBS, Local Authorities, Ministry of Health	Harmonized Monitoring program available	1	2021 - 2022
6.1.3. Conduct inspections to check compliance to UPOPs emission limits.	EAD, PCB, MBS, Local Authorities, Ministry of Health	No. of inspections/no. of facilities or sites inspected	12 (quarterly)	2021 - 2023
6.1.4. Develop projects for the use of clean fuels and energy saving technologies for cooking	EAD, Universities Research Institutions, MBS, Local Authorities, Private sector	No. of projects	Depending on need	2020 - ongoing
Strategic Outcome 7: Releases from stockpiles and waste reduced				
Outcome Target: 90% reduction of releases from stockpiles and waste by 2023				
Output 7.1.: Stockpiles and waste identified and assessed				
Output Target: 90% of stockpiles and waste identified and assessed by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
7.1.1. Develop and implement standards for evaluation of releases from stockpiles and waste	EAD, MBS, MoAIWD, ESCOM, EAD	Standards available	Depending on need	2019 - 2020
7.1.2. Develop and implement standards and guidelines for proper conditioning and disposal of stockpiles and wastes.	EAD, MBS, MoAIWD, ESCOM, EAD	guidelines and standards available		
7.1.2. Prepare guidelines for identification and assessment of stockpiles and waste	EAD, MBS, MoAIWD, ESCOM, EAD	guideline available	Depending on need	2019 - 2020
Strategic Outcome 8: Improved management, handling and disposal of stockpiles				

Outcome Target: Management, handling and disposal of stockpiles improved by 80% by 2023				
Output 8.1.: Reduced volume of stockpiles and wastes				
Output Target: Volume of stockpiles and wastes reduced by 80% by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
8.1.1. Develop guidelines and procedures for identification and assessment of stockpiles and waste	EAD, Ministry of Trade, PCB, Academia, MBS, MoAIWD, Research Institutions	Guidelines and procedures available	Depending on need	2020 - 2023
8.1.2. Carry out identification (including digital mapping), assessment and prioritization of stockpiles and wastes	EAD, Ministry of Trade, PCB, Academia, MBS, MoAIWD, Research Institutions	Volume of stockpiles and waste identified and assessed	To be determined	2020 - 2021
8.1.3. Develop a tracking system for stockpiles and wastes	EAD, Local authorities, PCB, MRA-Customs	Tracking system available	1	2021 - 2023
8.1.4. Develop best options for final disposal of stockpiles and wastes	EAD PCB MoAIWD Industry and other relevant stakeholders	Best Disposal Options available	-	2019 - 2021
Strategic Outcome 9: Environmental Contamination due to POPs reduced				
Outcome Target: 40% of POPs contaminated sites remediated in an environmentally sound manner by 2023				
Output 9.1.: Remediation of contaminated sites in an environmentally sound manner increased				
Output Target: 10% annual increase in remediation of contaminated sites between 2020 and 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
9.1.1. Develop guidelines and procedures for identification and assessment of POPs contaminated sites	EAD, Ministry of Trade, PCB, Academia, MBS, MoAIWD, Research institutions	Guidelines and procedures available	Depending on need	2019 - 2020

9.1.2. Carry out identification (including digital mapping), assessment and prioritization of POPs contaminate sites	EAD, Ministry of Trade, PCB, Academia, MBS, MoAIWD, Research institutions	POPs contaminated sites identified and assessed	No. of sites identified and assessed	2020 - 2021
9.1.3. Coordinate development and implementation of site-specific remediation plans	EAD, MoAIWD, PCB, ESCOM, Ministry of Industry and Trade, Local Authorities	No. of remediation plans developed	To be determined	2022 - 2023
9.1.4. Pilot remediation of high risk abandoned contaminated sites	EAD, MoAIWD, PCB, ESCOM, Local Authorities, Industry	No. of site remediated	To be determined	2021 - 2023
Strategic Outcome 10: Improved Information exchange and stakeholder involvement				
Outcome Target: Information exchange and stakeholder involvement improved by 90% by 2023				
Output 10.1.: Exchange of information and stakeholder involvement increased				
Output Target: Annually, 90% of key institutions and stakeholders reached with information and involved in implementation of POPs Management Programs by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
10.1.1. Carry out institutional and stakeholder mapping	EAD	No. of institutions and stakeholders identified	-	2019
10.1.2. Establish a national website and network of chemicals information exchange	EAD, Stakeholders	Information Exchange System available	1	2020 - 2021
10.1.3. Periodically update existing website to incorporate information on chemicals and POPs	EAD, Stakeholders	No. of website updates	16 (quarterly)	2020 - 2023
10.1.4. Develop procedures and protocols for information management	EAD, Stakeholders	Procedures and protocols available	Depending on need	2019 - 2020
Strategic Outcome 11: Public awareness, information dissemination and education improved				
Outcome Target: 90% of key stakeholders, interest groups and members of the public have their awareness and skills for POPs				

management increased by 2023				
Output 11.1.: Awareness and skills among the public, policy and decision makers, stakeholders and interest groups increase				
Output Target: Annually, 90% of the public, policy and decision makers, stakeholders and interest groups have their knowledge and skills for POPs handling, management and disposal increased by 60% by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
11.1.1. Design and implement a targeted awareness program for all stakeholders	EAD, MoAIWD, PCB, ESCOM, Ministry of Industry and Trade, Local Authorities	Awareness Program available	1	2021 - 2023
11.1.2. Develop training and IEC materials and translate into user-friendly languages	EAD, MoAIWD, PCB, ESCOM, Ministry of Industry and Trade, Local Authorities	Availability of training Materials on POPs in user-friendly languages	Depending on need	2019 - 2022
11.1.3. Carry out training of institutions, stakeholders, interest groups, traders and members of the general public.	EAD, MoAIWD, PCB, ESCOM, Ministry of Industry and Trade, Local Authorities	No. of training sessions; No. of institutions and individuals trained.	To be determined	2019 - 2023
Strategic Outcome 12: Monitoring and evaluation of the presence of POPs improved				
Outcome Target: Institutional Capacity for Monitoring and Evaluation of the presence of POPs improved by 75% by 2023				
Output 12.1.: Technical capacity for evaluation of presence of POPs increased				
Output Target: 90% of relevant institutions have their technical capacity for monitoring and evaluation of the presence of POPs increased by 75% by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
12.1.1. Develop and administer a technical capacity needs assessment tool	EAD, PCB, Research Institutions MoH, MoAIWD, ESCOM, Local Authorities, Academia	Needs Assessment Tool available	1	2019 - 2020
12.1.2. Develop and implement a training	EAD, PCB, Research	Training program	1	2019 - 2020

program on monitoring and evaluation of the presence of POPs	Institutions MoH, MoAIWD, ESCOM, Local Authorities, Academia	available		
12.1.3. Develop and implement a program for monitoring and evaluation of POPs presence in the environment including bio-monitoring	EAD, PCB, Research Institutions MoH, MoAIWD, ESCOM, Local Authorities, Academia	Monitoring and evaluation program available	1	2019 - 2020
12.1.4. Conduct regular M & E of the Training Program and POPs Monitoring and Evaluation Program	EAD, Independent Consultant	M & E Reports	12 (Quarterly)	2020 - 2023
Strategic Outcome 13: National Capacity for reporting of POPs management programs improved				
Outcome Target: National capacity for reporting of POPs management programs by 90% by 2023				
Output 13.1.: Institutional capacity for reporting of POPs management programs increased				
Output Target: 90% of relevant institutions are able to collect data and generate reports on POPs by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
13.1.1. Develop/review data collection tools	EAD, PCB, MoH, MoAIWD, MRA-Customs, MBS, Local Authorities, Relevant stakeholders	Data collection tools available	Depending on need	2019 - 2020
13.1.2. Procure and provide data collection equip to institutions		No. of institution with equipment	To be determined	2019 - 2020
13.1.3. Identify and train data collectors		No. of data collectors identified and trained	20	2019 - 2020
13.1.4. Develop and implement a regular reporting program		Reporting program available	1	2019 - 2020
Strategic Outcome 14: Research, development and monitoring promoted				
Outcome Target: Research, development and monitoring enhanced by 2023				
Output 14.1: Harmonized National program for research, development and monitoring of POPs developed and implemented				
Output Target: 1 Harmonized National Program for Research, Development and Monitoring of POPs developed and implemented by 2023				

Activity(s)	Responsibility	Indicator	Target	Time Frame
14.1.1. Conduct consultative meetings on research, development and monitoring	EAD; NCST; Ministry of Industry and Trade; MBS; Academia; MoH; MoAIWD; PCB.	No. of meetings	5	2019 - 2021
14.1.2. Develop and implement a harmonized Program for Research, Development and Monitoring of POPs		Program available	1	2019 - 2020
14.1.3. Integrate the research, development and monitoring program elements in sectoral and institutional plans		Sectoral plans contain POPs research, development and monitoring	N/A	2021 - 2023
Output 14.2: Individual and institutional capacity for effective research, development and monitoring increased				
Output Target: Individual and institutional capacity for effective research, development and monitoring increased by 60% by 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
14.2.1. Undertake needs assessment	EAD; NCST; DHRMD; Ministry of Industry and Trade;	Needs Assessment Report available	1	202 1 - 2022
14.2.2. Conduct consultative workshops to prioritise capacity building needs		Capacity needs prioritised	N/A	2021 - 2022
14.2.4. Facilitate research and dissemination grants in the following areas: Impact of POPs on human health impacts of POPs on the environment	EAD Academia GEF-SGP Relevant institutions	No. of research projects	Depending on needs	2021 - 2023
Strategic Outcome 15: Technical and financial capacity for the management of POPs strengthened and maintained				
Outcome Target: Technical and financial capacity for the management of POPs increased by 90% by 2023				
Output 15.1: Technical capacity for the management of POPs increased				
Output Target: Technical capacity for the management of POPs increased by 30% annually from 2021 to 2023				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
15.1.1. Carry out national consultation to identity critical capacity gaps and needs	EAD, DHRMD, MoFEPD Academia, research	No. of institutions and individuals	To be determined	2019 - 2020

	institutions	consulted		
15.1.2. Formulate and implement a national Capacity Development Plan		Plan available	1	2019 - 2028
15.1.3. Develop a National Procurement Plan and Procedure	EAD, PCB, MBS, MoH, MoAIWD Academia MoFEPD Development Partners	Procurement Plan and Procedure available	1	2019 - 2020
15.1.4. Identify and Procure necessary equipment for management of POPs	EAD, PCB, MBS, MoH, MoAIWD, Academia, MoFEPD Development Partners	Equipment available	-	2019 - 200
Output 15.2.: Resource Mobilisation Plan for implementation of the NIP developed				
Output Target: One (1) Harmonized Resource Mobilisation Plan for implementation of the NIP developed and implemented by 2020				
Activity(s)	**Responsibility**	**Indicator**	**Target**	**Time Frame**
15.2.1. Recruit consultant to develop plan	EAD, MoFEPD, Development Partners, PCB	Consultant available	1	2019
15.2.2 Develop a resource mobilization plan	EAD, Consultant	Plan available	1	2019 - 2020

CHAPTER 5

MONITORING AND EVALUATION

Monitoring and Evaluation will ensure that the objectives of the NIP are on track. It will enhance the achievement of the strategic outcomes hence contributing to the adherence to Stockholm Convention Articles. The M&E Framework presented in Table 24 has been developed following the strategic outcomes and outputs. It is important to ensure that Monitoring and Evaluation is carried out at quarterly and annual intervals.

5.1. Monitoring

Implementation of the NIP will be through annual work plans and budgets. A National Coordination Unit will facilitate the development of annual work plans and budgets. Each entity which will be assigned tasks will ensure that the objects of the task are met and the outputs are realized. The activities outlined in section 4.3.3 will form the basis for preparing annual work plans and budgets.

The National Coordination Unit will ensure that there are proper mechanisms for ensuring that there is adequate monitoring of the activities during implementation. Monitoring will check if all the planned activities are implemented as desired. Feedback from monitoring is vital hence Monitoring Reports will have to be generated and properly recorded.

5.2. Evaluation

Performance evaluation is very important as it entails comparing actual against expected results and the resultant impact. Evaluation will entail comparing the expected results to the actual results at activity, output and outcome levels. It will also help in checking the effectiveness of the methods used. The results of evaluation will also be used for reviewing the NIP. Table 24 provides a Monitoring and Evaluation Framework for the NIP.

Table 24: Monitoring and evaluation framework

Objective 1: To ensure that all institutional and regulatory measures relevant to POPs management are harmonized											
Strategic Outcome 1.0.	**All relevant Institutional and regulatory measures harmonised**										
Outcome Target	**80% of Institutional and regulatory measures harmonized by 2023**										
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data Collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
1.1. 80% of stand-alone Acts and Regulations on chemicals harmonized by 2023	Percentage of stand-alone acts and regulation harmonized into one legislation	The difference, in percentage terms, of total number existing pieces of legislation and number of legislation harmonized			20%	20%	20%	20%	Reports	Annually	Questionnaire	EAD
1.2. 100% of existing relevant regulations on POPs reviewed by 2023	Percentage of relevant regulations reviewed	The difference, in percentage terms, of total number existing pieces of legislation and number of legislation reviewed		-	25%	25%	25%	25%	Reports	Annually	Questionnaire	EAD
1.3. All (100%) of Monitoring & enforcement tools and mechanisms strengthened or put in place by 2023	Number of enforcement tools/mechanisms developed	The number of tools/mechanisms developed for strengthening enforcement of legislation	4	2	2	0	0	0	Reports	Quarterly	Reports	EAD

1.4. 100% of key institutions have their roles and responsibilities clearly defined by 2020	Percentage of institutions with full understanding of their roles and responsibilities	The difference, in percentage, of total number of key relevant institutions and Number of Institutions with full understanding of their roles in POPs management	5	5	5	-	-	-	Reports	Annually	Report	EAD
Objective 2	**To reduce/eliminate releases from intentional production and use of POPs**											
Strategic Outcome 2.0.	**Releases from intentional production and use of POPs reduced/eliminated**											
Outcome Target	**Releases from intentional production and use of POPs reduced by 90% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
2.1. 20% average annual reduction of releases from intentional production and use of POPs by 2023	% average annual reduction of releases	The difference, in percentage terms, between initial level and current level of release	101. 592 g TEQ/a	20%	20%	20%	20%	20%	Reports	Ongoing	Reports	EAD
Objective 3	**To eliminate the production, exportation and use of PCBs and equipment containing PCBs**											
Strategic Outcome 3.0.	**Production, importation, exportation, and use of PCBs and equipment containing PCBs eliminated**											
Outcome Target	**100% elimination of production, importation, exportation, and use of PCBs and equipment containing PCBs by 2023**											

Output(s) and Overall Target(s)	Performance Indicators	Definition of indicator	Baseline 2017/18	Targets					Data source	Frequency	Data collection instrument	Responsibility for data collection
				Y1	Y2	Y3	Y4	Y5				
3.1. Guidelines for identification and labelling of equipment using PCB oils developed	Availability of guidelines	Availability of printed copies or accessible soft copies for easy identification and labelling	0	1	0	0	0	0	Annual report	Annually	Progress reports	EAD
3.2. 100% support for voluntary agreements with enterprises or industry groups on phasing out PCB containing Equipment by 2023	Percentage of agreements supported	The difference, in percentage terms, between the total number of agreements proposed and the number supported	0	0	5	5	5	0	Reports	Annually	Annual progress reports	EAD
3.3. 85% of key stakeholders and interested groups are aware of the environmental and health impacts of POPs by 2023	Percentage of stakeholders and interested groups with adequate awareness	The difference, in percentage terms, between total number of key stakeholders and interest groups identified and the number of stakeholders and interested groups with awareness	30%	45%	50%	65%	75%	85%	Annual report	Annually	Questionnaire	EAD
3.4. 85% of traders and users aware of and able to adopt proper	Percentage of traders and users adopting proper chemical	A sampled difference, in percentage terms, between total	30%	45%	55%	65%	75%	85%	Survey report	Annually	Questionnaire	EAD

chemical handling practices by 2023	handling practices	number of traders and users sampled and total number of adopters										
Objective 4	**To prohibit and eventually eliminate the production, importation, export and use of stockpiles and wastes of POPs pesticides**											
Strategic Outcome 4.0.	**Production, import, export, and use stockpiles and wastes of POPs pesticide prohibited**											
Outcome Target	**Production, import, export, and use stockpiles and wastes of POPs pesticide reduced by 60% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
4.1. 80% of POPs pesticides that are used, imported and exported are monitored by 2023	% of POPs and POPs contaminated materials under surveillance and regulatory control	The difference, in percentage terms, between total volume of POPs and POPs contaminated materials produced/imported and the volume under surveillance	20%	-	30%	50%	70%	80%	Reports	Annually	Reports	EAD
	% decline in volume of POPs produced or imported	The difference, in percentage terms, between initial (previous year) volume produced/imported and current year volume		-	20%	40%	60%	80%	Industry records; Import/ export records	Annually	Questionnaire	EAD

Objective 5	To ensure that all exemptions and continued exemptions are registered										
Strategic Outcome 5.0.	Measures enforced for Register for specific exemptions and continued exemptions										
Outcome Target	100% registration of specific and continued exemptions by 2023										
Output(s) and Overall Target(s)	Performance Indicators	Definition of indicator	Annual Targets						Data source	Frequency	Data collection instrument	Responsibility for data collection
			Baseline 2017/18	Y1	Y2	Y3	Y4	Y5				
100% registration of specific and continued exemptions annually by 2023	Percentage of exemptions and continued exemptions registered	The difference, in percentages, between total number of exemptions and number of registered exemptions		100%	100%	100%	100%	100%	Reports	Annually	Annual progress reports	EAD
Objective 6	To reduce the unintentional production of PCDDs/HCBs and PCBs										
Strategic Outcome 6.0.	Unintentional production of PCDDs/ PCDFs, HCB and PCBs reduced										
Outcome Target	80% reduction in unintentional production of PCDDs/ PCDFs, HCB and PCBs by 2023										
Output(s) and Overall Target(s)	Performance Indicators	Definition of indicator	Annual Targets						Data source	Frequency	Data collection instrument	Responsibility for data collection
			Baseline 2017/18	Y1	Y2	Y3	Y4	Y5				
6.1. Incidences of uncontrolled burning reduced by 80% by 2023	Percentage decline in incidences of uncontrolled burning	The difference, in percentage, between number of incidences in previous year and		-	25% %	55%	25%	25%	Report	Annually	Questionnaire	EAD

		number of incidences in current year										
Objective 7	**To reduce releases from stockpiles and wastes**											
Strategic Outcome 7.0	**Releases from stockpiles and waste reduced**											
Outcome Target	**90% reduction of releases from stockpiles and waste by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
7.1. 90% of stockpiles and waste identified and assessed by 2023	Percentage of stockpiles and wastes identified and assessed	The difference, in percentage, between total volume of stockpiles and wastes identified and volume of stockpiles and wastes assessed		-	25% %	30%	20% %	15%	Reports	Annually	Progress Reports	EAD, PCB
Objective 8	**To improve the management, handling and disposal of stockpiles**											
Strategic Outcome 8.0.	**Improved management, handling and disposal of stockpiles**											
Outcome Target	**Management, handling and disposal of stockpiles improved by 80% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
8.1. Volume of stockpiles and	% reduction in stockpiles and	The difference, in percentages,		-	20%	20%	20%	20%	Reports	Annually	Annual progress	EAD

wastes reduced by 80% by 2023	wastes	between volume of stockpiles and wastes in previous year and the volume in current year									reports	
Objective 9	**To reduce environmental contamination arising from POPs**											
Strategic Outcome 9.0.	**Environmental Contamination due to POPs reduced**											
Outcome Target	**40% of POPs contaminated sites remediated in an environmentally sound manner by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
9.1. 60% of POPs contaminated sites remediated by 2023	% of contaminated sites that are reconditioned and rehabilitated	The difference, in percentage terms, between the total number of contaminated sites in the initial year and the number of sites remediated in the current year	0%	-	-	20%	20%	20%	Reports	Annually	Annual progress reports	EAD
Objective 10	**To improve information exchange and stakeholder involvement**											
Strategic Outcome 10.0.	**Improved Information exchange and stakeholder involvement**											
Outcome Target	**Information exchange and stakeholder involvement improved by 90% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**

			Baseline 2017/18	Y1	Y2	Y3	Y4	Y5				
10.1. Annually, 90% of key institutions and stakeholders reached with information and involved in implementation of POPs management programs by 2023	Percentage of key institutions and stakeholders reached with information and involved	The difference, in percentage, between total number of key institutions and stakeholder identified and the number reached and involved		90%	90%	90%	90%	90%	Reports	Quarterly	Progress reports	EAD
Objective 11	**To raise awareness among policy and decision makers, stakeholders, interested groups and the general public**											
Strategic Outcome 11.0.	**Public awareness, information dissemination and education improved**											
Outcome Target	**90% of key stakeholders, interested groups and members of the public have their awareness and skills for POPs management increased by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
11.1. Annually, 90% of the public, policy and decision makers, stakeholders and interested groups have	Percentage of the public, policy and decision makers, stakeholders and interested groups whose	The difference, in percentage terms, between total number of policy and decision makers, stakeholders and interested groups		90%	90%	90%	90%	90%	Reports	Quarterly	Questionnaire	EAD

their knowledge and skills for POPs handling, management and disposal increased by 60% by 2023	knowledge and skills has been raised	targeted and the number whose knowledge and skills has increased										
	Percentage of the public, policy and decision makers, stakeholders and interested groups whose knowledge and skills has been raised by 60%	The difference, in percentage terms, between total number of policy and decision makers, stakeholders and interested groups targeted and the number whose knowledge and skills has increased		60%	60%	60%	60%	60%	Reports	Quarterly	Questionnaire	EAD
Objective 12	**To strengthen and enhance the monitoring and evaluation of the presence of POPs**											
Strategic Outcome 12.0.	**Monitoring and evaluation of the presence of POPs improved**											
Outcome Target	**Institutional Capacity for Monitoring and Evaluation of the presence of POPs improved by 75% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
12.1. 90% of relevant institutions have their technical capacity for	% of relevant institutions for which technical capacity has been increased	The difference, in percentage, between Total number of relevant		-	15%	35%	35%	15%	Reports	Annually	Questionnaire	EAD

monitoring and evaluation of the presence of POPs increased by 75% by 2023		institutions and number of institutions for which technical capacity has increased										
	% increase in technical capacity in relevant institutions	The difference, in percentage, between level of capacity at initial year and level of capacity at current year		-	-	25%	25%	25%	Reports	Annually	Questionnaire	EAD
Objective 13	**To develop/improve national capacity for reporting POPs management programs**											
Strategic Outcome 13.0.	**National Capacity for reporting of POPs management programs improved**											
Outcome Target	**National capacity for reporting of POPs management programs improved by 90% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
90% of relevant institutions are able to collect data and generate reports on POPs by 2023	% of institutions that are able to collect data and generate reports at national level	The difference, in percentage terms, between total number of institutions expected to report and the actual number of institutions reporting		100 %	100%	100%	100%	100%	Reports	Quarterly, Annually	Reports, Questionnaires	EAD

Objective 14	To promote research, development and monitoring on POPs											
Strategic Outcome 14.0.	Research, development and monitoring promoted											
Outcome Target	Research, development and monitoring enhanced by 2023											
Output(s) and Overall Target(s)	Performance Indicators	Definition of indicator	Annual Targets						Data source	Frequency	Data collection instrument	Responsibility for data collection
			Baseline 2017/18	Y1	Y2	Y3	Y4	Y5				
14.1. One (1) Harmonized National Program for Research, Development and Monitoring of POPs developed and 75% of it implemented by 2023	% completion the document	The difference, in percentage terms, between expected level and the actual level of completion of the document	0%	40%	60%	100%	-	-	Reports	Annually	Reports	EAD
	% progress of implementation of the program	The difference, in percentage terms, between expected level and the actual level of implementation of the program	0%	-	-	25%	25%	25%	Reports	Annually	Progress reports	EAD
14.2. Individual and institutional capacity for effective research, development and monitoring increased by 60% by 2023	% of individuals and institutions whose research and monitoring capacity has increased	The difference, in percentage, between the total expected number of individuals and institutions and the actual number of individuals and institutions	0%	-	15%	15%	15%	15%	Reports	Annually	Reports	NSO
Objective 15	To improve Technical and Financial Capacity for the management of POPs											
Strategic Outcome	Technical and financial capacity for the management of POPs strengthened											

15.0.												
Outcome Target	**Technical and financial capacity for the management of POPs increased by 90% by 2023**											
Output(s) and Overall Target(s)	**Performance Indicators**	**Definition of indicator**	**Annual Targets**						**Data source**	**Frequency**	**Data collection instrument**	**Responsibility for data collection**
			Baseline 2017/18	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**				
15.1. Technical and financial capacity for the management of POPs increased by 90% annually from 2021 to 2023	% increase/availability of financial resources	The difference, in percentage terms, between amount of budgeting funds and amount available		-	90%	90%	90%	90%	Reports	Quarterly, Annually	Reports; Questionnaires	EAD
	% increase/availability of skilled personnel and equipment	The difference, in percentages, between expected number of skilled personnel and equipment and the numbers available		-	90%	90%	90%	90%	Reports	Annually	Reports; Questionnaires	EAD
15.2. One (1) Harmonized Resource Mobilisation Plan for implementation of the NIP developed and implemented by 2020	% of progress of Resource Mobilization Plan development	The difference, in percentages, between the progress target and the actual progress achieved.	0%	60%	100%	-	-	-	Reports	Quarterly, Annually	Reports	EAD
	% of resources mobilized	The difference, in percentages, between total target to be mobilized and the actual amount mobilized	0%	-	-	30%	30%	40%	Reports	Quarterly, Annually	Reports	EAD

CHAPTER 6

REVIEW OF THE STRATEGIC PLAN

Implementation of the NIP is multi-sectoral in approach and will therefore require well-coordinated mechanisms. The National Focal Point shall engage relevant stakeholders in the review of the NIP. This review shall be 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 5 years. However, the NIP will be subject to progress reviews annually in order to check its effectiveness. In order to facilitate proper and consistent reviews, national consultants shall be engaged in order to build their capacity in NIP reviews and updates.

The implementation plan which has been developed based on annual output targets will be reviewed at the end of each financial year prior to the budget development for the impending fiscal year. A full review of the plan will be conducted at the end of the implementation period in 2023 when the plan expires. However, the plan may be reviewed at any time to incorporate new developments and emerging issues requiring immediate attention since it is a flexible document.

CHAPTER 7

CONCLUSION

The National Implementation Plan (NIP) for POPs for 2019 – 2023 constitutes a comprehensive, strategic policy document whose objective is to develop and improve the optimal and most effective POPs management system while protecting human health and environmental protection. Malawi will thus meet its obligations under the Stockholm Convention on Persistent Organic Pollutants (the Stockholm Convention) signed 22 May 2001. The elaborated NIP for the period 2019 – 2023 will be updated regularly consistent with the special NIP revision and amendment procedure. The Malawi Government and all its key partners are committed to translating the NIP into tangible actions from July, 2019 in order to prevent environmental degradation and associated impacts of POPs on human life and the environment. 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.

ANNEX 1: TASK FORCE TEAM FOR THE DEVELOPMENT OF THE NIP

ANNEX 1 below outlines the list of officers from various departments and divisions who were part of the task team in the development of the NIP.

A. COORDINATING TEAM			
ID	**NAME OF OFFICER**	**POSITION**	**DEPARTMENT/DIVISION**
1	Mrs. T. G. Mbale-Luka	Director	EAD
2.	Ms. V. Kachimera	Deputy Director	EAD
3.	Mrs. S. Najira	Deputy Director	EAD
4	Mr. M. Makonombera	Deputy Director	EAD
5	Mr. B. B. Yassin	Deputy Director	EAD
6	Mr. L. Kampira	Chief Scientific Officer	NCST
7	Ms. C. Theka	Project Coordinator	EAD
B. TASK FORCE TEAM			
1	Mr. W. Msiska	Environmental Inspector	EAD
2	Mr. E. Mvula	Environmental Inspector	EAD
3	Mr. G. Nangwale	Environmental Inspector	EAD
4	Mr. C. Chinyama	Senior Legal Officer	EAD
5	Mr. P. Nyirenda	Environmental Officer	EAD
6	Mr. C. Gamulani	Environmental Officer	EAD
7	Mr. M. Simoni	Environmental Officer	EAD
8	Mr. C. Manda	Environmental Officer	EAD
9	Mr. F. Munthali	Scientific Officer	NCST
10	Mr. P. Khonje	consultant	Croplife
11	Mr. E. Mkomwa	Environmental Inspector	EAD
12	Dr. J. Mwatseteza	Lecturer	Chancellor College
13	Dr. T. Biswick	Lecturer	MUST
14	Mr. R. Ndawala	Chief Inspector	PCB
15	Dr. C. Zalengera	Lecturer	Mzuzu University
16	Mr. I. Chirwa	Director	MBS
17	Mr. T. Mkaka	Officer	Lilongwe City Council
18	Ms. G. Malulu	Environmental Officer	ESCOM
19	Mr. C. Kaferapanjira	CEO	MCCCI
20	Ms. M. Njolomole	Officer	MRA
21	Mr. S. Kuyeli	Director	MBS
22	Mr. M. Soko	Ag. Registrar	PCB
23	Mr. H. Gowero	DOSH	Ministry of Labour

24	Mr. H. Mgodie	Director	Ministry of Health
25	Mr. Y. Kadzakumanja	Principal Officer	Ministry of Trade
26	Mr. C. Chalimba	officer	
27	Mr. F. Mfundi	officer	
28	Mr. V. Mulula	Director of Health & Social Services	Lilongwe City Council
29	Mrs. J. Chitedze-Kumatso	Lecturer	MUST
30	Mr. B. Munthali Chiona	Chief Preventive Health Officer	Zomba City Council
31	Ms. F. Kawaye	Lecturer	The Polytechnic
32	Mr. K. Gondwe	Lecturer	MZUNI
33	Mrs. C. Mainjeni	Researcher	ARET
34	Mr. M. Sankhulani	Intern - EIED	NCST
35	Mr. M. Tembo	Research Officer	NCST
36	Ms. N. Chawawa	EDO	LL District Council
37	Mr. W. Nyasulu	Economist	Treasury
38	Mr. M. Mbulaje	EDO	Blantyre District Council
39	Mr. G. Nyirongo	Statistician	Ministry of Industry Trade & Tourism

ANNEX 2: REFERENCE DOCUMENTS

ANNEX 2 below provides a list of documents that were used for reference in the update of the NIP.

No.	Reference Documents
1	Chinyama M.P.M. and Madhlopa A (1999), *An assessment of municipal solid waste management in the city of Mzuzu, Malawi*, Malawi J. Sci. Technol. 5 40 – 49.
2	Environmental Affairs Department, *Inventory Report on Furans and Dioxins*, 2017
3	Environmental Affairs Department, *Inventory Report on PCBs Malawi*, 2017
4	Environmental Affairs Department, *Inventory Report on PFOs and Related Chemicals in Malawi*, 2017
5	Environmental Affairs Department, *Inventory Report on POPs Pesticides in Malawi*, 2017
6	Environmental Affairs Department, *Desk Study Report on Assessment of the National Legislation, Infrastructure and Capacity for the Management of Persistent Organic Pollutants in Malawi*, 2017
7	Environmental Affairs Department, *Inventory Report of listed Polybrominated diphenyl ethers (POP-PBDE), Hexabrominated Biphenyl (HBB) and Hexabromocyclododecane (HBCD) in Malawi*, 2017
8	Government of Malawi, *Environment Management Act No.23 of 2017*, Government Printer. Zomba
9	Government of Malawi, *Environment Management (Chemicals and Toxic Substances) Regulations 2008*, Government Printer. Zomba
10	Government of Malawi, *Environment Management (Waste Management and Sanitation) Regulations 2008*, Government Printer. Zomba
11	Government of Malawi, *Water Resources Act No.2 of* 2013, Government Printer. Zomba
12	Government of Malawi (1968) *Laws of Malawi: Local Government Act Chapter 22:01*. Government Printer. Zomba
13	Government of Malawi (1968) *Laws of Malawi: Malawi Bureau of Standards Act*. Government Printer. Zomba
14	Government of Malawi (1968*) Laws of Malawi: Public Health Act. Government* Printer, Zomba
15	IPCS, *Key Elements of a National Programme for Chemicals Management and Safety*, pp 27-72 Constitution of Malawi, Chapter 1.01
16	Kamperewera *et al*, *Prevalence of Persistent Organic Pollutants in Blantyre – Malawi. American Journal of Environmental Protection*, 2016, Vol. 4, No. 3, 61-66,

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18	Makaya Eugine, Tanyanyiwa Vincent (2016) Prevalence of Persistent Organic Pollutants in Blantyre – Malawi. American Journal of Environmental Protection, 2016, Vol. 4, No. 3, 61-66, DOI:10.12691/env-4-3-1
19	Ministry of Finance, Economic Planning and Development, *Malawi Growth and Development III*, 2017.
20	Ministry of Health and Population, *Health Care Waste Management Policy*, 2003, Government Printers, Zomba, Malawi.
21	Ministry of Labour and Vocational Training , *Occupational Safety, Health and Welfare Act*, 1997
22	Ministry of Natural Resources, Energy and Mining, *National Profile on the Capacity and Infrastructure for Management of Chemicals in Malawi*, 2010
23	Ministry of Natural Resources and Environmental Affairs, 2002, *National Environmental Policy*, 2nd Edition, 2004, Venus Printers, Lilongwe, Malawi.
24	National Statistics Office, *Malawi Population and Housing Census Report,* 2018. Zomba, Malawi.
25	Ministry of Agriculture, Irrigation and Food Security, *Pesticides Act*, 2000
26	UNEP*, Stockholm Convention on Persistent Organic Pollutants, Text and annexes, Geneva, Switzerland*. Revised 2017
27	United Nations, *Sustainable Development Goals*, 2016
28	UNEP, *Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases*, 2003
29	UNEP, *Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs under Article 5 of the Stockholm Convention*, 2013,
30	UNEP, *Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants*, Revised 2017
31	UNEP Chemicals, *Guidelines for the Identification of PCBs and Materials Containing PCBs*, 1999.
32	UNEP, *Global Environmental Facility (GEF), Regionally Based Assessment of Persistent Toxic Substances.*
33	World Health Organisation, *Polychlorinated Biphenyls: Human Health Aspects*,

	Geneva, 2003.