The Republic of Kenya

THE KENYA NATIONAL IMPLEMANTATION PLAN FOR THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (POPS)

The Dawn of a new era for Chemicals and POPS waste for Kenya

Prepared under the Global Environment Facility/ United Nations Environment Program Global Environment Facility Kenya Government Enabling Activities for the Development of a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPS)

Nairobi, Kenya March 2007

Preface

Hon Prof Kivutha Kibwana, MP
Minister for Environment and Natural Resources

I have the pleasure of presenting the National Implementation Plan (NIP) for Kenya pursuant to the provisions of the Stockholm Convention on Persistent Organic Pollutants. The Convention seeks to eliminate 9 pesticides and 2 unintentionally produced Persistent Organic Pollutants (POPs).

It is encouraging to note that Kenya does not produce any intentional POPs. According to the recently conducted national inventory on POPs unintentionally produced PeOPs such as dioxins and furans are present in the Kenyan environment while the use of all the nine pesticides is banned or restricted to disease vector control. The NIP therefore addresses the presence of several POPs, either as obsolete wastes awaiting disposal or as environmental contaminants.

The process of developing the NIP, which began in late 2002, was coordinated by the Ministry of Environment and Natural Resources and was financed by the Global Environment Facility (GEF) through the United Nations Environment Programme (UNEP). UNEP also provided technical support for enabling activities which included the national inventory of POPs.

The National POPs Committee guided the process while the University of Nairobi Enterprises Services (UNES) Ltd. carried out the inventory of POPs in Kenya. The Ministry of Environment and Natural Resources (Kenya POPS office), /UNEP/GEF Project under the Enabling Activities for the Development of the National Implementation Plans under the Stockholm Convention on POPs coordinated a national capacity and infrastructure assessment.

The Government of Kenya recognizes the importance of managing risks posed by POPs through the development of policies and action plans as well as building the capacity for comprehensive chemicals management. In addition, the NIP responds to the existing and potential impacts of POPs on human health and the environment. It specifies Kenya's POPs management priorities and includes appropriate short, medium and long-term interventions to mitigate such impacts. My ministry is convinced that the implementation of the Stockholm Convention will result in improved quality of life for our people in terms of better health, job creation, poverty reduction, and an improved environment.

The implementation of this NIP is also an important step towards meeting the commitments of the World Summit on Sustainable Development whose goal is to ensure that, by 2020, chemicals are produced and used in ways that do not endanger human health and the environment.

I wish to thank the Global Environment Facility, UNEP Coordination office in Nairobi for the support in the development of this NIP.

Hon. Prof Kivutha Kibwana, MP, EGH
Minister for Environment and Natural Resources

Prof. James Ole Kiyiapi
Permanent Secretary
Ministry of Environment and Natural Resources

Kenya has just completed four important processes related to chemicals namely, the National Chemicals Profile, the National Inventory of Persistent Organic Pollutants, the assessment of infrastructure and capacity to manage POPs and the National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants.

What came out of these processes is that Kenya has an active chemical use sector in industry, agriculture, health, research and services. Most of the chemicals are imported for the purposes of agriculture, manufacturing and services. Chemicals accounted for 16.5% of national imports in 2005 and 2006 and, we continue to export chemicals extracted from national resource deposits, such as carbon dioxide, soda ash, fluorspar and sodium chloride. Our country is not a major exporter of substances regarded as having significant toxicity.

The objective of this NIP is to come up with activities and programs related to the implementation of the Stockholm Convention. It is also a pre-requisite to meeting our country's obligations to the Convention as a Party. The NIP will therefore enable Kenya to take appropriate steps towards the management of POPs and to control processes that generate unintentional POPs. The document also addresses other chemicals and waste management issues which pose risks to human health and the environment.

This NIP is in line with the 9th three-year National Development Plan. The plan encourages relevant government and private sectors to establish, and participate in an effective national chemicals management framework to minimize the impacts of POPS. It emphasizes policies, which encourage voluntary procedures of self-regulation and the adoption of proactive emission reduction initiatives.

In the three-year initial period, Kenya should experience a reawakening in management of chemicals and hazardous wastes.

I wish to thank all the institutions who were members of the National POPs Committee for guiding the process.

Prof. James L. Ole Kiyiapi
Permanent Secretary
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES

ACKNOWLEDGEMENTS

This NIP could not have been realized without the dedicated support of the Global Environment Facility. It got substantive guidance from Matthias Kern, Bahar Zorofi and Mr Victor Ogbuneke all from the Global Environment Facility Coordination Office in Nairobi

The development of this NIP was the work of dedicated members of the National POPs Coordinating Committee whose names are recognized in Annex 1.

In addition there are those scientists who have done commendable work on research on POPs. These scientists based in the University of Nairobi were led by Prof. Shem Wandiga whose scientific work on pesticides in general and DDT in particular has contributed substantially to this NIP. We would also like to recognize support and encouragement from the Ministry of Environment and Natural Resources policy makers. We would like to note special contributions of Mrs. Rachel Arunga (former Permanent Secretary, Ministry of Environment), Dr Engineer Andrew Kiptoon (former Permanent Representative Kenya Mission to UNEP), Prof Ratemo Michieka (former Director General NEMA), Prof George Krhoda (former Permanent Secretary, Ministry of Environment) who chaired a committee of eminent persons, Dr Paul Saoke, Director Physicians for Social Responsibility (PSR-Kenya) and Ms. Rachel Kamande of Ilima Kenya for her dedication to matters of open-burning of waste and landfills.

United Nations Office Nairobi, Kenya. Home of UNEP Global Environment Coordination Office.

We wish to thank them all

NIP Coordination Unit

Mr Francis Kihumba Coordinator

Mr Muitungu Mwai Deputy Coordinator

Ms Agnes Kamiri Secretary

ES. 1 EXECUTIVE SUMMARY

On 24th September 2004, Kenya became a Contracting Party to the Convention. The commitment to fully implement the Convention was reiterated when it sent a strong delegation to the First Conference of the Parties held in Punta del Este, Uruguay, 2-8 May 2005 and the second Conference of Parties held in Geneva Switzerland in May 2006

Kenya has developed this National Implementation Plan under the convention in compliance with Article 7 of the convention.

The Plan was endorsed by stakeholders on 20th March , 2007 at Utalii Hotel Nairobi. The endorsement report in Annex 1 to this plan.

The NIP consists of an executive summary, three chapters and Annexes.

Chapter 1 is the background of the POPs issue and forms the background and rationale for the NIP.

Chapter 2 is Kenya's background and its relevance to the POPs Stockholm convention.

Chapter 3 is the strategy of the implementation plan and action plans.

The annexes are the report of the endorsement, action plans , record of consultaion and places visited in the development of the POPs inventory.

The main components of the National Implementation Plan (NIP) provides for the development of a coordinated national strategy highlighting opportunities for sharing data and information, a national capacity for technological assessment, delivery mechanisms for technical assistance, and sustainable financing of chemical and waste management programmes in Kenya. The specific components of the NIP are:

- Development of a Strategy for national chemical management,
- Governance,
- Institutional strengthening,
- Sustainable financing and prudent financial management;
- Public participation, awareness and education,
- Reporting requirements, and
- The capacity assessment reports from an appendix 2 of this NIP.

ES. 2 Kenya's Policy an political Commitment to Implementation of the Convention

One of the key indicators of Kenya's commitment to the implementation of the Stockholm Convention is the full completion of the processes for the development of the National Implementation Plan (NIP). The NIP demonstrates how all stakeholders will implement the obligations of the Convention.

The development of the NIP has been based on consultations at the highest levels of the government. Thus, it has received high-level political commitment which allows for harnessing of domestic resources to meet national obligations to the Convention in a manner consistent with its resources, needs, and priorities.

POPs affect many communities, both rich and poor. Hence, implementation of the NIP constitutes a contribution to various national development endeavors, including policy development legislation, environmental and public health protection, and development of the

agricultural, industrial and private sectors. A cross-section of stakeholders, including the public and various interest groups, were consulted especially on waste disposal and the search for alternatives to POPs.

In order to make an effective and successful NIP, a wide range of stakeholders was involved and engaged in the process. The process included representatives from government, private sector, academia, NGOs, CSOs, women groups, industrial, commercial, agricultural, labor organizations, inter-governmental organizations and, development partners and their agencies. The government departments that participated in the process were those that were able to coordinate corrective actions proposed in the NIP. Details of the consultation are contained in Annex 1.

ES. 3 Objective of the Convention

The objective of the Stockholm Convention is to protect human health and the environment. The Convention bans nine (9) chemicals, namely aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and polychlorinated biphenyls (PCBs) but restricts use of DDT to disease vector control. Most of these banned POPs have been previously used, and some continue to be used in agriculture and pest control in Kenya. The Convention further requires contracting Parties to take measures to reduce the unintentional production of dioxins and furans.

POPs have been known to persist in the environment for many years and to bio-accumulate in the food chain. They are resistant to photolytic degradation and are semi-volatile. They are transported over long distances and tend to accumulate in Polar Regions. In humans and animals, POPs accumulate in tissues with high lipid content and are passed on to children both in the uterus and through breastfeeding. However, most of the POPs that enter the human system are acquired through the food chain. The higher the position an organism occupies in the food chain the greater the accumulation of POPs.

ES. 4 Political and Policy Commitment.

As has earlier been stated, there exists a high level of administrative and political commitment by the government of Kenya to address issues relating to chemicals and wastes in general and, POPs in particular as indicated in Sessional Paper No. 6 of 1996 on Environment and Development priorities on these topics. This commitment to sustainable management of hazardous chemicals and wastes currently suffers from weak enforcement of regulations due to lack of financing and the need to mobilise resources in order to enhance continued political and administrative commitments technical and financial resources are necessary.

ES. 5 Cross Cutting Priorities

The NIP addresses the ways and means of managing POPs through removal of regulatory, technical and financial constraints. Associated actions are summarized as activities towards the following objectives:

i) Capacity building activities to Ministry of Environment and Natural resources to drive the implementation process;

ii) Disposal of wastes containing POPs as contained in th Kwenya POPs inventory of July 2006;

iii) Mobilizing financial resources for project proposals to address capacity building, of laboratories, disposal of wastes, alternatives to DDT, open burning of waste etc;

iv) Health impacts surveillance for POPs;

v) Development of policy and legal instruments top regulate POPs;

vi) Search and introduction of alternatives of DDT;

vii) Disposal of PCBs at Pan African Paper Mills as well as other sites;

viii) Awareness creation among civil society and the informal sector. The activity is aimed at minimizing dioxins and furans emissions from open burning of waste and landfills to the environment;

ix) Capacity building in laboratories for analysis of POPs and also participating in the UNEP Global monitoring program for POPs;

x) Design and implementation of economic instruments to catalyze minimization of POPs missions;

xi) Introduction of Best Available Technologies (BAT) and Best Environmental Practices (BEP) for Annex C Part III sources and especially biomass burning in residential facilities and rural areas;

xii) Development and implementation of a POPS monitoring program in major lakes, rivers and Indian Ocean Coast for organochlorines, dioxins, furans and PCBs;

xiii) Labeling of transformers containing 50 ppm PCBs and above;

xiv) Partnering with specialized institutions to be able to monitor the import of chemicals and their presence in the environment.

Sector priorities are as below;

a) Intentionally Produced POPS

The following are actions for intentionally produced POPs like pesticides, DDT, PCBs and Hexachlorobenzene:

i. Ensure that in future Kenya does not produce any intentionally produced POPs pesticides;
ii. Search for alternatives to DDT especially from Pyrethrum flower;
iii. Controlling illegal entry of POPs by banning those not yet banned;
iv. Adopt legislation banning or restricting the use of PCBs;
v. Prepare institutions, such as Kenya Power and Lighting, KENGEN, etc., for labeling of the PCB equipment in use consistent with the provisions of the Convention;
vi. Comprehensive inventory of PCBs undertaken using better analytical technology to identify equipment containing PCBs in concentrations of 50ppm or greater and labeling such equipment accordingly;
vii. Giving special focus to abandoned d industrial sites that still contain disused power transformers and/or capacitors and in what is an environmentally sound manner;
viii. Monitoring those POPs currently in use and with POPs like characteristics.

b) DDT:

i) Promoting awareness on DDT

ii) Finalizing policy on DDT and streamlining political consultation;

iii) Developing alternatives to DDT.

iv) Defining linkages between DDT and other multilateral environmental agreements;

v) Mobilizing resources for alternatives to DDT

c) Stockpiles and Wastes Containing POPs

The following are the priorities for stockpiles and wastes: -

i. Dispose of about 15,000 tones of obsolete pesticides distributed across the nation in various different conditions of storage in an environmentally sound manner;

ii. Rehabilitate obsolete pesticides at sites detailed in the POPs Inventory and especially at Wajir, Kitengela, Dandora dumpsite and Nakuru;

iii. Evaluating efficacy of alternatives to POPs to ensure they are not reintroduced;

iv. Reduce risks associated with hazardous chemicals through the use of safe chemical practices;

v. Provide necessary advice and guidance to stakeholders involved in cleanup and disposal operations;

vi. Partnership with sector organizations especially the Agrochemical Association of Kenya and Pest Control Products Board;

vii. Participate in Global POPs Monitoring Program;

viii. Manage PCB waste stockpiles already identified.

d) Unintentional POPs

For unintentionally produced dioxins, furans, hexachlorobebze, and PCBs

. Kenya produces 4,000TEQ g/year mainly from open burning of waste. However all Category C sources were found to be relevant.

i. Developing regulations on dioxins and furans

ii. Minimizing emissions from open burning process

iii. Introduce Best Available Technologies and Best Environmental Practices

iv. Assess unintentional production of PCBs and hexachlorobenzene which could not be made because the guidelines are not available ;

v. Give priority to the source categories in Annex C of the convention having high dioxin emissions as identified in the dioxin and furan inventory;

vi. Train personnel involved in the handling and disposal of medical wastes;

vii. Upgrade incinerators to meet emission levels consistent with the BAT/BEP guidelines and other regulations;

viii. Support to public awareness programmes on proper waste handling, especially biomass and municipal wastes, and the need to discontinue open burning practices of waste;

ix. Implement fossil fuel regulations No. 121 of 2006. of EMCA on fuel additives;

x. Ensure the phase-out of lead in gasoline is on course;

xi. Regulate governing environmental monitoring of contaminants, discharges and emissions from pulp and paper industries should be developed and enforced.

ES.6 Targets for Implementation and Responsible Institutions

The NIP will be supported by policy guidelines and regulatory requirement for all enterprises and entities that are subject to compulsory environmental audits and environmental impact assessments. The implementation process will provide practical measures to facilitate an integrated national approach to the management of chemicals and wastes in all sectors of national development by supporting those institutions involved in the production, use, export and import of POPs as well as those involved in waste treatment, waste disposal and environmental monitoring.

These may include: -

i. Disposal of POPs waste and cleanup of contaminated sites by mid 2008

ii. Mobilizing the owners of enterprises with assistance from Environment Trust Fund, ASP , GEF and other financing mechanisms by December 2007;

iii. Developing comprehensive policy and other lead agencies for waste management in all sectors by mid 2008;

iv. Supporting the civil society, women groups, the informal sector and municipalities to develop project concepts so that they can access financial and technical assistance through technical assistance programmes by the end of 2007;

v. Training programmes on the safe use of chemicals that are currently conducted by the private sector and business organizations;

vi. Develop working systems for supporting bans (with scientific information) and restrictions on chemicals found unfavorable for trade by NEMA, the Pest Control Board and the Ministry of Health within 2 years in line with requirements of Kenya's trading partners;

vii. Catalyze the search for at least three alternatives to DDT (within three years) and market the alternatives already produced by the Pyrethrum Board of Kenya, International Centre for Incept Physiology and Ecology (ICIPE)and local authorities within the next 5 years; and

viii. Ensure that all POPs generators and users have a programme for phasing their use within five years. Emphasis will be placed on the use of PCBs by KenGen and Kenya Power and Lighting and, other holders of PCB materials.

ES7. Overall NIP Responsibility and Measures for Implementation.

Implementation will be coordinated by the Ministry of Environment and Natural Resources. A coordination unit will be created within NEMA for this purpose. The following benchmarks will be used as indicators of implementation:

i) In the first year, achieve better management of identified stockpiles through cleanup of contaminated sites emphasizing waste management.

ii) In the second year, finalise guidelines for calculating the costs of action and inaction and developing procedures for preparing environmental audits and environmental impact assessments;

iii) In the third year, enhance the process of accessing increased support from global funding mechanisms and technical assistance programs for the improved management of chemicals.

ES8. Resource Requirements

The implementation of the NIP is estimated to cost US$.35 million (equivalent to Ksh. 270 million). This calls for mobilizing domestic resources and increased financial support for national activities; hence, the need to mobilize new and additional funding from development partners, private sector, NGOs and informal sector. Initially, the NIP will mobilize funds from sources available to Kenya including government and private sectors, international technical assistance and the financial mechanism under the Convention's financing mechanisms (the GEF) as agreed in the 1st Conference of the Parties. It is imperative for the Ministry of Finance to factor financing the implementation of the NIP in to the national budget for the next four years.

ES. 9. Costs of Implementing the NIP

(i) **One-time Costs**

The one-time costs of eliminating stocks of obsolete pesticides and wastes contaminated with PCBs, which includes the disposal of wastes containing plastics that would otherwise be burnt in the open, are estimated at US$ 10 million. (KShs. 720).

(ii) **Medium-term Costs**

These include the costs associated with:

- Building institutional capacity to implement the Stockholm Convention,
- Designing programmes and projects for finding alternatives to DDT for all sectors.
- Introducing Best Available Techniques (BATs) and Best Environmental Practices (BEPs) in source categories II of Annex C of the Stockholm Convention are estimated to Cost US$ 20 Million.

(iii) **Long-term Costs**

These will involve:

- Improving chemical and waste management in general,
- Designing environmental economic tools and incorporating in projects assessments of incremental costs,
- Introducing Best Environmental Practices, especially those that avoid the accumulation of wastes and stockpiles, and introducing new technologies that minimize emissions, and
- Adoption of the Strategic Approach to International Chemicals Management (SAICM).

Program and Cost Component Summary .

Year	Total US$	2007 US$	2008 US$	2009 US$
Institutional Support	1,700,000	1,400,000	200,000	100,000
Intentionally Produced Pesticides	1,240,000	1,000,000	200,000	40,000
DDT	4.840,000	2,200,000	2,500,000	100,000
Polychlorinated PCBs	3,000,000	2,000,000	800,000	200,000
UPOPS	32.030,000	15,000,000	15,000,000	230,000
Total	**42,810,000**	**21,600,000**	**18,700,000**	**670,000**

ES. 10 Detailed Supporting Documents:

This NIP is supported by detailed documents contained in the attached CD-Rom

1) POPs Inventory July 2006
2) Policy and Legal Analysis
3) Research and Social Analysis
4) Information and awareness analysis
5) Financial and economic Assessment

LIST OF ACRONYMS

AAK	–	Agro-Chemical Association of Kenya
ACFC	–	Agro-chemical and Food Company
ACP	–	African Caribbean Plan
AFD	–	African Fund for Development
AIDS	–	Acquired Immunie Deficiency Syndrome
APCS	–	Air Pollution Control Systems
ASAL	–	Arid-Semi Arid Lands
ASP	–	African Stockpiles Program
BAT	-	Best Available Technology
BCRC	–	Basel Convention Regional Center
BEP	–	Best Environmental Practices
BOD	–	Biochemical Oxygen Demand
CBOs	–	Community Based Organizations
CCMS	–	Committee on Challenges of Modern Society
CFC	–	Chlorofluorocarbon
COD	–	Chemical Oxygen Demand
COMESA	–	Common Market for Eastern and Southern Africa
COP	–	Conference of Parties
DDD	–	Dichlorodiphenyldichlroethane
DDE	–	Dichlorodiphenylether
DDT	–	Dichlorodiphenyltrichloroethane
DEC	–	District Environmental Coordinators
DIT	–	Directorate of Industrial Training
DLCO	–	Desert Locust Control Organization
DOHSS	–	Directorate of Occupational Health and Safety Services
EAC	–	East African Community
EGB	–	Expert Group on BAT and BEP
EIA	–	Environmental Impact Assessment
EMCA	–	Environmental Management Coordination Act
EPZ	–	Export Processing Zone
ERS	–	Economic Recovery Strategy
ESM	–	Environmentally Sound Management
EST	–	Environmentally Sound Technologies
EU	–	European Union
FAO	–	Food and Agricultural Organization
FDI	–	Foreign Direct Investment
FK	–	Federation of Kenya Employers
FPEAK	–	Fresh Produce Exporters Association of Kenya
FRMS	–	Financial Resource Mobilization Strategy
GATT	–	General Agreement on Trade and Tariffs
GC	–	Government Chemist
GCMS	–	Gas Chromatograph – mass spectrophotometer
GDP	–	Gross Domestic Product
GEF	–	Global Environmental Facility
GMT	–	Greenwich Mean Time
GTZ	–	German Technical Cooperation
HCB	–	Hexachlorobenzene
HCFC	–	Hydrofluorocarbon
HDI	–	Human Development Index
HIV	–	Human Immunodeficiency Virus
ICIPE	–	International Center for Insect Physiology and Ecology
IGAD	–	Inter-governmental Authority on Desertification
ILO	–	International Labour Organization
IPC	–	Investment Promotion Centre
IPCS	–	International Program on Chemical Safety
IPEN	–	International POPs Elimination Network
IPM	–	Integrated Pest Management
ISO	–	International Standards Organization

ITDG	–	Intermediate Technology and Development Group
ITN	–	Insecticide Treated Nets
IUCN	–	International Union of Conservation of Nature
IVM	–	Integrated Vector Management
JICA	–	Japan International Cooperation Agency
JKUAT	–	Jomo Kenyatta University of Agriculture and Technology
KAM	–	Kenya Association of Manufacturers
KAP	–	Knowledge Attitude and Practices
KARI	–	Kenya Agricultural Research Institute
KBC	–	Kenya Broadcasting Corporation
KEBS	–	Kenya Bureau of Standards
KEMFRI	–	Kenya Marine and Fisheries Research Institute
KEMRI	–	Kenya Medical Research Institute
KEPHIS	–	Kenya Plant Health Inspectorate Services
KETRI	–	Kenya Trypanosomiasis Research Institute
KFA	–	Kenya Farmers Association
Kg	-	Kilograms
KIRDI	–	Kenya Industrial Research and Development Institute
KIWM	–	Kenya Institute of Waste Management
KMUNEP	–	Kenya Mission to UNEP
KNAP	–	Kenya National Action Plan
KNCPC	–	Kenya National Cleaner Production Center
KPLC	–	Kenya Power and Lighting Company
KPRL	–	Kenya Petroleum Refineries
KRA	–	Kenya Revenue Authority
Ksh.	-	Kenya Shilling
KWS	–	Kenya Wildlife Services
LDCs	–	Least Developed Countries
LNROA	–	Lake Naivasha Riparian Owners Association
MCD	–	Malaria Control Division
MDGs	–	Millennium Development Goals
MEAs	–	Multilateral Environmental Agreements
MENR	–	Ministry of Environment and Natural Resources
MOA	–	Ministry of Agriculture
MoH	–	Ministry of Health
MRM	–	Mabati Rolling Mills
MT&I	–	Ministry of Trade and Industry
MTEF	–	Mid-term expenditure Program
NACOPHER	–	National Committee of Occupational Public Health and Epidemiology Research
NATO	–	North Atlantic Treaty Organization
NCC	–	Nairobi City Council
NCC	–	National Coordinating Committee
NCST	–	National Council of Science and Technology
NDP	–	National Development Plan
NEMA	–	National Environmental Management Authority
NGOs	–	Non-governmental Organizations
NIB	–	National Irrigation Board
NIP	–	National Implementation Plan
NNSC	–	National NIP Steering Committee
NOPHERP	–	National Occupational Public Health and Epidemiology Research Program
NPER	–	NIP Performance Evaluation Reports
NPHD	–	National Public Health Department
ODA	–	Overseas Development Assistance
OECD	–	Organization of Economic Cooperation and Development
PBK	–	Pyrethrum Board of Kenya
PCBs	–	Polychlorinated-diphenyls
PCDD	–	Polychlorinated-dibenzo-p-dioxin
PCDDF	–	Polychlorinated-dibenzo-furan
PCPB	–	Pest Control Products Board
PIC	–	Prior Informed Consent

POPs	–	Persistent Organic Pollutants
PPM	–	Parts per million
PRSP	–	Poverty Reduction Strategy Paper
PSR	–	Physicians for Social Responsibility Kenya
PVC	–	Polyvinylchloride
SAICM	–	Strategic Approach to International Chemicals Management
SC	–	Stockholm Convention
SERC	–	Standards and Enforcement Review Committee
TAC	–	Technical Advisory Committee
TDS	–	Total Dissolved Solids
TEF	–	Toxic Equivalent Factor
TEQ	–	Toxicity equivalent
TV	-	Television
UK	–	United Kingdom
UN	–	United Nations
UNDP	–	United Nations Development Program
UNEP	–	United Environmental Program
UNIDO	–	United Nations Industrial Development Organization
UNITAR	–	United Nations Institute for Training and Research
UON	–	University of Nairobi
UPOPs	–	Unintentionally produced POPs
WCO	–	World Customs Organization
WHO	–	World Health Organization
WSSD	–	World Summit on Sustainable Development
WTO	–	World Trade Organization
WWF	–	World Wildlife Fund for Nature

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CHAPTER 1: PURPOSE OF NATIONAL IMPLEMENTAION PLAN

1.0. Introduction

Kenya is a Contracting Party to the Stockholm Convention on Persistent Organic Pollutants (POPs), which it ratified on 24th September, 2004. Article seven[1] of the Convention states that, each Party shall develop, and Endeavour to implement, a plan for the implementation of its obligations under the Convention. Contracting Parties are required to transmit their National Implementation Plan (NIP) to the Convention Secretariat within two years from the date on which the Convention entered into force. In our case, the NIP should have been submitted to the Convention Secretariat by 25th December, 2006. Kenya will conduct periodic reviews and updates of the NIP in accordance with schedules to be determined by the Conference of Parties. However, the consultative process was not completed in time.

The development of this National Implementation Plan arises from a recognition by the Kenya Government that the Convention is relevant to Kenya and that its implementation is beneficial to the national development plan for 2003 -2008 and the achievement of Kenya's Millennium Development Goals insofar as they relate to POPs[2].

To develop the NIP, a POPs Coordinating Office was established in April, 2002 in the Ministry of Environment and Natural Resources. The process has identified priority POPs through stakeholder consultations and formulated an environmental Action Plan for POPs and assessed infrastructure as contained in Annex 3 to this plan. Since the signing and ratification of the Convention, there have been wide national consultations[3] with key stakeholders and the public concerning regulatory aspects, monitoring, research, manufacturing, capacity building, disposal, and awareness creation in relation to POPs.

This NIP is consistent with the Convention guidelines[4] that specify that, where appropriate Parties shall cooperate, directly or indirectly, with global, regional and sub-regional organizations and consult national stakeholders, including women's groups and groups involved in the health of children, to facilitate the development, implementation and updating of national implementation plans. The guidelines further require that the Parties Endeavour to utilize and, where appropriate, integrate their national implementation plans for persistent organic pollutants into their sustainable development strategies. The development of this NIP therefore follows these basic obligations as well as the guidelines issued and adopted by the Contracting Parties at the First Conference of Parties held in May 2005 in Punta Del Este, Uruguay.[5]

1.1. Outline and Purpose

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global agreement that came into effect on May 17, 2004 with the objective of protecting human health and the environment from Persistent Organic Pollutants (POPs). Under Article 7 of the Convention, Kenya, as a Contracting Party, is obligated to develop and implement a National Implementation Plan (NIP).[6]

The purpose of the NIP is to inform the Conference of the Parties and the public regarding

[1,3,5], The Stockholm Convention on Persistent Organic Pollutants: htt//www.pops.int
[2] Ministry of Planning,2005 : Kenya Report on the Millennium Development Goals
[3] Appendix 1: Record of Consultation
[4] Report of the Ist Conference of Parties to the Stockholm Convention/www.pops.int/meetings

national initiatives and projects designed to meet the requirements of the Stockholm Convention. These initiatives include the preparation of legislation, regulations, voluntary programmes, standards, policies, plans, programmes and other actions by the Kenya government to manage and eliminate POPs from the environment. Articles 3 and 5 of the Convention stipulate that the NIP shall include a National Action Plan (NAP) for reducing intentionally and unintentionally produced POPs, such as polychlorinated dioxins and furans, hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs).

1.2 . Structure of the NIP

This NIP comprises three (3) chapters[7] as follows:

(i) Chapter one contains background information about the Stockholm Convention on POPs, its aims, obligations and opportunities.

It details the processes for the development of the NIP, especially the consultative process, and summarizes POPs issues and provides background to some of the POPs chemicals and why they need to be managed in an environmentally sound manner.

(ii) Chapter two covers the basic national background information relevant to the NIP. It describes the current situation and state of knowledge regarding POPs as well as the status of institutional and other capacities to address the associated problems.

(iii) Chapter 3 contains a formal policy statement and the implementation strategy for the NIP and sets outs specific action plans and strategies to meet Kenya's obligations under the Convention.

(iv) The appendices contain detailed assessment of legal and policy issues, economic, research and information with detailed action plans.

1.3. Summary of the Stockholm Convention

The Stockholm Convention is one of a number of global multi-lateral environmental agreements aimed at implementing the Rio Declaration on Environment and Development. The objective of the Stockholm Convention therefore derives from principle 15 of the Declaration[8]. POPs possess properties of toxicity, resistance to degradation, have a propensity to bioaccumulate in human and animal tissue. Accordingly, these substances are transported through air and water across international boundaries. They are therefore deposited far from their places of origin. Eventually they are distributed widely in terrestrial and aquatic ecosystems posing threats to environmental and public health.

1.3.1. Principal Objectives

The key specific objectives of the Convention are to:

- **Eliminate** the production and use of aldrin, endrin and toxaphene.
- **Control** the use of chlordane, dieldrin, heptachlor, Mirex and HCB
- **Eliminate** the production of DDT for all purposes except public health protection, (e.g., malaria vector control) and the development of alternatives to DDT in the health protection sector.
- **Eliminate** PCB production for all new uses but permit their use in existing equipment subject to phasing out such equipment as soon as possible.

[7] Guidelines for Development of NIP Report of COP1 os the Stockholm Convention
[8] The Rio Declaration on Environment and Development http//. Www.unep.org/meetings

- **Minimize** the release of polychlorinated biphenyls, dioxins and furans from unintentional sources.
- **Develop criteria** for the identification of additional candidate POPs.

1.3.2. General Obligations

The Convention comprises of general obligations, control provisions, a procedure for adding new POPs and financial and technical assistance mechanisms.

1.3.3. Specific Obligations

Under this Convention, Parties are required to:

i) Develop, implement and update a National Implementation Plan;

ii) Designate a National Focal Point;

iii) Promote and facilitate a wide range of public information, awareness and education measures;

iv) Encourage/undertake research and development, monitoring and cooperation on all aspects of POPs and their alternatives; and

v) Report to the Conference of Parties (COP) on;
   - Measures taken to implement the Convention;
   - The effectiveness of measures taken;
   - Data/estimates for total quantities of Annex A and B POPs that are traded and a list of states involved, and;
   - The status of unintentionally produced POPs.

This NIP was also tailored to the electronic reporting format

1.3.4. Control Provisions

Article 3 requires parties to take measures to reduce or eliminate the release of intentionally produced POPs. The article provides for:

(a) **Elimination of Intentionally Produced POPs and restriction of the use and production of DDT.**

Annex A of the Convention applies to nine (9) chemicals. These are the pesticides: aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene (HCB), Mirex and toxaphene. It also applies to PCBs. Annex B refers to DDT while Annex C of the Convention covers POPs that are unintentionally released to the environment. These comprise of the industrial chemicals specifically polychlorinated biphenyls (PCBs), hexachlorobenzene and the unintentionally-produced dioxins and furans.

With regard to PCBs, all Parties must:

(i) Cease production of new PCBs immediately (on entry into force); [9]

(ii) Eliminate the use of in-place PCB-containing equipment by 2025;

(iii) Make best efforts to identify, label and remove from use equipment containing more than 50 ppm PCBs.

(b) Restriction **of production and use of DDT**

According to Article 3 i (b) of the Convention, the use of DDT is restricted to disease vector control programmes. Its use is allowed only in circumstances where such use is locally safe and effective and affordable alternatives to DDT are unavailable.

Article 11 encourages Parties to undertake appropriate research and development, monitoring and cooperation pertaining to POPs and, where possible, to use relevant alternatives, placing emphasis on measures to prevent or minimize human exposures and releases to the environment.

(c) Exemptions

Exemptions are allowed for laboratory-scale research, reference standards, and unintentional trace contaminants in products and articles, constituents of articles manufactured or already in use. Hexachlorobenzene (HCB), is permitted when confined to production/ use in a closed-system.

(d) Trade **Issues**

Many of the POPs to be controlled have trade implications. The Convention provides that trade be restricted for all POPs in Annexes A and B. Imports and exports are limited to shipments intended for environmentally sound disposal or to Parties with "*specific exemptions*" under Annex A or B, or "*acceptable purposes*" under Annex B.

1.3.5. Management of POPs in Stockpiles and Wastes

Stockpiles and wastes plus products and articles upon becoming wastes that consist of, contain or are contaminated by POPs shall be managed in an environmentally sound manner. This will include actions such as:

(i) Development and implementation of strategies to identify stockpiles, products and articles in use, and wastes containing POPs;

(ii) Managing stockpiles in a safe, efficient and environmentally sound manner (ESM) until they are deemed to be wastes with low POPs content;

(iii) Taking measures to handle, collect, transport and store wastes in an ESM

(iv) Disposing of wastes in ways that destroy their POPs content, taking into account international rules, standards and guidelines;

(v) Proscribing recovery, recycling, reclamation, direct reuse, or alternative uses of POPs;

(vi) Proscribing transportation of these materials across international boundaries without taking into account international rules (*e.g.,* the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989); and

(vii) Developing strategies for identifying contaminated sites and, if remediation is to be attempted, it is to be done in an environmentally sound manner.

1.3.6. Unintentionally-Produced POPs (UPOPs)

Parties must in accordance with Article 5 of the Convention, promote the use of Best Available Techniques (BAT) in the following industrial sectors that have the potential for comparatively high formation and release of POPs, mainly polychlorinated dioxins and furans, to the environment:

- Waste incinerators (municipal, hazardous or medical waste; sewage sludge);
- Cement kilns firing hazardous wastes;
- Pulp production involving elemental chlorine; and
- Thermal processes used in the metallurgical industry (secondary production of aluminum, copper or zinc; sinter plants in the iron and steel industry)

Parties to the Convention shall phase in any BAT requirements for such new sources as soon as is practicable but not *later than 4 years* after entry into force for that Party and promote the use of Best Environmental Practices (BEP) for such new sources.

This article further states that Parties must promote use of BAT and BEP for:

(i) *New* sources within the 13 categories (Annex C Part III) of the Convention

(ii) *Existing* sources within all categories (Parts II and III);

(iii) Open burning of wastes (including landfill sites);

(iv) Thermal processes in the metallurgical industry not specified in Part II;

(v) Residential combustion sources;

(vi) Fossil-fuel fired utility and industrial boilers;

(vii) Firing installations for wood and other biomass fuels;

(viii) Chemical production processes releasing unintentionally produced POPs (e.g., pentachlorophenol, chloranil)

(ix) Motor vehicles, particularly those using leaded gasoline;

(x) Textile and leather dying and finishing;

(xi) Shredder plants for the treatment of end-of-life vehicles;

(xii) Smouldering of copper cables;

(xiii) Waste oil refineries;

(xiv) Destruction of animal carcasses; and

(xv) Crematoria.

(xvi) 

Plate 1.1. Example of Pesticides, Herbicides and Chemicals disposed carelessly. Source: BCRC-Pretoria[8]

1.3.7. Identifying New POPs

To ensure that the Convention responds to future chemical management issues effectively, provision has been made for the addition of new POPs through the application of scientific criteria and an agreed process for the evaluation of candidate POPs nominated by Parties in the future. The process and criteria incorporate precaution to ensure that all proposed candidate POPs are thoroughly considered and evaluated on the basis of available scientific data to determine if they can be appropriately characterized as POPs.

The Convention provides safeguards to ensure that all Parties have the opportunity to get a full hearing in the evaluation of any nominated candidate POPs.

1.3.8. Financial and Technical Assistance

The process of developing the NIP was supported financially by the Global Environment Facility (GEF), and the United Nations Environment Programme GEF Coordination Unit (UNEP/GEF) to the tune of $ 425,000 for POPs the Enabling Activities.

1.4. National Obligations

- Kenya may submit proposals to the Convention Secretariat for the addition of new POPs for inclusion in Annexes A, B and C for consideration by the review committee (Article 8).
- Kenya must develop, implement, and update an implementation plan for the implementation of its obligations under the Convention (Article 7). This implementation plan is to be transmitted to the Convention Secretariat within two years from the date the Convention enters into force for Kenya. Kenya's National Implementation Plan must therefore be submitted by December 25th 2006.
- The Government of Kenya should encourage/undertake research, development, monitoring and cooperation on all aspects of POPs and their alternatives (Article 11).
- Within its capabilities, the Government of Kenya should promote public awareness campaigns and education on POPs (Article 10).
- The Government should facilitate the exchange of information on POPs (Article 9).
- The Convention encourages all Parties to render timely and appropriate assistance in response to requests from other Parties but give priority to requests from developing countries (Article 12).
- Kenya is required to provide, within its capabilities, financial support and incentives in respect of national activities intended to achieve the objectives of the Convention (Article 13).
- Kenya is required to report to the Convention Secretariat on the measures taken to implement the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. Such reporting shall be at periodic intervals and in a format decided by the first COP.
- The Government of Kenya is required to comply with the provisions of the Convention and follow the established dispute settlement procedures concerning interpretation or application of the Convention (Articles 17 & 18).

1.5. Mechanism used to develop the Kenya NIP.

The main mechanism has been through the use of guidelines provided by UNEP combined with UNEP consultation and participation in national activities that have a bearing to Stockholm Convention.[10]

The following is a summary of various actions which have been taken by Kenya in the process of developing the NIP. They include the involvement of policymakers, regulatory bodies, researchers, manufacturers and other stakeholders. The process included consultative meetings, workshops, seminars, surveys and awareness creation activities.

- Kenya had strong delegations at Intergovernmental Negotiating Committees 6 and 7.
- Kenya also had a strong delegation at the First and Second Conference of Parties (COP1).
- The three past ministers of the Ministry of Environment and Natural Resources have been made fully conversant with, and have been supportive of, the Convention and have taken an active part in the NIP preparation process;
- Formation of an interministerial / inter-sectoral National Coordinating Committee for POPs
- 5 day stakeholders forums in Baringo in July 2002;
- 3-day training on the development of the national chemical profile;
- 3-day training on priority-setting in Naivasha in July 2004;
- 1 Day roundtable on DDT attended by 50 senior researchers, policy makers and politicians;
- Over 15 meetings held by the National Coordinating Committee for the various categories of POPs (pesticides, DDT, PCBs and UPOPs);
- Field visits;
- Preparing the chemical and waste agenda at the National Environment Management Authority for the development of chemicals and waste regulations;
- The development of a national plastics waste management strategy;
- 200 questionnaires sent to enterprises;
- Awareness POPs T- shirts printed and distributed;
- Participation in TV programmes;
- Newspaper advertisements.

Detailed consultations are in Appendix 1

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appendix.1 Record of Consultations

([8] *Source: Basel Convention Regional Centre for Training and Technology Transfer for English Speaking African Countries: Regional Training Workshop, 2004)*

1.6. Stakeholder Consultation Process

The consultation involved workshops, seminars and meetings of the National POPs Coordinating Committee and the creation of specific task groups. Fields visits were made and capacity assessment made.

1.6.1 Major Events in Developing the NIP

On 24th September 2004 Kenya ratified the Stockholm Convention on Persistent Organic Pollutants and became a GEF-eligible country under Article 9(a) of the GEF Instrument. It has also ratified a number of related international environmental agreements. These include the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International trade that was ratified on 14th February 2005, and the Basel Convention of Transboundary Movements of Hazardous Wastes and their Disposal - ratified on March 26, 1999. These conventions have crosscutting relationships and are primarily aimed at protecting human health and the environment from the adverse effects of hazardous chemicals and wastes, including POPs.

The Kenyan Government has demonstrated that it has an active interest in working with stakeholders to build their capacities to manage chemicals safely[11]. The approach adopted is to provide awareness, a legal and policy framework and training on key chemical issues, in support of national legislation. This is often followed up with institutional or enterprise-based activities to help stakeholders integrate chemical risk management measures into their health and environmental protection programmes. During 2002-2005[12,13] period, MENR organized many national meetings and capacity-building workshops, which brought together Government departments, agricultural organizations, industry and other non-governmental organizations, to address chemical management issues. A recurrent recommendation in all those forums was the urgent need to enhance capacity at national and regional levels in line with the national Environmental Management and Coordination Act (EMCA)[14] and other legislations related to chemicals and wastes.

The process of developing the NIP befitted from the following landmarks:

- July 2002 — Stakeholders Workshop (55 participants) opened by the Minister for the Environment[15]
- April 2003: — High Level Roundtable discussion on DDT with the involvement of Members of Parliament/Academic Organizations and NGO's with 40 people involved on health debate on DDT [16];
- October 2003 : — 5 Day consultation on research on POPs in Kenya[17]
- December 2004 : — Commencement of inventory of POPs
- April 2004 : — Infrastructure assessment and forum to discuss country position on ratification of the Stockholm Convention
- June 2004 — Cabinet approves ratification of the Convention
- May 2004 — First draft of the inventory report

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[11] *Sessional Paper on Environment and Development: Ministry of Environment and Natural Resources*
[12] *Workshop Report of the Consultation of Institutions involved in Chemicals Management*
[13] *GOK/MENR Report of the Kenya Delegation to the Second Preparatory Committee Meeting for the Strategic Approach to International Chemicals Management Nov 2004*
[14] www.nema.go.ke
[15] Report of The Stakeholders Conference on POPs: Kenya POPs Office
[16] *MENR/POPS Project: Report of the First Stakeholders workshop on POPs(2003)*
[17] *MENR/POPS Project Report of the High Level Stakeholders Roundtable on DDT*

- July 2004 First priority-setting workshop[18]
- 24th September 2004 Ratification of the Convention
- 24th December 2004 Convention comes into force for Kenya
- March 2005 - Drafting of the NIP

Training

- April 2003 - Obsolete Pesticides (25 people trained)
- Nov. 2002 - National Chemicals profile with UNITAR; Review of Dioxin Toolkit (23 people trained)

POPs Workshops

- June 2003 Expert meeting on multilateral environmental agreements on chemicals and waste.

A key area is participation in the development of the Strategic Approach to International Chemicals Management (SAICM). It will form a broad analysis of chemical management.

1.6.2. Major Outputs of the NIP Process.

a) Policy Related

i) Draft waste Regulations gazetted by NEMA[19]

ii) Inclusion of POPs issue part of the NEMA Strategic Plan[20]

iii) Draft National Chemicals Profile[21]

iv) National POPs Inventory[22]

v) Coordination of the investigation of alleged Hazardous Waste dumping in North Eastern Kenya

vi) Cooperation with ICIPE as the Regional Centre for Technical Delivery on DDT alternatives presented to the First Conference of Parties, May 2005[23].

vii) 10-Point Action Plan on Waste Plastics now a regional project[24].

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18 *MENR?POPS Project: Report of Workshop on Research under the Stockholm Comvention, Kakamega October 2003*

19 *www .nema.go.ke*

20 *www .nema.go.ke*

21 *NEMA/POPS Project Draft Reports*

22 *NEMA/POPS Project Draft Reports*

23 *www.pops.int/cop2/inf*

24 *www.nema.go.ke*

Plate 1.2 : Involvement of Key policy makers in environment. Prof Michieka Director General NEMA, Prof Khamalla, Chairman, NEMA Board, Prof Wangari Mathai,Assistant Minister and Nobel Laurette, Mrs Rachel Arunga, Permanent Secretary, MENR and her Deputy Environment Dr Timothy Mmella**.**

b) Participation in Related Processes

i.) A key member of the National Committee on Epidemiology Research in Cooperation with KEMRI.

ii.) A key member of the Kenya National Cleaner Production Centre[25]

iii.) Participation in the Expert Group on BAT/BEP[26]

iv.) Participation in the Implementation of the Basel Convention and the Rotterdam Convention. The POPs Project is the Focal Point.

v.) Coordination of the national process of the Strategic Approach to international Chemicals Management (National Position Paper). The POPs Project is the Focal Point.

c) Project Concepts Developed

i.) Development of the project concept on capacity building for chemicals management

ii.) Development of project concepts on DDT alternatives. A report was produced that led to the development of the government position on DDT.

iii.) Development of the project concept on the minimization of UPOPs emissions for Pan African Paper Mills.

iv.) Development of a project concept on the delivery of cleaner production to Annex C Source Categories.

v.) Development of a project concept on open burning.

Various sectors and institutions were involved in each of these activities.

1.7. Context and background on POPs chemicals, their uses and associated problems

1.7.1. What are POPs?

Persistent Organic Pollutants (POPs) are organic compounds of natural or anthropogenic origins with a particular combination of physical and chemical properties such that, once released into the environment, they remain intact for exceptionally long periods of time. They are known to resist photolytic, chemical and biological degradation [25]. POPs include

[25] 2004 Annual Report of the Kenya National Cleaner Production Centre

[26] *research and Socio Issues:/ Assessment of Infrastructure/ Inventory/appendix 3*

industrial chemicals such as PCBs, pesticides, DDT and by-products such as polychlorinated dioxins and furans. Characterized by low water solubility and high lipid solubility, POPs bioaccumulate in the fatty tissues of living organisms, including humans, and are found at higher concentrations at higher levels in the food chain. Thus, humans, and wildlife are exposed to POPs for extended periods of time and spanning generations, resulting in chronic toxic effects. POPS are introduced to humans through the food chain. They can be passed from mother to child and are known to have significant negative teratogenic, immunological, neurological and reproductive health effects[27].

1.7.2 Why are POPs a global issue?

POPs are semi-volatile chemicals that evaporate from the regions in which they are used and are then transported over long distances in the atmosphere and aquatic ecosystems. They are also discharged directly, or through atmospheric deposition, into waterways and are transported by movement of fresh and marine waters. This results in widespread distribution of POPs across the globe, including regions where they have never been used. POPs occur at low levels in air and water but human and animal health concerns arise from their ability to bio-accumulate in organisms rather than from direct exposures.

POPs have a tendency to accumulate in fatty tissue of organisms and be transferred along terrestrial and aquatic food chains. People in the northern hemisphere who rely on marine mammals with a high fat content for food (*e.g.,* ringed seal and beluga whales) are especially susceptible to high exposures to these pollutants. In Canada, the highest concentrations of POPs in aquatic life are found in the Great Lakes, the St. Lawrence basin and the Arctic.

POPs are a global issue because of their widespread distribution having the potential for adverse effect to human health and the environment. They can cause birth defects, various cancers, immune system dysfunction and reproductive problems in animals. There exists strong weight of evidence that high levels of exposure over the long periods of time can contribute to increasing rates of birth defects, fertility problems, increased susceptibility to disease, diminished intelligence and some types of cancers in humans. Of major concern for human health is the effect of exposures to POPs on the developing foetus. POPs can have the ability to pass through the placental filter and accumulate in the amniotic fluid in the uterus where gestation occurs. Furthermore, POPs have been detected in the breast milk of women throughout the world. Emerging evidence indicates that many POPs may act as endocrine disruptors. In recent decades, the risks posed by POPs have become of increasing importance in many countries. As a result, measures are being taken at national, regional and international levels to protect human health and the environment.

1.7.3. Why are POPs a Kenyan issue?

Limited studies have been carried out to quantify POPs presence in the Kenyan environment. However, research by three notable scientists has shown that POPs and their effects are present and affect human health and the environment.

Kenya has a wide range of institutions with specialized knowledge and factual information on POPs (Annex3). Preliminary studies indicated that most of these stakeholders are poorly coordinated and their capacities are limited in terms of handling POPs. During the implementation of the NIP, Kenya will carry out more detailed studies for identifying those

[27] *Research and Socio Economic Issues: Assessment of Infrastructure/ Inventory/appendix 3*

groups and individuals who hold key information (*e.g.,* actual users of POPs pesticides and industry representatives who can provide realistic information relevant to assessing likely sources of unintentionally produced POPs) in order to understand the extent of needs (real or perceived) and the way in which POPs are used and managed.

POPs pesticides have been used in agriculture for crop protection and for the control of vectors of human and animal diseases. The presence of residues of POPs pesticides and their residual effects on humans and environmentt cannot be ruled out, especially in areas where POPs were extensively used. The problem of POPs is compounded by the fact that most people are unaware of their adverse effects on animal health. The activities that lead to the production of UPOPs are continuing and expose the public and the environment to risks.

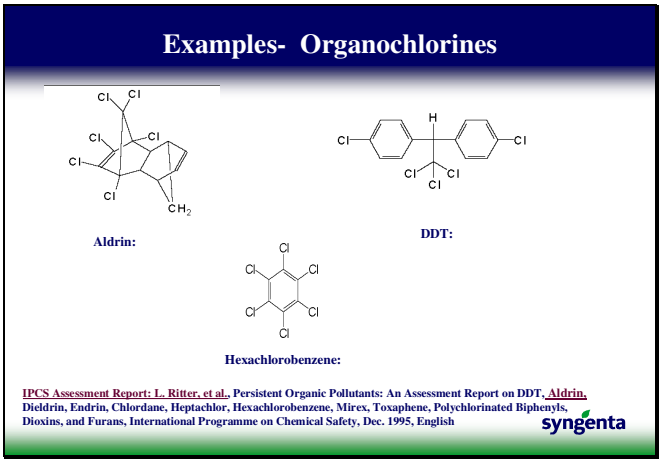
1.7.4. Overview of the 12 POPs

By ratifying the Stockholm Convention, Parties agree to the management and control of the 12 POPs (sometimes known as the "*dirty dozen*") and to a formal process to consider additional substances for inclusion under the Convention. The 12 POPs that were included when the Convention came into force in 2004 fall into three broad categories: pesticides, industrial chemicals and unintentionally produced POPs. The following description of the three broad categories is based upon a UNEP document "*Ridding the World of POPs: A Guide to the Stockholm Convention on Persistent Organic Pollutants"* (2002)[28] and provides the list of the substances and a summary of the key uses of each chemical.

1.7.4.1. POPS Pesticides

These POPs are principally chlorinated hydrocarbons composed mainly of planar organic compounds, with or without a benzene structure. They are cyclic compounds and always fully halogenated. Fig 1 shows he structure of some of the chlorinated POPs.

Figure 1.1. Structures of exemplar POPs chemicals



Compounds in this category are:

[28] *www.pops.int/documents*

i) **Aldrin** – A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests.
ii) **Chlordane** – Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops.
iii) **DDT** – It is perhaps the best known among the POPs. It was widely used during World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. It continues to be applied against mosquitoes in several countries to control malaria.
iv) **Dieldrin** – Used principally to control termites and textile pests, dieldrin has also been used to control vector-borne diseases and insects living in agricultural soils.
v) **Endrin** – This insecticide is sprayed on the leaves of crops such as cotton and grain. It is also used to control mice, moles and other rodents.
vi) **Heptachlor** – Primarily employed to kill soil insects and termites, heptachlor has also been used more widely to control cotton insects, grasshoppers, other crop pests, and mosquitoes.
vii) **Hexachlorobenzene** (HCB) – HCB controls fungi that affect food crops. HCB is also an industrial chemical and can be released as an unintentional byproduct of combustion processes.
viii) **Mirex** – This insecticide is applied mainly to combat fire ants and other types of ants and termites.
ix) **Toxaphene** – This insecticide, also called camphechlor, is applied to cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.

1.7.4.2 Industrial Chemicals[29]

- **Polychlorinated Biphenyls (PCBs)** – These compounds are employed in industry as heat exchange fluids in electric transformers and capacitors and as additives in paint, carbonless copy paper, sealants and plastics. They are also released as an unintentional byproduct of combustion processes.
- **Hexachlorobenzene (HCB) –** HCB is used in the production of rubber, aluminum, munitions, and dyes and in wood preservation and other manufacturing.
- **Mirex** – This chemical is used as a fire retardant in plastics, rubber, and electrical goods.

1.7.4.3 Unintentionally Produced POPs[30]

- **Dioxins** (polychlorinated dibenzo-*p*-dioxins) – These chemicals are produced unintentionally due to incomplete combustion, as well as during the manufacture of certain pesticides and other chemicals. In addition, certain kinds of metal recycling and pulp and paper bleaching can release dioxins. Dioxins have also been found in automobile exhaust, tobacco smoke, and wood and coal smoke.
- **Furans** (polychlorinated dibenzofurans) – These compounds are produced unintentionally from the same processes that release dioxins and they are also found in commercial mixtures of PCBs.
- **Hexachlorobenzene (HCB)** – HCB is a by-product of the manufacture of industrial chemicals and is released as a result of certain combustion processes.
- **PCBs** - PCBs can be unintentional byproducts of industrial processes.

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[29] www. Pops.int/docs/

[30] www.POPs.int/: Reports of the EGB on dioxins and furans

CHAPTER 2. COUNTRY BASELINE

2.1. Country profile.

Kenya became a republic on the 12th December 1963 after a century of colonization by Britain. There are 42 ethnic groups each with its own culture and traditions, some of which are influenced by the extent of economic development. For example, some communities are predominantly farmers while others are pastoralists, fishermen, traders, etc. These diverse communities have, over many years, used chemicals to protect their health, that of livestock and for controlling pests.

2.1.1. Geography and population

Kenya is located within the eastern side of the vast continent of Africa and forms an important geopolitical, economic and infrastructural part of East Africa. It shares boundaries with Uganda to the west, Tanzania to the south, Ethiopia in the north, Sudan in the north-west and Somalia in the east. Kenya is bordered to the south-east by the Indian Ocean, which serves the country as an important outlet and means of international maritime contact.

Map.2.1. Kenya and Neighboring Countries.

a) Location

It lies between latitudes 5^o 0' N and 4^o 40' S and longitudes 33^o 83' E and 41^o 75.5' E. It is almost bisected meridionally by the Equator and zonally by longitude 38^o 0' E. Kenya has a single time zone which is GMT +3. Figure 2.1 above shows a map of Kenya and neighboring countries.

b) Altitude

The altitude varies widely from sea level to about 5000 meters above sea level on the central highlands. Lakes occupy about 2% of total area while 18% is occupied by agriculturally high potential areas, and arid and semi-arid lands the rest of the country.

c) Area

Kenya has an area of about 582 646 km^2. Water occupies about 1.9 % or 11,230 km^2 leaving 571,416 km^2 of land of which more than two-thirds is either semi-desert or desert. This means that only between 142,314 and 189,562 km^2 of the land can be used by the country's estimated 32 million (2003) inhabitants.

The greater part of the more arable area of the republic is situated in the wetter south-western area, although there is a narrow strip of the land along the Indian Ocean coast that is also arable.

d) Population

Kenya had a population of 32 million in 2003, of which about 70% live in rural areas. The population distribution is uneven from an average of 230 persons per km^2 in high population areas to an average of 3 persons per km^2 in arid areas. Over 50% of the population is under 15 years. As mentioned earlier, some areas like Kisii District exhibit up to 800 persons per km^2

Kenya's inter-censual population growth rate declined from a high 3.9% per annum during the years 1969-79 to 2.5% during the period 1989-2000. The country's population is characterized by high mortality rates, low and declining life expectancy, increasing fertility rates (from 4.7 children per woman in 1995-98 to 4.8 in 2000-2003), high infant mortality and low life expectancy.

e) Political Situation.

After political independence in 1963, the population living in urban areas started to increase. By 1999, the population of urban dwellers had increased to 34.5% and is expected to increase to 50% by the year 2015. Kenya has 8 provinces: Nairobi, Central, Eastern, Coast, Rift Valley, Western and Nyanza (see Map 2**.4.)**

Map 2.2. Administrative Regions of Kenya

The major urban areas are as shown in Map 2.5. Below

Map 2.3 Map of Kenya Showing Major Urban Centres (Source: Survey of Kenya)

2.1.2. Political Economic Profile

Kenya's Human Development Index (HDI)[3132] show that the socio-economic development progress of the nation is about 0.539 with variations among provinces and districts (see Appendix 3). Such variations are reflected by differences in the regional resource base, infrastructure development and life opportunities. The components of HDI vary widely among the regions with large parts of the country falling in the low human development category that is typical of least developed Countries (LDCs).

For the last 25 years, the Kenyan economy has generally been stagnant. For example, between 1997 and 2002, the economy grew by an annual average of only 1.5%, well below population growth rate of 2.5% per annum. Since 2002, a slight change in the picture was apparent with a definite growth rate of 5.8% in 2005 as opposed to 4.7% in 2004. This growth is underpinned by agriculture and forestry that grew by 6.7%. Despite these signs of economic recovery, the growth of the economy is still far below the growth rate of about 7% needed to ensure sustained economic growth. Its is expected that growth will occur in all sectors with significant use of chemicals and generation of POPs

Real growth in GDP has been fluctuating over the years showing a downward trend since the early 1990s reaching about -0.3 % in the year 2002. Consequently, poverty has been increasing. The underlying causes for poverty are many, the main ones being the poor state of national infrastructure, depressed foreign investment, declining tourism activities, a slump in industrial production, deteriorating terms of trade and increasing climatic variations.

Poverty contributes to the unsustainable use of resources and environmental degradation, such as poor farming practices, overgrazing and reliance on wood as the main source of energy. This is because immediate survival needs often take precedence over the long-term need to preserve and maintain the viability and integrity of the environment.

Kenya is a signatory to the Millennium Declaration and the Millennium Development Goals (MDGs)[32]. There are eight (8) MDGs related to halving poverty, reducing hunger, reducing child mortality, combating the HIV/AIDS pandemic, ensuring environmental sustainability and developing a global partnership for development. The MDGs are expected to be central to development planning and resource allocation and will be fully incorporated into the mid term Expenditure Framework (MTEF) adopted by the Ministry of Finance to plan the Government financial year expenditures budgeting process. For this reason, the Economic Recovery Strategy (ERS) was structured to implement initiatives that would facilitate the achievement of the MDGs this plan s in line with this Strategy.
The MDGs and the outcomes of the WSSD underlined that the global chemical and waste management issues constitute a threat to economic development, poverty reduction and the environment and, hence, to peace.

[31] UNDP Kenya human Development Index, 2006
[32] Kenya Report on millennium development Goals

Table 2.1: Selected Annual Economic Indicators, 1998-2005[33]

Indicator	1998	1999	2000	2001	2002	2003	2004	2005
Population (Millions)	28.88	29.54	30.21	30.86	31.52	32.16	32.8	33.40
Growth %	2.31	2.29	2.24	2.17	2.11	2.06	4.7	5.8

2.1.3 Trade Issues

Kenya's trade performance in the recent past can be described as modest. However, a number of factors have adversely affected domestic regional, bilateral and multilateral trade[34]. These factors are: the influx of imports into the domestic market, the non-competitiveness of local products, the limited negotiation capacity of private and public sectors and falling terms of trade. Others include: poor infrastructure, the high cost of utilities, a narrow product export base, limited finance, the effects of liberalization, limited market access for Kenyan products and the high cost of raw materials for locally manufactured products.

The Government believes that the promotion of international trade is a major complementary factor towards meeting the MDGs in developing countries, in addition to increased overseas development assistance (ODA). Therefore, the reforms that the Government has been undertaking since the 1990s are aimed at not only increasing trade openness locally but also improving trade with countries in the African region and the rest of the world. In this regard, the government supports the call for improved market access and support for improved south-south competitiveness among developing countries for the international trade in general and as it affects POPs.

a) International Trade

The government is already undertaking comprehensive reforms of its trade system in the context of the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), African, Caribbean, Pacific–EU trade arrangements and the World Trade Organization (WTO). To this end, the East African Community customs union came into effect on 1st January 2005. Under the African-Caribbean Plan and European Union (ACP-EU, agreement has been reached for both the ACP and EU to negotiate new WTO compatible trading agreements that will enter into force in January 2008[35]

b) Trade Issues that Affect POPs

The trade sector has the following strategic objectives aimed at creating an enabling economic environment for businesses to thrive some of the chemicals related ones include:

- Facilitation of the development of trade through formulation and implementation of policies and strategies that promote domestic and external trade.

[33] Central Bureau of Statistics, 2005
[34] Ministry of Trade and Industry, Briefing Paper to PrepCom 2 of SAICM
[35]

- Protection of consumers from trade malpractices such as fraudulent manipulations of weighing and measuring equipment.
- Provision of management training, extension and consultancy services to entrepreneurs, especially to micro-enterprises.
- Collect analyze, store and disseminate trade information.
- Monitor the changes brought about by liberalization, globalization of world trade systems, trading blocks and international agreements on trade and design polices and means of enabling Kenya to reap maximum benefits from same.
- Negotiate favorable terms for Kenyan exports in bilateral and multilateral trade to promote economic integration and develop trade through regional bodies.
- Whereas Kenya is a keen proponent of environment conservation, it should be noted that it objects to any move to use environmental measures as a barrier to trade. Kenya observes and agrees that Article XX of GATT 1994 is flexible enough to allow for exceptions to accommodate environmental issues. This article allows trade measures that are considered to be inconsistent with other WTO obligations to be used to achieve *inter alia* environmental protection.

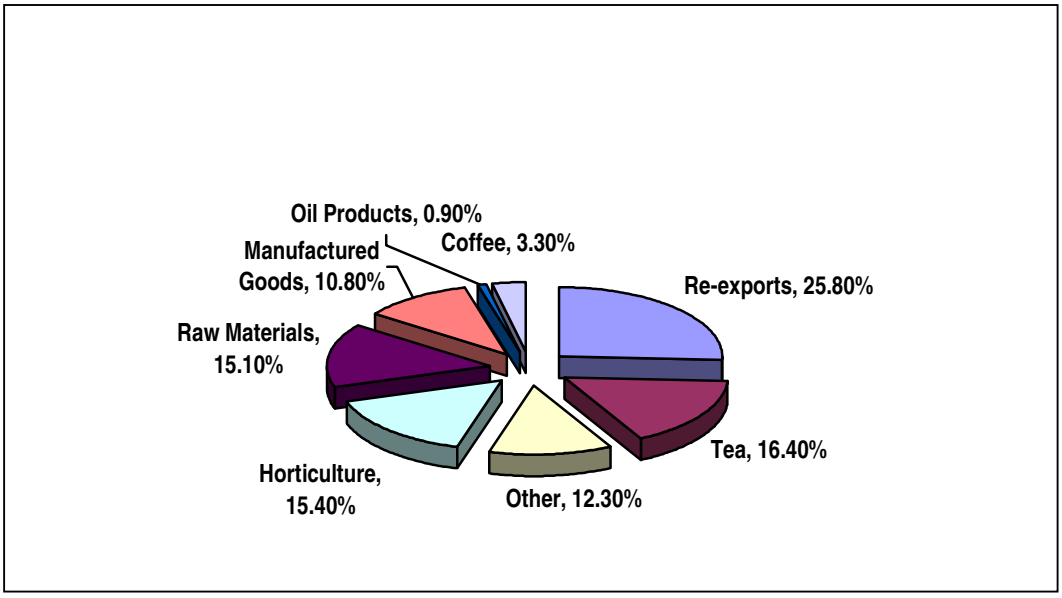
c) Effects of the Convention on Trade

In view of the above, Kenya believes that[36] "*Environmental norm and standards are a function of the stage of development of the economy*." It therefore resists to the imposition on low-income developing countries environmental standards prevailing in advanced countries as this would internally, artificially and substantially raise their costs of production and externally extinguish their comparative advantage in the export sector. However, sustainable development should be mainstreamed in their operations.

- Further, Kenya supports efforts that enhance that developing countries be involved at International level debate on the linkages between Multilateral Environment Agreements (MEAS) with other trade related organizations. This collaboration, Kenya believes would lead to an all inclusive final stand in terms of where to draw the line between trade and environment and what each organization should handle.
- In addition, Kenya believes that the role of assessments in addressing the negative impacts of trade liberalization and promoting the positive ones with a specific focus on the environment must be further explored.
- The key economic sectors are agriculture, industry and services. Figure 2.2 shows the key exports of Kenya.

[36] www.nema.go.ke State of Environment Report, 2005

Fig 2.2. Kenyan Export Trade



Below are the profiles of major sectors significant to POPs and the convention

2.1.4 Environmental Status

2.1.4.1 Air Quality

Clean air is a public good. Indeed no other resource exhibits the same degree of public property. Land can be fenced and subdivided, water can be bottled, people can put in ear plugs when they do not want too much noise and survive with uncollected solid waste. Unfortunately one has no choice but to breathe the air around whether it is polluted or not. Therefore, we cannot individually ensure that the air we breathe is sufficiently clean to maintain ones health and well-being.

Ideally, every major habitat should have an air quality management capability with regard to addressing sources of air pollution. Kenya does not have any air quality monitoring stations except those on an *ad hoc* demand-driven basis[37]. Nevertheless, every Kenyan is aware of air pollution as it is visible everyday from combustion, motor vehicles and residential cooking fires which area an important source of dioxin and furan emissions under Annex C emission categories..

A number of studies have been done in the last ten years that have deferred legal, doctrines barriers.

i) a number of institutions KEMRI NEMA,UON,ITDG have done research and studies this is a basis for improving.

ii) It has been identified that the cheapest, quick, easy and simple solution is in the combustion technology to achieve an even and a complete burn.

[37] www.nema.go.ke State of Environment Report, 2003

iii) It is now identified that the main cause of high incidence of diseases of the upper respiratory track is suspected to be due to the higher levels of pollutants in the air. There is clear correlation between levels of air pollution, socioeconomic, technological and the capacity of Kenya to enforce regulation already in place.
iv) Kenya meeting its target to phase out lead in petrol December 2006.
v) A plan to invest $200 and to upgrade facilities at the Kenya oil refinery.
vi) Regulations are being drafted to reduce air and noise pollution by a process coordinated by NEMA.
vii) The setting up of the global atmospheric watch Mt Kenya.
viii) Continuous monitoring of ozone in university of Nairobi, Meteorology Dept. incorporation of air pollution in the school curriculum.
ix) Increase recognition of the improvement of wood fuel technology.
x) The strengthening of the role of the Kenya clearing production center.
xi) Introduction of possible financial incentives and subsidies on clean energy eg wind and solar energy for heating and lighting.

The inventory on persistent organic pollutants, targeting dioxins and furans, identified open burning of wastes as one of the largest sources of air pollutants. Of the aggregates solid wastes, 58.9% is combusted in inefficient burners, 12.8% in open fires and 25% is dumped. The metal recycling industry burns both metal and plastic containers. Vehicle emissions are also a major source. However, open burning is the cheapest, easiest, most sanitary means of volume reduction and disposal of combustible materials.

2.1.4.2. Vehicular Emissions.

In motor vehicles, the petrol engine provides its power. The engine derives its power from the explosion of a mixture of air and petrol. The air-fuel mixture, when ignited, expands rapidly in a cylinder, forcing a piston from the top of the cylinder to the bottom. The exhaust gases from internal combustion engines are potential sources of PCDD/PCDF emissions. After the exhaust is released from a vehicle, it is diluted approximately 1,000-fold in the first few seconds and cools very rapidly.
Most passenger cars, motorcycles and some trucks are petrol-fueled, but large trucks, buses, and farm and heavy equipment are usually diesel-fueled. In a diesel engine, the fuel-air mixture self ignites under pressure and the burning rate is lower than in a petrol fuelled engine. It is generally accepted that the source of PCDD/PCDF emissions from road transport are the 1,2-dichloroethane scavengers added to leaded petrol. Several studies have identified strong correlations between chlorinated additives in gasoline and motor oil and associated PCDD/PCDF emissions during combustion tests. Unleaded gasoline may have a chlorine content of approximately (10 ppm)[38], whereas the chlorine content in leaded gasoline may be 5 to 10 times higher. In addition, it has been suggested that the concentration of aromatics in the fuel may contribute to these emissions. The reduction in the lead content of leaded petrol and the increase in the use of unleaded petrol that, like diesel fuel is likely to contain only trace quantities of chlorinated impurities, has resulted in a significant reduction in emissions. The contribution in 1996 to PCDD/PCDF emissions from road transport was 3%[39]

[38] Kenya Dioxin/Furan inventory
[39] Ditto

The detailed inventory of dioxin and furans emissions from the transport sector is given in Volume 1 -The inventory of POPS.

2.1.4.3. Open Burning of Wastes and Landfills.

One major source of air pollution is the disposal of wastes through open burning either at ponts of generation or in dumps as opposed to technologies with more effective waste disposal methodologies. This is especially true for people in informal settlements and near waste dumps who without organized waste handling have been left to their own devices for materials disposal and resort to burning them in the open. Open burning is an environmentally detrimental process that generates by-product POPs and numerous other pollutants, such as the products of incomplete combustion.

Open burning of waste, including burning at landfill sites for volume reduction, is listed as an inadvertent source of by-product POPs in Annex C, Part III of the Stockholm Convention. Most importantly, Annex C, Part V A (f) refers to the aspiration *"…the aim of cessation of open and other uncontrolled burning of wastes, including the burning of landfill sites."*[40]

Although the Stockholm Convention is concerned with POPs, such as polychlorinated dioxins and furans as products of incomplete combustion, open burning is responsible for generation of toxic by-products of combustion well beyond the twelve POPs. Other by-products include polycyclic aromatic hydrocarbons, particulate matter, benzene and carbon monoxide.

2.1.4.4 Air Pollution and its Impact to Health.

A major source of air pollution is the combustion of biomass. For example, in Kenya, in residents using biomass fuel and with no proper ventilation, typical kitchen emission of smoke to levels of more than 5000µkg/m^3. This concentration is as high as the worst of the London smog's of the 1950's and 100 times the current limits for acceptable atmospheric pollution in the developed world. Many studies have been carried out and it can be stated that the emissions of suspended particulate matter and carbon dioxide from the combustion of biomass, in addition to their other environmental consequences, have been causally associated with high incidences of respiration difficulties and eye infections. It is therefore a priority concern

Managing air pollution to protect human health and the environment is one of the greatest challenges in addressing the Kenyans efforts to meet Millennium Development Goals(MDGs) mainly because of the following constrain:

i) Absence of measurable indicators to drive action to minimize emissions
ii) Assessing pollution and exposure levels
iii) community views and the acceptability /affordability of interventions
iv) how to empower communities to understand and appreciate the risks associated with emissions from households, small businesses and informed sector infrastructure;
v) Too much focus on established enterprises and leaving out the informal sector which cover 40% of the GDP of Kenya

[40] Book 9 guidelines on BAT/BEP www.pops.int/guidelinmes/Report of the expert Group

vi) Lack of direction in building capacity, to monitor and to use data for decision making;
vii) the need to allocate finance to address reduction of pollution (for example, money should be allocated to relate emissions to human health and environmental impacts, monitoring
viii) and enforcing regulations.); and
ix) The popularity of technologies, in both in the production and services sectors, those are not clean. Because they are seemingly cheap.

The details on Biomass burning are in the inventory.

2.1.4.2 Aquatic Ecosystems

Lakes occupy 2% of the total area of Kenya because of topography; Lake Victoria, the Rift Valley lakes (Turkana, Baringo, Nakuru, Naivasha and Natron) and the Indian Ocean are the main recipients of residual industrial chemicals pesticides and wastes. Making the protection of the lakes a critical issue of the convention.

Map 2.2 shows the major rivers drain into these lakes and the Indian Ocean. Map2.2 shows the drainage basins of Kenya.[41]

Lake Victoria is the most important natural resource shared between the three partner states of the East African Community (EAC). It represents a symbol of their natural and lasting unity for the three East African Community countries. Beyond its symbolic significance, the Lake Basin provides enormous potential for economic and social development of the region. The rich biodiversity of the lake basin is not only of local but also of national and international importance.

Below is a description of the major aquatic ecosystems

a) Lake Victoria Basin

Lake Victoria is the second largest freshwater lake in the world after Lake Superior and is also the largest in Africa. Table 2.1 shows its size and the extent of its catchment in Eastern Africa.

It thus has the widest international relevance and could receive and discharge emissions of POPs from the parties of the convention

[41] Source Ministry of Water Development and Irrigation, 2005

Map 2.4. Main Drainage Basins of Kenya .

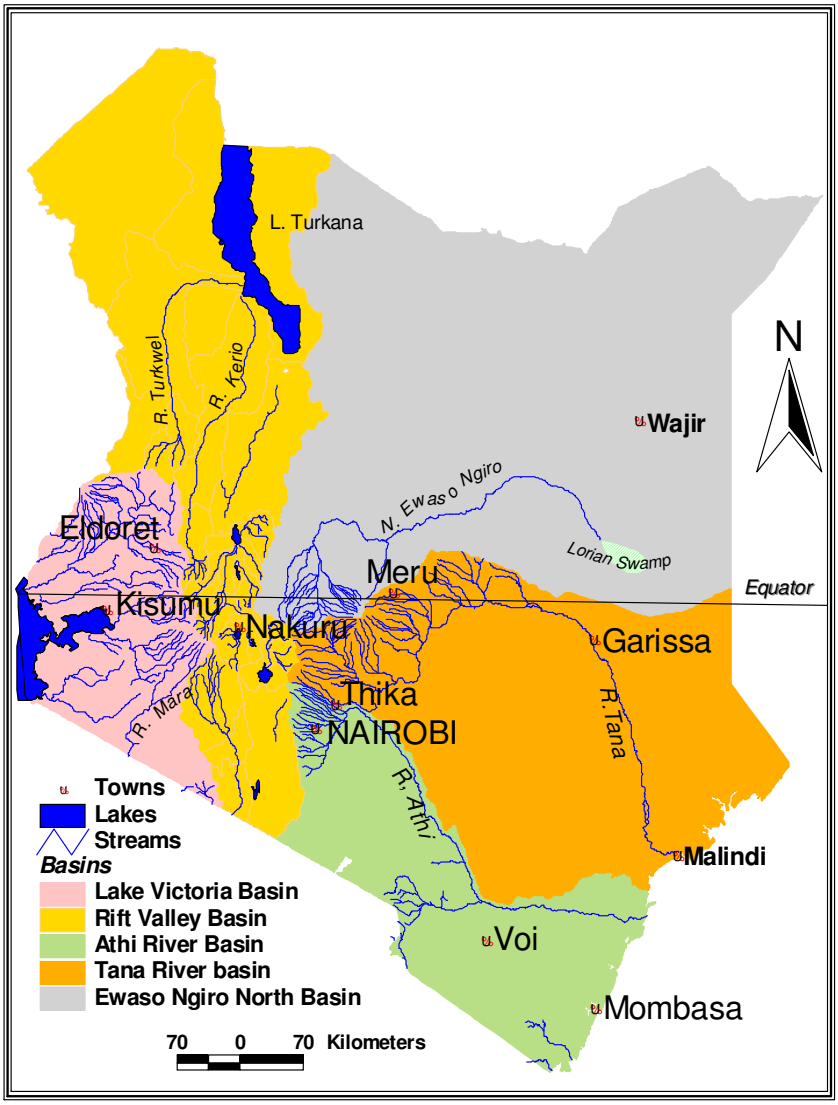


Table 2.2. [42] Lake Victoria: Surface Area, Catchment Area and Shoreline Length for Each Riparian Country

Country	Surface Area		Catchment Area		Lake Shoreline	
	km^2	%	km^2	%	Km	%

[42] **Source:** CODA *et al.*, 2001

Kenya	4,113	6	38,913	21.5	550	17
Uganda	31,001	45	28,857	15.9	1,790	50
Tanzania	33,756	49	79,570	44.0	1,150	33
Rwanda	-	-	20,550	11.4	-	-
Burundi	-	-	13,060	7.2	-	-
Total	**68,870**	**100**	**180,950**	**100**	**3,450**	**100**

The Lake Victoria basin in Kenya is shown in Fig.2.3

b) Athi River Basin; Area (67,000 km^2)

This comprises the southern part of the country east of the Rift Valley and drains the southern slopes of the Aberdare Ranges and the flanks of the Rift Valley to form the Athi River finally flowing into the Indian Ocean. This river basin drains an area that is very active with high potential in terms of agricultural and industrial development. The area is also urbanized and has major contaminated dumps such as Dandora Waste dump on the Nairobi River much of the POPs which could have been used as pesticides would be used in this area.

The Athi River whose length is approximately 591 km, has an average width of 44.76 m, average depth of 0.29m and average flow rate of 6.76 m^3/sec. It is the main river traversing this basin. The river tributaries traversing urban centers such as Thika and Nairobi City have poor water quality due to untreated or semi-treated municipal and industrial waste discharges. Measurement of POPs levels is a good indicator of their presence/absence

c) Tana River Basin: Area (127,000 km^2)[44]

This drains the eastern slopes of the Aberdare range, the Southern slopes of Mount. Kenya and the Nyambene hills, and discharges through the Tana River into the Indian Ocean. Similar to the Athi River basin, Tana River basin drains an area that has high population, is highly urbanized and has intense agricultural activities. There is extensive chemical use in the basin as well as location of major industries and informal settlements.

The main river traversing this basin is Tana River, whose length from its source to the Indian Ocean is approximately 1,050 km. The river has an average width of 39.3 m, average depth of 2.5 m and an average flow rate of 41.98 m^3/sec. Its mean annual discharge at Garissa is 5 billion cubic meters. The River traverses four provinces: Central, Eastern, North Eastern and Coast with a catchment area of 127,000 km^2. The total population within the basin is 5.8 million. The Tana River basin is among the highest coffee and tea producing areas in the country, yielding 62% and 55% of the coffee and tea harvests respectively. Other products from this basin include flowers, horticultural crops, rice, and other food crops such as cereals, bananas, potatoes and livestock products such as milk, beef, mutton and pork. The Tana River is contaminated with silt, industrial effluents, agrochemicals (such as fertilizers, insecticides and herbicides) and municipal and domestic wastewater. No systematic assessment of POPs has been made.

d) Ewaso Ng'iro North River Basin: Area (209,000 km^2)

This comprises the northern part of Kenya, and drains the northern slopes of the Aberdare Range and Mount. Kenya. Even during flood season, the Ewaso Ng'iro River is absorbed by the Lorian swamp although, in some years, its flow continues into the Somali Republic. No significant agricultural industrial or human settlements are located to generate POPs.

e) Lakes

The Rift Valley basin has an area of 125,000 km^2. This basin consists of a number of closed basins. These include those discharging into Lake Turkana in the north through the Turkwel and Kerio Rivers. They also include the basins draining into Lake Natron in the south through the Ewaso Ngiro South River. There are also others feeding smaller lakes such as Lake Baringo, Lake Bogoria, Lake Nakuru, Lake Elementeita, Lake Naivasha and Lake Magandi.

Nearly all the major lakes of Kenya are found in the Rift Valley. Their water quality varies from fresh (L. Naivasha and L. Baringo), through brackish (L. Turkana) to saline (L. Magadi). Lake Naivasha (a Ramsar Site) supports a highly significant horticultural industry and some fisheries, providing many jobs. Lake Naivasha supplies drinking water for hundreds of thousands of people as well as for livestock in the region. Unfortunately, the use of the lake's resources, notably its water and riparian lands, are largely uncontrolled and serious concern has arisen about the sustainability of contemporary activities. The lake's ecological integrity is threatened by eutrophication, agricultural contamination and waste disposal from the town of Naivasha. To address these problems, as a community-based initiative, the long existing Lake Naivasha Riparian Owners Association (LNROA), together with the pastoral communities and the Lake Naivasha Growers Group has developed the Lake Naivasha Management Committee with the aim of implementing a Lake Naivasha Management Plan (Gazetted on 1st October 2004 as a legal instrument to safeguard the lake's resources). [43]

Lake Nakuru, the other Ramsar Site, is a soda lake well known for its unique and large populations of the Lesser Flamingo. The lake's surrounding wilderness has very high biodiversity and the entire area is contained in a National Park managed by the Kenya Wildlife Services (KWS). The lake is threatened by nutrients from local farms and surface runoff of chemical pollutants and silts from the town of Nakuru Solid Waste.

Lake Baringo has also been similarly affected by siltation.

2.1.5 Climate, Natural Ecosystems and Land Use Pattern

a) Climate

Kenya's climate is influenced mainly by its position relative to the Equator, its proximity to the Indian Ocean and Lake Victoria, as well as its varied topography. Annual rainfall in Kenya follows a strong bimodal seasonal pattern. Generally, the long rains occur in March to May, while the short rains occur in October to December. Because of the amount of rain, POPs in land and water environments would be carried by runoff from regions of generation considerable

[43] Annual report lake Naivasha Riparian Organisation

distances. There would be therefore a large flux during rains and concentration during the dry season.

b) Natural Ecosystems

Kenya is endowed with a variety of habitats and ecological systems, including wildlife, forests, lakes and rivers, wetlands, farmlands, vegetation, marine life forms and micro-organisms. There are a number of ecologically sensitive areas as far as chemicals are concerned especially the Lakes and Rivers.

c) Land-use Patterns

About 18% of total land area is of high to medium agricultural potential and supports about 80% of the country's population. The remaining 20% of the population live in the remaining 82% of the total land area, which is arid and semi-arid (ASAL).

2.1.6. Profiles of Economic Sectors Relevant to POPs

2.1.6.1. Agriculture

Stockholm Convention Annex A pesticides are used in agriculture and pest control. Agriculture has been a mainstay of the Kenyan economy. It is the basis for food security, for economic growth, employment creation and foreign exchange generation. Most Kenyan industrial and manufacturing firms are agro-based. The development strategy depends on agriculture and industry. Most of the agricultural production in Kenya comprises mixed farming, *i.e.,* crop and livestock farming. Agriculture accounts for 60% of foreign exchange earnings and provides raw materials for industries. Hence, there is tendency towards the use of chemicals such as fertilizers, veterinary chemicals, pesticides and herbicides. Agricultural production systems in the non-arid areas are more intensive than those in semi-arid areas. Maize is the staple food crop, while the dry bean is the most important legume crop. Coffee, tea, and sugarcane are the major commercial crops**.** It is in these same sectors that chemicals are most used and in which waste biomass is generated that is burnt in the open. Coffee production constitutes a major use of pesticides and fungicides, while tea production is a major user of fertilizers.

a) Fisheries

In the aquatic environment, the main products affected by POPs are fish and other organisms. During 2004, the fisheries sector had a value of KShs 8 billion[44]. This provides the livelihood for about 500,000 people nationwide. It is estimated that there are about 50,000 people working in the sector directly, mainly as fishermen, traders, processors and employees. Kenya's total annual fish production is estimated at 150,000 tonnes. However, it is noted that the country's principal fishery is that of Lake Victoria and primarily comprises Nile perch, Tilapia, and Omena (*Rastrineobola argentea*). In 2004, Lake Victoria accounted for 106,000 tonnes (71% of the total annual production). These are

[44] CBS Statistical Abstract, 2005

consumed locally but the bulk is exported largely to the European Union and the Far East[45].

Although it is difficult to estimate the value of public and private investments in the fish industry, investments in the national fisheries sector were estimated to be about US$ 40 million in 2001. For Lake Victoria, an attempt to estimate investments in the fisheries sector could easily be based on information and data from the two previous surveys (fishery census) the last of which was conducted in early 2006. Previous surveys were conducted in 2000, 2002 and 2004 respectively

Currently there are six fish processing and exporting factories in the basin that specialize in Nile perch products (*i.e.,* fillets, unskinned, headless and gutted). These comprise East African Sea Foods limited, Food Processors 2000 K Ltd, Peche Foods Ltd, all located in Kisumu, and the processing plants of W.E. Tilley Ltd, Capital Fish Ltd and Prinsal Ltd located in Nairobi, Migori and Homa Bay respectively.

In Lake Victoria some fish are sold fresh while a significant proportion are processed for export and local later consumption. Artisanal fishers prepare dried and smoked fish, mostly for local market, while industrial fishers freeze or chill fish for export and, to a lesser extent, for consumers living in the urban areas of Kenya.

The fish trade chain extends to fishermen, agents and sub-agents and processors (for local and international markets). This means that the fish trade in Kenya is a two-channel kind of system, one supplying the local market and the other supplying fish processing industry largely feeding the export market.

Supplying the local market is the traditional fish-processing sub-sector dealing with both smoked or deep-fried tilapia and Nile perch. Nile perch that accounts for 90% of the trade dominate Kenya's fish export trade. The Nile perch products are in the form of fillets, whole body (gutted, headless), fish maws, and bladders. In the last few years, the quantity and value of fish catch has declined due to over-fishing and, probably, environmental degradation, as shown in Table 2.4. In 1996/7 the European Union ban of fish due to excessive residues of pesticides. Since then residue levels and hygiene are monitored regularly.

Table 2.3: Total Fish Landings and Values 1985 – 2004

Year	Tonnes	Value (Kshs billion)
1985	89,000	0.75
1989	135,400	0.91
1990	166,800	4.81
1997	166,640	6.1

[45] Fisheries Department 2004

1998	176,579	6.5
1999	200,159	7.2
2000	192,740	7.5
2001	151,804	7.6
2002	114,812	6.9
2003	105,866	6.2
2004	115,747	6.8

c)Horticulture

In the past, horticulture farming was the largest user of SC Annex A substances. Horticulture has expanded rapidly in the last two decades to become the largest export earner in 2005 contributing about 26.7% of total export earnings of Kenya. This sector currently commands an area of about 250,000 hectares with a total annual production having an estimated value of US$ 610 million[46].

Horticulture is a major agricultural industry in Kenya. It will influence may financial decisions.

The products are both for export and local consumption. The majority of horticulture farmers are small-scale landholders constituting about 80% of all growers and accounting for 60% of the export produce in the sector. However recently, more large scale growers have come up. Plate 2.1 is a typical horticulture farm in Limuru using intercropping, open air and greenhouses.

Plate 2.3 Small scale horticultural growing. Notice the intercropping

d). Production of Pyrethrum

Pyrethrum is the most viable alternative to most SC Annex A compounds.

Products of pyrethrum flower have been proposed as alternatives to persistent and other insecticides. It is an important crop in Kenya's economy as it offers livelihood to approximately 200,000 households with about two million individuals benefiting directly or indirectly. It is also a major foreign exchange earner ranking fifth after tea, horticulture, tourism and coffee. Kenya is the leading world producer of natural pyrethrum producing 65-75% of the global

[46] IPC, sector profile on agriculture

annual production and is expected to be able to supply between 7,000 and 10,500 tonnes of dry flower equivalent per annum.

The value of pyrethrum exports in the past four years has been KShs 1.2 billion in 1999/2000, KShs 1.5 billion in 2000/01, KShs 912 million in 2001/02 and KShs 867 million in 2002/03.

The Pyrethrum Board of Kenya has a monopoly for purchasing produced pyrethrum, process the flowers and market the products. The local market consumes about 5% of the annual production with the remaining 95% being exported *exclusively* to an American company (Johnson Wax)[47]. There are plans to expand the export market to other regions (IPC, sector profile on agriculture). The current acreage under pyrethrum is about 10,000 ha. However, the Pyrethrum Board's strategic plan indicates a desire to increase the area to 20,000 ha having now ventured into new markets in the Far East. The products in this sub-sector constitute alternatives to synthetic chemicals used for pest control.

In Kenya, the pyrethrum thrives in the highlands at altitudes above 1800 m. Both the production, and the area devoted to growing, of pyrethrum has fluctuated. In 2003/04, production of 5,796 tonnes of dry flowers was realized from an area of 10,950 ha.
The crop is grown in 25 districts spread over 5 provinces as shown in Table 2.5[48]. The Lake Victoria basin accounts for over 75% of all pyrethrum grown in Kenya with most of it being grown in the Nakuru district. Currently, the crop is produced by 184 cooperative societies, 969 self-help groups and about 6,300 individual growers. The pyrethrum flowers are delivered directly to the Pyrethrum Board or through the 94 collection centers distributed throughout the growing areas. Other factors that have undermined pyrethrum production in recent years include:

i) Competition from synthetic pyrethroids and other farming enterprises (horticulture, dairy, tea, etc.).
ii) Delayed payments to growers.
iii) High cost of production, especially labour for weeding and harvesting.
iv) Lack of affordable credit to finance farm operations.
v) Unfavorable weather conditions.
vi) Mismanagement of the cooperative societies.
vii) Poor infrastructure in pyrethrum growing areas (*e.g.,* poor roads).
viii) Pests and diseases affecting the crop (thrips, mites, nematodes and *fusarium wilt).*
ix) Social unrest in some pyrethrum growing areas.
x) Inadequate provision of extension services, and
xi) Limited application of modern technologies.

[47] Pyrethrum Board of Kenya
[48] [50](Source: Ministry of Agriculture, November 2004, Internal Reports)

Plate 2.2 Pyrethum Farm in Limuru

All the pyrethrum grown is processed at the factory situated in Nakuru.

The factory was constructed in 1959 with an installed capacity of 15,000 tonnes of dry flowers per annum. However, one of the two extraction plants burnt down in March 2003 reducing the extraction capacity by two thirds. The current annual output capacity is 800 tonnes of pyrethrum powder containing 1.3% pyrethrin, 500 tonnes of crude extract containing 25% pyrethrin and 300 tonnes of refined extract containing 50% pyrethrin. The way forward for the pyrethrum industry includes, among other things, payment of outstanding farm deliveries. In the long run, however, the government must discontinue its monopoly on processing and marketing of the commodity, as planned in a policy paper. Privatization of the PBK, through an IPO or private placement is planned. As more POPs are included in the SC, the crop is likely to gain more recognition and perhaps its Marketing will improve.

Table 2.4: Pyrethrum Production 1994/95 – 2003/04 (Tonnes)

Area (ha)	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Nakuru	2,277.5	2215	3710	5,185	4,885	2,917.5
Bomet	121	195	291	424	236	131.3
Kericho	168	193	310	259	320	172.9
U/Gishu	218.5	293	433	549	992	232
K/Marakwet	196	243	357	500	521	370.5
West Pokot	4	180	495	468	299	123.7
Transnzoia	2	3	4	8	7	3.6
Kisii	203.2	231	334	413	193	257.6
Gucha	-	41	67	72	-	51.1
Nyamira	100	129	168	187	174	79.7
Mt. Elgon	7	10	22	29	18	10.1
Narok	96	135	254	446	992	102.3
Koibatek	119	158	209	304	280	132.3
Nyandarua	320.4	366	740	1530	1731	916
Kiambu	12.9	26	56	98	70	93.1
Nyeri	15.2	17	38	93	70	43.3
Laikipia	1.5	39	77	89	70	78.3
Meru	33.26	64	135	195	187	49
Others	35	58	70	71	44	21.6
Total	**3,994**	**4,724**	**7,964**	**11,381**	**10,953**	**5,796**

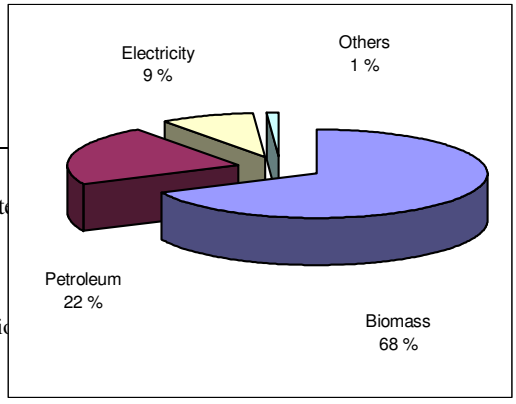
2.1.7. Services

The serviceswithe relevance to the convention include waste collection , treatment works, disposal, recycling, reclamation, garages, roads construction etc. Services are the greatest users of SC Annex B substances as well as SC Annex C source categories. The service sector that includes public transport, the informal sector, building and construction, storage, trade, communications, distribution and other services contributes to over half of Kenya's GDP and provides over two-thirds of the total employment[49]. Energy generation, waste water supply and wastewater treatment are key elements of the service sector relevant to the Stockholm Convention and users of POPs and generators of unintentional POPs.

a) **Energy**

As shown in Figure 2.3, the major types of energy currently used in Kenya are biomass (68%), petroleum (22%) and electricity (9%)[50]. Biomass energy dominates as the principal source of energy for the majority of Kenyans, particularly those living in rural areas while petroleum fuel, is the dominant energy source for the modern economic sector and in the urban areas. Others include geothermal and solar energy which are not contributors of POPs.

Fig. 2.3 Major Types of Energy Used in Kenya[51]



[49]

[50] www.nemqa.go.ke : State

[51] Ministry of Energy

Biomass energy represents the various wood-based fuels which include fuel wood, charcoal, biogas and biomass wastes.

Fossil fuels are imported in the form of either crude oil or refined petroleum because Kenya does not have any known fossil fuel deposits. The refining of crude oil is done at the Kenya Oil Refineries in Mombasa.

2.1.8 Chemical Industry

Chemical industries are the backbone of a sustainable industrial sector. They are a key link between the various economic sectors of the national economy. Currently, chemical related industries contribute 6% of Gross domestic product crop. However, a number of them are associated with negative health and environmental impacts. There are cases where workers may be exposed to occupational health hazards during chemical handling. The Chemical and allied sector had a production turnover of Ksh 19.7 billions in 2004 which was a 5.9 % contribution to the turnover in manufacturing. Employment in this sector stood at 12,197 in 2003 which was 5% of all employment in the manufacturing industry. The sector had 165 registered enterprises.

The sector exported goods worth Ksh 5.6 billion, contributing 11.6% to manufactured export earnings while import goods stood at Ksh 35,162 million

There are about 2,527 industries in Kenya, 1,206 (47.8%) of which are located in Nairobi. In descending order, the following districts are industrialized:

a) 258 industries in Mombasa;
b) 164 or 6.5% in Nakuru;
c) 126 or 4.0% in Kiambu; and
d) 96 or 3.85% in Kisumu.

The current approach is to ensure that all workers are made aware of the nature of chemicals they are handling on daily basis. Most of the chemical industries and services have inadequate waste disposal facilities. It is now a national requirement that they must incorporate pre-treatment plants into their operations. The other problem is lack of disposal facilities for used or expired chemicals resulting in indiscriminate dumping of obsolete chemicals together with general municipal waste. Among such wastes, the most important are residues of petroleum products, pesticides and other industrial chemicals.

a) Petroleum Products

The country imports crude oil, which is then refined by the Kenya Petroleum Refineries Ltd (KPRL)[52]. The process used results in the flaring of light distillates. The other by-products are the sludge from tanks and distillation residues. These are buried in sludge farms since there is no facility for handling hazardous wastes.

[52] Identification and Quantification of dioxins and furan releases in Kenya, March, 2006

The other products associated with the petroleum industry are grease, lubricants and hydraulic fluids. The disposal of these used/waste fractions is inadequate leading to soil and water contamination. Many streams and rivers traversing towns have unacceptable levels of oils and greases. There are three used oil recycling facilities but only two are operational and these below capacity. The main limitation to recycling is the lack of a well-established used oil collection system. This results in used oils being reused in inappropriate applications.

The sludge from KPRL, which is hazardous waste, is buried in a sludge farm within its premises. The sludge from Kenyan pipeline storage tanks is disposed of in a landfill at the Sultan Hamud sludge disposal site.

b) Pesticide Production

The rapid expansion of the agricultural sector has resulted in increased demand for agrochemicals. However, Kenya does not have pesticide-manufacturing facilities; active ingredients are imported and the formulation of marketable pesticides carried out locally. This activity is associated with dust, offensive smells and air pollution. Most of the industries have incorporated dust control equipment for their indoor environment.

Approximately 8,370 tonnes of pesticides with a value of Kshs 4.68 billion were imported into the country in 2005[53].The major active substances involved were Glyphosate (702,000 L),Copper Oxychloride (476,150 kg), Mancozeb (449 000 kg), Amitraz (433,388l), 1,3-Dichloropropene (432,000 kgs, 2,4-DiAmine (240,600 L), Sulphur (203,000 kg), Chlorothalonil (203,000 kg), Cuprous Oxide (202,000 kg), Methyl Bromide (187,000 kg) and Dimethoate (173,320 L) in order of decreasing volume. In the year 2005, more insecticides were imported in comparison to other pesticides. These include fumigants, rodenticides, growth regulators, defoliants, proteins, surfactants and wetting agents. Data is based on applications for the import of pest control products for commercial purposes approved by the Pest Control Products Board. This excludes quantities imported by the Ministry of Agriculture for commodity aid and grant programs.

Table 2.5: Volume and value of pesticides imported in 2005[54]

Category	Quantity (kg)	Value (Kshs)
Fungicides	2,490,421.	1,492,432,125
Herbicides	1,909,757	833,766,673
Insecticide	2,960,230	2,100,159,886
Others	1,010,538	248,774,625
TOTAL	**8,370,947**	**4,675,133,311**

Approximately 65 tonnes of pesticides worth Kshs 52 million were exported from Kenya to neighboring countries (mainly Burundi, Uganda and Tanzania).These exported pesticides were mainly cypermethrin, sarbofuran and chlorfenvinphos.

[53] Agrochemical association of Kenya, September, 2006 Quarterly Report
[54] Source Agricultural Association of Kenya, September,2007

No POPs ere exported.

c) Pharmaceuticals

There are 40 pharmaceutical manufacturers in the country. Like pesticides, most of the raw materials are imported. A large number of pharmaceutical formulations are produced locally in the form of tablets, syrups, capsules, and injectables. However, the bulk of pharmaceuticals are imported.

The manufactured products are both for export and local consumption. However, their production is accompanied with generation of organic solvents and residues containing heavy metals. The disposal of residues and by-products is a major challenge due to lack of appropriate disposal facilities.

d) Plastics

The plastics industry is well developed and produces goods made of Polyvinyl Chloride (PVC), polyethylene, polystyrene and polypropylene. All raw materials are imported in the form of granules. There are about one hundred and seventy registered manufacturers of plastics of various grades. Of the total, only 70 have the capacity to recycle their waste. About 20 enterprises do recycle street plastic waste but only two recycle polythene waste collected from the streets. The latter is a major environmental nuisance due to its persistence e environment leading to loss in property values, livestock deaths, drainage blockage and the creation of sites for mosquito breeding. These wastes also adversely affect the aeration of the soil leading to decreased land productivity. The industry produces 7,000 tons plastics/month of which 4,000 [55]tonnes are flexible plastic bags (6-7 µm *'juala') or flimsy plastic in local language.*

An estimated 11,000 people are employed with a turnover approx. US$ 220 million annually. The biggest products are mainly sacks and bags of ethylene with a total weight in 2002-2003 of 302,000 tonnes[56.]

e) Pulp, Paper and Cardboard Sector

There is only one major pulp and paper manufacturing factory which is the Pan African Paper Mills EA Ltd in Webuye. It uses elemental chlorine for bleaching and produces 120,000 tonnes per annum of paper. The plant uses mechanical and chemical pulping in a ratio of 70% and 30% respectively. The chemical pulping process releases organochlorines and sulphides resulting in frequent air pollution complaints. The other problems associated with pulping are the generation of POPs that may have been associated with fish population decreases in the Nzoia River but this has not been confirmed[57].
Pan African Paper Mills EA Ltd is currently monitoring ambient air quality at six stations around its premises. The results indicate relatively low concentrations of sulphur dioxide, the main culprit of roof corrosion in the neighborhood.
However, no dioxins or furans have been monitored[58].

f) Metallurgical Sector (Structural Metal Products)

[55] Munyao Gregory, Ministry of Trade and Ibndustry Personnal Communication
[56] Report of the UNEP/GOK project on Management of Plastic Waste,2006
[57] Report of ACK on Pollution in Webuye
[58] Lukorito Dioxin/Furan Minimisation in Webuye, Report to the BAT /BEP Workshop April, 2005

Kenya's installed metal production capacity is 500,000 tonnes per year. Usually mode of production is from virgin and recycled scrap metal. The recycled scrap metals are contaminated with oils, solvents and degreasing agents that may contain organ chlorines leading to the release of POPs. The main associated environmental challenges are the pre-treatment of spent liquors, emissions from the spraying unit and the disposal of slag and there is need to install dust arresters in all industries. The country lacks appropriate disposal facilities for such wastes. Some industries in the region have been proactive in addressing such challenges. For example, Mabati Rolling Mills (MRM) has made arrangements to have their hazardous waste disposed of in South Africa. Others have dumped the sludge in dumpsites. Nearly all use electricity and fossil fuelled furnaces. None are monitored for air pollution.

g) Cement Industry

Currently, there are four cement plants in Kenya with an aggregate installed capacity of 2.5 million tonnes per year. The current production is 1 million tonnes per year with an annual consumption of 1.5 million tonnes per year. The special quota of 0.5 million tonnes is meant for the export market - mainly Sudan and the Seychelles. The Bamburi Portland Cement Company located in Mombasa is the major use of coal for firing kilns and is experimenting on alternative sources of fuel either as waste of used tires. The kilns of cement industries should be used to dispose off the POPs wastes.

These cement factories are at various stages of installing air pollution control devices and the need for uniform adoption cannot be over-emphasized. Various complaints of particulate contamination have been recorded on the leeward sides of the factories. No monitoring is done. None uses their Kilns for waste disposal as happens in many countries

h) Glass and Glass Products

There are five glass manufacturing industries in Kenya. The raw materials for their manufacture are soda ash, silica sand, sodium sulphate and fluorspar, all of which are extracted locally with associated environmental impacts such as air, water pollution and landscape damage. Central Glass Industries in Ruaraka is the major one recycling glass and using a major finance in the process. It has been evaluated as requiring a detailed assessment in future to assess dioxins and furans.

i) The Informal Sector

The informal sector, also referred to as *Jua Kali,* includes all semi-organized and unregulated small-scale activities largely undertaken by self-employed persons or those employing a few workers but excluding all farming and pastoral activities. This sector has grown considerably over the last 20 years and employed 2,987,000 people in 1997 and 3,353,000 in 1998.

The POP wastes from the informal sector should be controlled to avoid their widespread.[59]It represents about 8% of the country's GDP[60]. It is the second largest source of employment after small-scale agriculture. The important aspect of the informal sector is that most recyclers and reusers are based here. They reuse drums that originally contained chemicals for various purposes.

[59] Economic Development Institute EDDI.: Investment Programme for Economic Recovery Strategy for Wealth and Employment 2003-2007. July, 2006 GOK Annual Progress Report 2004/2005

[60]

2.2 SUSTAINABLE DEVELOPMENT POLICY

Kenya's development planning process can be traced to the 7th National Development Plan of 1994-1997. Subsequent National Development Plans and other policy papers, including the Poverty Reduction Strategy Paper (PRSP) and the Economic Recovery Strategy on Employment and Wealth Creation, have provided the required policy platforms for increased involvement of stakeholders, especially local communities, in decision-making for environmental goods and natural resources.

The 9th National Development Plan (2002-2009) provides a more fundamental approach to environmental management and is emphatic about the need to develop and incorporate environmental economics and natural resources accounting into the National Accounting System. For example, the Plan is even more specific in the forest sub-sector where one of the outlined strategies is the valuation of forest resources to determine their value. The Plan also has recommended the use of property rights for wildlife management.

The Poverty Reduction Strategy Paper (PRSP) highlights that "*Conservation, sustainable utilization and management of the environment and natural resources, especially land, water and forests*" is an integral part of national planning and poverty reduction efforts. The PRSP also states that "*in order to improve environmental management and conservation, the government and other stakeholders will create awareness of environmental costs and benefits.*"

The use of chemicals is an essential means of achieving economic and social development in Kenya. To make such development sustainable, the benefits of chemicals must be maximized and their adverse health and environmental impacts minimized. It is crucial that workers are conscious of the negative health effects of chemicals and that enterprises using chemicals make efforts to improve occupational safety measures.

2.2.1 Institutional, Policy and Regulatory Framework

Since independence in 1963, Kenya has developed various policy papers and plans that have emphasized the need to sustainably manage and conserve the environment and natural resources. In addition, a variety of sectoral legislation exist while others have been prepared. Key policy documents are the National Development Plans (NDPs), the Sessional Paper on Environment and Development, the National Environment Action Plan and the Environment Management and Coordination Act (1999). The current National Development Plan (2002-2007), for example, whose theme is "*Resource Mobilization for Sustainable Development*", is unique in the sense that it incorporates the spirit of UNCED with a commitment for the Government of Kenya to shift towards improved environmental protection. It also emphasizes the need for adopting appropriate management mechanisms.

The National Environment Policy of 1996 focuses the actions that will be taken by the Government in addressing the issue of chemical management and information exchange as follows:

i. Enact new or strengthen existing laws to regulate the manufacture export, import, distribution, use and disposal of all chemicals in Kenya;

ii. Review or strengthen the boards which are concerned with the regulation of existing chemical laws;

iii. Implement the multilateral environmental agreements on chemicals and waste;

iv. Enhance bilateral cooperation with a view to curtailing trans-boundary harmful effects of chemicals including hazardous waste;

v. Monitor the status of chemical usage to ensure that maximum benefits are derived from their use;

vi. Promote public awareness on proper and safe use and disposal of chemicals; and

vii. Cultivate goodwill and collaboration among manufacturers, distributors and the local communities to achieve proper management of chemicals.

Within the existing policy and regulatory frameworks, the Government has continued to develop appropriate institutional structures to deal with chemicals management for effective regulating, monitoring and enforcement. The preparation of appropriate strategies to address the concerns has involved various stakeholders including local communities.

2.2.2 Institutional Roles and Responsibilities

This NIP is the result of an extended participatory and consultative process of internal self-[re]-evaluation. It is based on the fact that the Ministry of Environment and Natural Resources is mandated to protect, conserve and sustainably manage the environment and natural resources in the country. Sustainable management of the environment and natural resources is linked to the improvement in the economic and social conditions of Kenyans hence the objective of achieving equity, ecological sustainability and economic growth. The Government's commitment to poverty reduction is clearly stated in the Economic Recovery Strategy (ERS) for Wealth and Employment Creation (2003-2007) and the Sessional Paper No. 6 of 1999 on Environment and Development[61].

Sustainable development is considered to be a key concern to economic growth, equity and ecological concerns. The Ministry of Environment and Natural Resources is therefore expected to play a major role in meeting this global and national objective through action at national and international levels.

2.2.3. Relevant International Commitments and Obligations

Kenya has an active and growing programme to help stakeholders build their capacities to manage chemicals safely. The general approach is to provide awareness, legal and policy framework and training in key chemical safety elements, usually in support of the relevant NEA such as the Rotterdam

[61] MENR Sessional Paper No 8 on Environment and Development

Convention on Pesticides and Individual Chemicals in international trade or Stockholm Convention, Montreal Protocol etc. During the plan development process, MENR organized over 20 meetings and capacity-building workshops, bringing together Government departments, agricultural organizations, industry and other non-governmental organizations, to address chemicals and hazardous wastes issues. These activities were a response to the call for strengthening Kenya's capacity-building needs in the areas of chemicals and hazardous waste management.

UNEP Chemicals is currently assisting Kenya to develop the Stockholm Convention national implementation plans through GEF-funded enabling activities, and is working with other stakeholders to develop project proposals. These projects are part of an implementation portfolio of NEMA. The projects are wide ranging, including activities to i) develop inventories and management of dioxin and furan sources and releases, polychlorinated biphenyls (PCB), stockpiles of obsolete pesticides ii) to identify for use alternatives to POPs pesticides as well as non chemical alternatives to products such as DDT used in the control of malaria breeding mosquitoes and iii) participate in the chemical information exchange network. Many of the chemicals and wastes management programmes that Kenya has are driven with catalytic assistance of UNEP.

Examples of technical assistance to Kenya from international organizations using such organizations include activities such as detailed here below:

- FAO is helping Kenya on pesticide and chemical management and is the principal agency managing the African Stockpiles Project that covers pesticide and wastes under the Stockholm and Basel Conventions
- GTZ of Germany has been an active supporter of our activities in matters of ozone-depleting substances while UNIDO has been a good partner for Kenya in the chemical industries sector especially for the leather sector.
- WHO has been providing assistance in the debate on the replacement of DDT as part of the implementation of the Stockholm Convention and is a member of the National Committee on Chemicals as well as an active participant in a taskforce on DDT
- UNITAR has provided training in chemical profiles in Kenya to complete the total chemicals management and Kenya hosted the second Preparatory meeting for the Strategic Approach to International Chemicals Management. (SAICM) in October 2004 and the 8th Meeting of the conference of Parties to the Basel Convention on the Trans-boundary Movement of Hazardous Waste and their Disposal in November 27 – 1st December 2006[62].

2.2.4. National Institutions

To meet sustainable development objectives, Kenya has to address various developmental challenges. These include deforestation, environmental degradation and the prudent use of mineral resources through carefully targeted programmes and projects. Kenya thus has identified environmental conservation and sustainable management of the physical environment as a key priority within

[62] www.basel.int/meetings/docs/Report of COP8

the 2006-2010 Plan Period. As a result, many sub-plans and policy guidance have emerged giving rise to many specialised institutions have also emerged.

Some chemicals intended for use may pose health and environmental hazards during their production processes and such is the case in the cement and pesticide formulation factories. It is now the policy of business licensing authorities, such as the Ministry of Trade and Industry, the Investment Promotion Centre (IPC), the EPZ, Electricity Generating Board (ERB) and local authorities that enterprises and services utilizing or producing chemicals must have an Environmental Impact Assessment (EIA) undertaken to ensure the protection of the working and general environments.

It is a requirement of the Factories and Other Places of Work Act that chemical enterprises know how to deal with chemical hazards and if, in the opinion of an inspector, the associated risks cannot be minimized to a reasonable level, then a decision must be made to change to an alternative process, abandon the project or withdraw the license. Institutions therefore must address sound environmental management of chemicals and wastes. However, there are barriers which include:

i) Public opinion may be based on external influences, publicity and multinational corporate interests due to lack of awareness.

ii) Data on impacts and effects of chemicals may not be readily availed to users and there is a tendency for overuse and reliance on trade names hiding toxicity of chemicals.

iii) Import of raw materials that may contain hazardous chemicals as mixtures;

iv) The legal/regulatory framework is still weakly enforced;

v) The Customs Harmonized Code is not understood by a majority of clearing and forwarding agents and is not applied effectively for the identification of risks associated with hazardous chemicals;

vi) There is widespread use of mixtures and premixed preparations being imported ;

vii) Countries from which chemicals are imported to Kenya may have their own legal/regulatory loopholes that may allow chemicals to be shipped without appropriate registration.

Accordingly, the Government and the private sector should cooperate in rationalizing risk assessment decision guidance models for regulatory applications especially in selecting a system for data storage that would be beneficial to all users. Jointly, they could create awareness through workshops and seminars of the hazards associated with different types of chemical as they enter the market and the production process.

Efforts can be made to sensitize the insurance industry to the development of risk assessment for the chemical industry with qualified chemists who can utilize national and international information facilities and encourage the use of EIA in industrial assessment as such a number of institutions specialized in certain aspects of chemicals and hazardous safety issues have been established.

There are a number of institutions involved in the handling and management of chemicals. Key among these are:

i) NEMA;
ii) Government Chemists Departments
iii) Kenya Medical Research Institute,
iv) Kenya Plant Health Inspectorate Services;
v) Kenya Cleaner Production Centre;
vi) Department of Occupational Health and Safety Services;
vii) Kenya Bureau of Standards;
viii) Kenya Association of Manufacturers; and
ix) Kenya Industrial Research and Development Institute.

The specialized roles of some of this institution are explained below.

2.2.4.1 National Environment Management Authority (NEMA).

National Environment Management Authority (NEMA) was established under the Environment Management and Coordination Act (EMCA) of 1999[63]. The Act provides overall responsibilities for the management and coordination of the environment in Kenya. Under the EMCA, NEMA has the mandate of ensuring overall coordination, planning, regulation and enforcement of environmental standards and overall compliance with the Act.

The mandate is clearly defined in the Act, Section 9 (1):

"The object and purpose for which the Authority is established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment."

The mandate means that NEMA supervises, coordinates and ensures compliance but is not an implementing agency. This is a role done by specialized institutions (LEAD agencies).

Section 9 (2) of EMCA details its 17 functions whose descriptions are reflected in the EMCA guidelines. In this context NEMA:

- Coordinates various environmental management activities being undertaken by the lead agencies and promotes the integration of environmental considerations into development policies, plans, programmes and projects with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Kenya;
- Prepares and issues an annual report on the State of the Environment in Kenya and in this regard may direct any lead agency to prepare and submit a report on the state of particular sectors of the environment under the administration of that lead agency; and

[63] www.nema.go.ke

- Monitors and assesses activities, including activities being carried out by relevant lead agencies, to ensure that the environment is not degraded by such activities, environmental management objectives are satisfied, and adequate early warning of impending environmental emergencies is provide.

In this context NEMA took the lead in coordinating instillations to develop this plan and will subsequently be the technical institution to release the plan and supervise its implementation.

Plate 2.4 Minister Kulundu addressing one of the high-level roundtables on DDT. Others in the picture are Prof Khamalla, Chair NEMA Board, Ben Komudho, Fomer Director, National Environment Secretariat, the Hon Kajwang, MP Mbita, Prof Shem Wandiga Leading scientist on DDT.

2.2.4.2. Government Chemists Department

The Government Chemists Department was established in 1912 as the first general testing laboratory. Currently, the core functions of the Department broadly fall under the provision of analytical services in the fields of public and environmental health as well forensic investigations.

The activities of the department touching on chemicals dates back to the 70s when it was determined that while there were regulations covering pesticides, fertilizers, and food additives to name a few, there was a gap in the management of chemicals and the department directed to coordinate the activities of a Task force set up to address this with a view of the enactment of a relevant legislation. Since draft bills were prepared in; this connection in 1994 and a revised draft in 1999, this is a process which can be reactivated.

GCD is mandated to provide analytical services in the examination of chemicals and other substances and with branches in Mombasa and Nairobi has the capability to provide services in the country.
Although practical and financial facilities with capacity development of both human resources and infrastructure great strides can be made towards establishing an effective monitoring and surveillance system in place.

2.2.4.4. Kenya Plant Health Inspectorate Services[64]

The Kenya Plant Health Inspectorate Service (KEPHIS) is a regulatory body that commenced its operations in 1997. Its role in chemical issues may be captured in both its mission and vision, which reads:

"To provide dependable, effective, efficient and competitive regulatory services for ensuring quality agricultural inputs and produce, thereby promoting sustainable agriculture and economic growth."

KEPHIS aims at being the leading and most credible regulatory agency for quality control of agricultural inputs and produce.

The agricultural inputs include those that are chemically based, *i.e.*, pesticides and fertilizers. One of the KEPHIS mandates is to establish service laboratories to monitor the quality and levels of toxic residues in plants, soils and crop and animal produce.

Chemical analyses carried out in the analytical chemical laboratories include:

- Pesticide formulations for active ingredient concentrations;
- Pesticides in the environment; and
- Pesticide residues in food. This is to verify compliance with maximum residue levels (Marls) and Good Agricultural Practices in pesticide use required by importers and exporters.

Kenya is a key exporter of commodities susceptible to contamination when environmental pollution occurs. Since 2004, in collaboration with the Lake Victoria Environment Monitoring Programme and the Fisheries Department, KEPHIS has been monitoring pesticide residues in fish, water and sediments. The monitoring is a requirement by the European Union for fish imported from Kenya. The ban on fish exports to the EU in the late 1990s was lifted after KEPHIS produced convincing analytical results on the safety of our fish in respect to pesticide residues. Most critical ill be capacity to analyse POPs.

Involvement in pesticide residue analysis in both agricultural and environmental commodities, and the capacity to evaluate World Trade Organisation(WTO) notifications and the EU Directives and Regulations related to pesticides, places the organisation in a consultancy position for food commodities exporters and non-agricultural chemical users, *e.g.,* the National Public Health Laboratory services reconsider the use of DDT in Public Health and the low tolerance levels of the same in Kenya fish and fresh produce by the European Union.

To appreciate environmental issues linked to its activities, KEPHIS has facilitated staff training in:

[64] www.kephis.org Strategic Corporate Plan, 2006

- Inventories of obsolete pesticides by FAO;
- Development of national chemical profiles by the United Nations Institute for Training and Research (UNITAR) through UNEP;
- Environmental Management Systems and ISO 14001; and
- State of Environment (SOE) Reporting.

2.2.4.5 Department of Occupational Health and Safety (DOHSS)

The primary responsibility and mandate of the DOHSS, whose vision is "***a healthy worker in a safe working environment*** ", is the protection of workers and any other persons who may be exposed to unsafe and unhealthy conditions arising from working activities. Being the custodian of occupational health and safety matters, the department promotes a safe and healthy working environment by preventing accidents, occupational diseases, ill health and damage to property. It does this by developing standards for evaluating the exposure of workers and communities to unsafe working conditions.

The mandate of DOHSS is spelt out in the Factories and Other Places of Work Act, Cap 514 in the laws of Kenya. Officers of the department carry out health and safety audits at workplaces to identify toxic substances and advise on safe handling and disposal of hazardous chemical substances. There is also provision for audits by safety and health advisers approved by the department under the safety and health committee rules. The department monitors the work of the advisers and undertakes medical surveillance through medical examination of workers and surveys of health conditions in workplaces.

The department has the infrastructure to collect data and has established an Occupational Health and Safety Information Centre to serve as a referral point on occupational health and safety matters. Establishment of this infrastructure to collect data on production processes, medical surveillance of exposed workers, and hazard data, including mechanisms to ensure access of workers to information and participation in decision-making is one of their goals This centre also serves as a national centre of the International Health and Safety Information Centre (CIS) of the International Labour Organization (ILO).

The Act also requires that:

- Every medical practitioner notifies the Director of DOHSS on any occupational diseases brought to his or her notice. Through workplace inspection and audits, useful data and statistics are collected on harmful chemicals in use and exposed workers. Such information includes audits relating to the marking of containers filled with harmful substances and the availability of instructions for safe handling of chemicals at workplaces.

- The Act has provision that there be the formation of Safety and Health Committees in workplaces at which twenty or more employees are

employed. Both the employer and the workers are represented on these committees.

- Occupiers of premises post safety and health pamphlets and posters, including summaries of rules and regulations developed by the DOHSS, at workplaces to pass information to workers. DOHSS disseminates information to educate workers by carrying out training and education on health and safety.

- Chemical risk assessments are carried out through monitoring of the work environment as a means of detecting any relationships between occupational diseases and the work environment and to ensure that remedial measures are recommended.

2.2.4.6 Pest Control Products Board (PCPB)

The Pest Control Products Board (PCPB) was established in 1982 through an Act of Parliament (the Pest Control Products Act, Cap 346, and in 1985, became operational after the creation of a secretariat.

The goal in regulating pesticides is to ensure the provision of pest control products that are safe for human health and the environment. The mission of the board is to provide an efficient and effective regulatory service for the manufacture, registration, import, export, distribution, transport, sale and safe use of pest control products and to mitigate harmful effects on the environment.

This mandate is achieved through:_

(a) Inspections of pesticide premises nationwide;

(b) Training of all stakeholders;

(c) Quality monitoring;

(d) Information dissemination;

(e) Product registration; and

(f) Publicity and public relations.

The Registration Department is responsible for pesticide registration. Currently, there are six hundred and twenty pesticides registered in Kenya of which 30 are biological products related pesticides.

To facilitate the registration of bio-pesticides, the PCPB has organized workshops to formulate internationally-acceptable guidelines for the registration of pesticides. Representatives of government, the private sector and international organisations participated in these workshops.

In the 2002/2003 financial year, PCPB inspectors inspected a total of three thousand six hundred and fifty nine pesticide premises in the country. A total of 1.1 tonnes of illegal pesticides were impounded and they included expired, obsolete, smuggled, fake (counterfeit) or unregistered formulations. All these pesticides were disposed of by a registered consultant using a kiln at Athi River under the supervision of Pest Control Products Board Inspectors.

2.2.4.7. Kenya Bureau of Standards (KEBS)

The Kenya Bureau of Standards (KEBS) is implementing over 82 chemical standards covering 200 registered chemical firms in the country. These include firms dealing with cosmetics, detergent, pens, toothpaste, industrial chemicals, fertilizers, paints, adhesives, polishes, automotive oils, glass, books, etc.. KEBS also categorises imported chemicals. The firms produce both toxic and non-toxic chemicals used in the agriculture, motor vehicles, aviation, advertising, energy, industrial and domestic sectors.

KEBS has not developed Kenya Standards for chemical/hazardous waste management and disposal but It has, however, formed a technical committee on hazardous waste management and will be calling for a technical meeting before the end of 2006. KEBS was also involved in writing the National Environmental Waste Management Regulations in September 2003 in collaboration with NEMA and other stakeholders which has been finalised.

The variables measured include: Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), grease and oil, suspended solids, Total Dissolved Solids (TDS), nitrate, lead, iron and chromium.

KEBS is partially involved in the prevention of international traffic in toxic and dangerous goods at ports of entry through import inspections. These enforce the national standard for labeling of goods. The main bodies controlling entry through clearance are the Customs Department and the Ministry of Health (Department of Public Health). Major constraints of KEBS include:

i) Lack of capacity equipments, chemicals and trained personnel to manage chemicals throughout their life cycle;
ii) Inadequate/outdated and/or lack of suitable equipment to test for chemicals and hazardous wastes in many private and public laboratories;
iii) Lack of standards, risks assessments and management procedures;
iv) Inadequate facilities to test and control illegal international traffic in toxic products; and
v) An inadequate number of laboratories to conduct sufficient tests nationally.

2.2.4.8 Kenya Medical Research Institute (KEMRI)

KEMRI was established through parliament's science and technology (amendment) act of 1979**,** which mandated it to;

- Carry out biomedical research
- Train on persons on relevant research matters
- Collaborate nationally and internationally with research organs
- Cooperate with NCST, MoH and medical science advisory research committee on matters of research policies and priorities.

Each programme has a Programmes Committee whose chairperson is also the programme coordinator. Amongst other things, the committee's functions are to;

- Identify Research Priorities in Programme
- Initiate and Coordinate Development of Research Projects in the Programme
- Review Progress on this Periodically
- Identify, Procure and Mobilize Research Resources

Following several committee meetings for this programme, it was thought appropriate to change the programmes name to National Occupational Public Health and Epidemiology Research Programme (NOPHERP) and the committee to National Committee of Occupational, Public Health and Epidemiology Research (NACOPHER)**.** The operational areas of the programme fall under the following health fields;

- Environmental/occupational Health Research
- Health Systems Research
- Human Nutrition
- Material and Child Health
- Reproductive and Population Studies
- Epidemiology
- Training

Environmental/occupational health research is an important operational area for this programme, as such PoPs becomes the best entry point, hence the organization of the current workshop.

The membership to this programme committee is drawn from a number of key research, learning and service Institutions namely; KEMRI, NEMA, KETRI, NCST, Ministry of Labour, UoN, and MoH .

Each of these institutes are represented by one of its staff.

2.2.4.9. Kenya Revenue Authority (KRA)

The Kenya Revenue Authority is responsible for the efficient collection of government revenue and enforcement of laws and regulations concerning Customs and Excise, income tax, value-added tax and road transport registration. Customs and Excise Department as a gateway to the international exchange of goods, is responsible for facilitating legitimate trade, the enforcement of import and export controls to ensure compliance with international agreements and national legislation. This involves clearance of goods through ports, airports and border posts and the inspection of goods prior to entry. Illegal international trade in commodities, such as ozone-depleting substances, toxic chemicals and hazardous wastes, can undermine the effectiveness of multilateral agreements.

Kenya is a member of the World Customs Organization (WCO) that is concerned with the harmonization and uniform application of customs procedures governing the movement of commodities, people and conveyances across frontiers. International trade statistics are an important source of economic indicators for

any country. The accuracy of this kind of information is dependent upon the correct classification of goods. The WCO promotes the Harmonized Commodity Description and Coding System (referred to as the "*Harmonized System*") tariff nomenclature that is used as a basis for the collection of customs duties and international trade statistics, the surveillance of controlled goods and enforcement (risk assessment and targeting).

At the request of several United Nations organizations, the WCO has adopted recommendations to monitor the trade in ozone-layer depleting substances, environmentally hazardous materials and toxic wastes. Kenya has therefore amended the customs tariff to facilitate monitoring of certain chemical substances controlled under international conventions. Such chemicals include, for example, CFC-11 (trichlorofluoromethane), CFC-12 (dichlorofluoromethane), HCFC-22 (chlorodifluoromethane) and CFC-113 (trichlorotrifluoroethane) classified in the HS under the heading 29.03. It is this same procedure that will be followed for POPs.

In cooperation with the WCO, the secretariats of multilateral environment agreements (MEAs) that have trade provisions, such as the Basel Convention on the Trans-boundary Movement of Hazardous Wastes and their disposal and the Montreal Protocol on Substances that Deplete the Ozone Layer have instituted trainer-training programmes. Two Kenya customs officials have been trained. Additional training is anticipated in relation to national implementation of the Rotterdam Convention on Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals in International Trade and the Stockholm Convention on Persistent Organic Pollutants (POP).

2.2.4.10 Agrochemical Association of Kenya (AAK)

The Agrochemical Association of Kenya was founded in 1958 to provide the industry with a forum in which to pursue goals of common good.

Since its inception, the association**,** in conjunction with Pest Control Products Board, the Ministry of Agriculture, the Ministry of Livestock, the Fisheries Department and other relevant government agencies has successfully promoted safe, effective, environmentally friendly and profitable use of pest control products in Kenya. In addition, AAK alongside other stakeholders has worked to ensure that fair national and regional policy structures help to promote pesticides as important elements in sustainable agriculture.

AAK is a voluntary member association that is open to all organizations dealing with agrochemicals and has 72 member companies comprising manufactures, distributors, importers, consultants and users of pesticides. The members are bound by a Code of Conduct that has been drawn up in line with the FAO Code of Conduct on the distribution and sale of pest control products. In addition, AAK members adhere strictly to the law as stipulated in the Peat Control Products Act, Cap 346, and regulations promulgated thereunder.

In the spirit of ensuring continuity in industry activities, AAK is managed through an Executive Committee comprising members elected annually from the representatives of member companies.

2.2.5. Technical Capacity

The major preoccupation all these institutions include occupational health, public health and environmental protection. However, they lack the appropriate skills and technical capacity for effective chemicals and hazardous waste management.

The Kenya Government and other stakeholders, especially the development partners will be called upon to contribute financial and technical resources for POPs and the management of hazardous wastes in an environmentally sound manner through research, environmental monitoring and data collection. During the last ten years, Kenya has focused on the establishment of infrastructure to assess and monitor levels of contaminants. Table 2.7 provides a summary of institutions and their roles and responsibilities in chemicals and chemical wastes handling and management.

Table 2.7: Summary of Responsibilities of Government Agencies and Other Institutions

Concerned Ministry/Agency	Life Cycle Stage						
	Import	Production	Storage	Transport	Distribution/ Marketing	Use/ Handling	Disposal
Environment/NEMA	X	X	X	X	X	X	X
Health/GCD	X	X	X	X	X	X	X
Agriculture/PCPB	X	X	X	X	X	X	X
Labor/DOHSS	-	X	X	X	X	X	X
Trade and Industry/KIRDI	X	X				X	X
KRA/Customs	X	X	X	X	X	X	X
Traders/ AAK	X	X	X	X	X	X	X
Specialized	X	X	X	X	X	X	X
Foreign Affairs/ KMUNEP	X	X	-	-	-	-	X
Local Government/City Councils	X	X	X	X	X	X	X
Universities	X	X	X	X	X	X	X

Specialized institutions responsible for various POPs are outlined here above

2.2.5.1. Needs Identified in Relation to National Capacity Building for Chemicals Management

The following requirements have been identified as critical for capacity building in chemicals management:

(a) Strengthen the capabilities of various institutions officers to manage chemicals and hazardous waste in international trade with regard to the

chemical description, labeling, packing, and handling and hazard classification of goods;

(b) Drafting of national standards to align with the globally harmonized system for the classification and labeling of chemicals;

(c) Establishment of infrastructure to undertake any necessary testing of chemicals for management across the life cycle. There is also need to equip the laboratories with modern monitoring and analytical equipment.

(d) There is need to build capacity for the training of technical personnel, trainers, analysts, industrial managers and those responsible for the environment and health and safety in industry; and those who are at the forefront of the country's efforts to combat illegal trade, to control and monitor imports, exports for the purpose of assisting the country in implementing international agreements. and

(e) Establishment of infrastructure that facilitates national and international exchange of information on hazardous chemicals.

. The specific institutions dealing with POPs are detailed below.

a) Pesticides Including DDT

The members of this sector group are:

- Pest Control Products Board;
- Kenya Agricultural Research Institute;
- Agrochemical Association of Kenya;
- Twiga Chemicals Ltd;
- Ministry of Agriculture-Crop Protection Services Department; and
- Horticultural Crops Development Authority

b) PCBs

The members of this sector group are:

- Kenya Power and Lighting Co. Ltd. (KPLC);
- Kenya Electricity Generating Company (KenGen);
- Kenya Industrial Research Development Institute (KIRDI);
- Kenya National Cleaner Production Center (KNCPC);
- Ministry of Trade and Industries (MT&I); and
- Government Chemists Department (GC).

c) Wastes/Unintentional POPs

The members of this sector group are:

- Kenya Medical Research Institute;
- Nairobi City Council;
- Government Chemists Department;
- Agrochemical Association of Kenya;
- Ministry of Health;
- Pest Control Products Board;
- Kenya National Cleaner Production Centre.

d) **Legal/Policy/Social Economic**

The members of this sector group are:

- Attorney General Chambers;
- Ministry of Environment, Natural Resources and Wildlife;
- National Environment Management Authority;
- The Treasury, Ministry of Finance;
- Kenyatta University; and
- The other who could and will contribute in the plan are detailed in table 2.8

Table 2.8. Major Stakeholders and their Responsibilities

Institution	Role in Convention Implementation	Sector

Customs and Exercise Dept.	Regulates international trade and collect tax revenue for regulator.	Import/export
Kenya Ports Authority	The Authority manages all the sea ports of Kenya. It is an enforcer, regulator and user of POPs	Import /export
Municipalities	Wastes related to POPs. The disposal is mainly through landfill.	Waste Management
Kenya Industrial Research and Development Institute (KIRDI)	The institute conducts industrial research in the country. Some of the processing activities include leather tanning that generate POPs.	Research
Kenya Medical Research Institute (KEMRI)	KEMRI undertakes medical research in the country. It has efficient incineration facilities.	Research
Kenya Marine and Fisheries Research - Institute (KEMFRI)	KEMFRI undertakes marine and fisheries research in the country.	Research
Kenya Agricultural Research Institute (KARI)	KARI undertakes all agriculture-related research in the country.	Research
Universities and Other research institutions	These institutions are involved in academic education and research.	Regulatory Research
Ministry of Health (Malaria Control Programme)	The Ministry provides policy guidelines on human health in Kenya.	Industries
Ministry of Trade and Industry (MT&I)	The Ministry regulates and enforces trade (local and international) and industrial policies and practices in Kenya	Industry
Ministry of Agriculture (MOA)	The Ministry oversees sustainable agricultural practices in the country.	Agriculture
Ministry of Local Government Authorities	The Ministry regulates the functions of all city, municipal and town councils in the country.	Waste, vector diseases
Kenya Flower Council	The Council is a foremost self regulation body in charge of all flower farmers in Kenya.	Pesticide use
Horticulture Crops Development Authority (HCDA)	The Authority is responsible for horticultural development in the country.	Pesticide
International Centre of Insect Physiology and Ecology (ICIPE)	Among other responsibilities, the ICIPE is involved in research on alternatives to POPs.	Research
Fresh Produce Exporters Association of Kenya (FPEAK)	Production and export	Pesticides

2.2.6. Principles of Existing POPs-Related Legislation

The current statutes generally deal with chemicals in terms of pollution, import, export and the protection of individuals from harmful effects. They are not entirely effective with regard to chemicals management because the chemicals that fall within their ambit were not specifically classified during their formation. Further, at the time of their enactment, emphasis was not placed on the preservation and management of the environment. They therefore cannot in themselves form an adequate legislative framework for chemicals management. The legislation needs review with a view to updating and require appropriate regulations.

These shortcomings, however, are being addressed in the future review of legislation, particularly the Environment Management and Coordination Act No. 8 of 1999, as well as the draft regulations on toxic chemicals and hazardous wastes. The EMCA does not fully provide a specific regulatory framework to manage chemicals although it contains framework provisions for the management of toxic and hazardous chemicals and calls for the development of regulations to address specific chemicals. It is envisaged that these draft regulations will address some of the ambiguities within the Act. Legislation that addresses various aspects of chemicals is listed in Table 2.9.below.

More detailed are contained in the report on Policy and legal framework in the context of the SC and hazardous waste.

Table 2.9. Main Legal Instruments Addressing the Management of Chemicals

Legal instruments and references	Responsible ministries or agencies	Chemical use/waste disposal categories covered	Objectives of legislation
EMCA Act	MENR Resources / NEMA	All categories	Coordinate environmental management as a whole
Factories and Other Places of Work Act (Cap 514)	Ministry of Labour	All categories	Protection of workers
Food/Chemical Substances Act (Cap 254)	Ministry of Health	Preservatives, addictives	Food safety
Pest Control Products Act (Cap 346)	Ministry of Agriculture Pest Control Board.	Pesticides and growth regulators	Regulate sale, use, export and import
Fertilizer Act (245)	Ministry of Agriculture	All fertilizers	To increase agricultural output
Petroleum Act	Ministry of Energy	Petroleum products	Regulate import, refining and distribution
Standards Act Public Health Act Local Government Act	MI&T	Industrial chemicals	Quality Control

2.2.7. Key Approaches and Procedures for POPs Chemicals

The EMCA establishes a legal framework for the management of pesticides and toxic and hazardous chemicals. EMCA allows for the promulgation of future legislation by way of the development of specific regulations. The Act also adopts the precautionary principle[65] . The EMCA has dealt with several shortcomings of the earlier statutes on chemical management. The regulations is provided for *inter alia* the registration, classification, labeling, packaging,

[65] The Precautionary principle states that, where the are threats to damage to the environment, whether serious or irreversible, lack of full scientific certainty should not be used for postponing cost effective measures to prevent environmental degradation

distribution, storage, transport, import, export and final disposal of toxic and hazardous chemicals and pesticides arising from chemical Use.

Under new regulations EMCA deals with a more comprehensive and broader list of chemicals. It captures hazardous chemicals and chemical wastes from industrial processes, research, photographic processes, surface treatment of metals and wastes from the petrochemical industry among others. It provides for the standards and Enforcement Review Committee (SERC) to adopt regulations.

2.2.7.1. Standards and Enforcement Review Committee (SERC)

The Standards Enforcement and Review Committee (SERC) is charged with recommending criteria for the classification of hazardous wastes.

Section 92 of the Act empowers the Minister to make regulations prescribing the management of toxic and hazardous chemicals, including classification, registration, import, export, packaging and advertising.

Section 93 is the provision for the protection of the environment; it regulates and, in some instances, prohibits the discharge of hazardous substances, chemicals and materials and/or oil into the environment. Owners or operators of any facility or equipment that occasions discharges contrary to the Act are responsible for mitigation of the impact of their actions.

Section 94 mandates the SERC to prepare standards for pesticides and other toxic substances. Also, in relation to pesticides and toxic substances, the Act provides for registration, storage, manufacturing, import and export in Section 100. EMCA empowers the Minister to make regulations governing registration of toxic substances.

2.2.7.2. EIA Technical Advisory Committee (TAC)

An additional control mechanism for chemicals is affected through the environmental impact assessment procedure as provided by NEMA as the ultimate legal institution for approving EIAs with an opportunity to assess the potentially adverse effects of projects on the environment prior to their commencement. Through public participation, potentially affected persons can table their views on the project, associated risks can be managed through mitigation measures and the environment protected. The Environmental (Impact Assessment and Audit) Regulations 2003 govern the requirements for environmental assessments and audits that are undertaken by proponents of projects prescribed in the Schedule [2] of EMCA.

2.3 ASSESSMENT OF POPs ISSUES IN KENYA

This section provides the reader with a brief national profile, as suggested in guidance issued by UNEP and the World Bank in 2003[66]

This section will give a summary of the situation for Pesticides, DDT, PCBs unintentionally produced POPs as well as stock piles and waste. For detailed expose the reader is referred and the POPs inventory and the reports of the assessment of infrastructure to manage POPs.

2.3.1. Production, import, export use of POPs Pesticide

There are more than 11 firms in Kenya formulating and/or selling various pesticide products in the country. Most of them import active ingredients and semi-finished products, which they reformulate and pack. Other types of pesticides formulated and marketed in the country include herbicides, miticides, plant growth regulators, insect repellents and soil sterilants.

The majority of pesticide producers in Kenya are subsidiaries of multinational companies. In 1994, their investment was estimated at Kshs 182 million but it is not clear how much of this was for pesticides as most, if not all, also produce pharmaceuticals, veterinary products and industrial chemicals.. Domestic consumption, as well as the demand for exports to neighboring countries continues to increase. The further development of the industry based on the locally available natural pyrethrins. Imported synthetic products and raw materials is likely to continue**.**

Kenya consumption of pesticides by type is shown in Table 2.10

Table 2.10. Importation of Pesticides Quantities (tonnes)[67]

Year	Insecticides	Herbicides	Fungicides	Others	Total
2002	2747	1064	2138	434	6383
2001	1664	1398	1779	154	5651
2000	1762	633.4	1665.9	370.6	4431.9
1999	2186	593	2284	1116	6179
1998	1814.4	1407.8	4225.4	158.8	7604.4
1997	2077.8	703.1	2391.0	655.6	5827.5
1996	1876.2	997.9	3469.8	602.5	6946.4
1995	1413.3	870.6	2323.0	501.9	5108.8
1994	1049.9	747.4	1671.8	563.3	4032.4

[66] UNEP/World Bank *National implementation plans: Interim guidance for developing a national implementation plan for the Stockholm Convention, Revised, December 2004*). www.pops.int/docs/guidelines/

[67] Pest Control Products Board, 2004

The bulk of the imported pesticides were consumed locally with only 3% being re-exported to neighboring countries.

Before the restriction of DDT as much as 70 tonnes of DDT was used annually for agricultural pest control on maize and cotton crops. Lindane, aldrin, dieldrin were also used as seed dressings. DDT was banned for agricultural uses and restricted to public health usesin Kenya in 1986, the year of last import. Aldrin and dieldrin were banned in 1992. Despite the official ban of these pesticides, some are still available on the market because of possible diversion of transit goods and in the environment. Organchlorine pesticides still officially in use in Kenya are endosulfan, alpha, and gamma-BHC and alachlor.

2.3.2 Historical Use of POPs

Pesticides have been widely used for the control of ticks, mosquitoes, houseflies, post-harvest storage insects, tse-tse flies and as control agents for crop pests and weeds. Frequent applications of pesticides have led to the development of resistance, for example *Anopheles gambie* Giles, has developed resistance to DDT and fenitrothion. The development of resistance to insecticides has been a contributor to the resurgence of malaria in many regions of Kenya. However, since resistance is only developed when direct exposure to insecticides occurs over an extended period, replacement of a pesticide or discontinuing applications often prevents the development of resistance. This has been observed in ticks when resistance to DDT and dieldrin were eliminated by the use of organ phosphorus compounds, dioxathion and coumaphos in combination with HCH, toxaphene or the use of new pesticides like carbaryl. It should therefore be noted that:

- Kenya does not produce any Annex A Substances;
- Pursuant to paragraphs 1 and 2 of Article 3, Kenya has taken legal/ administrative measures to eliminate the use of chemicals listed in Annex A of the Convention; and
- Kenya has a pesticide Ban and Restriction List in which some Annex A and B compounds are included.

Between 2001 and the early part of 2004, records from the Pesticides Control Product Board (PCPB) of Kenya indicate that there were no POPs pesticides listed above imported into the country. There were however, 40,000 kg and 13,800 liters of other pesticide POPs namely, lindane and dicofol during that same period (PCPB 2004).

2.3.3 Projected Future Production/Use

As noted Kenya has taken the administrative measures necessary to eliminate the import of chemicals listed as Annex A pesticides by banning and restricting the use. The only remaining POPs i.e Mirex and DDT, pursuant to paragraphs 1 and 2 of Article 3 of the Convention. This situation arises from the following considerations:

- The consumption of pesticides in the past has been significant and after the legislation came into force, the growth of abandoned obsolete pesticides increased.
- The policy and administrative aspects of pesticide control are well-developed and it will be comparatively easy to take decisive action on the remaining Annex a substances namely mirex and DDT once the Kenya decides that there are cost effective and efficacious alternatives to them.
- There are compulsory and voluntary initiatives driven by socio-economic circumstances and trade requirements for the management of POPs pesticides that have compelled stakeholders to impose faster phasing out programmes for POPs. Specific actions on Annexe pesticides POPs include:

  i. **Aldrin** Termites are a serious problem in Kenya and aldrin is known to be quite effective. It was banned in 2004.
  ii. **Chlordane** was banned in 2004.
  iii. **DDT** was restricted in 1986.
  iv. **Dieldrin** was banned in 2004.
  v. **Endrin** was banned in 2004.
  vi. **Heptachlor** was banned in 2004.
  vii. **Hexachlorobenzene** was banned in 2004.
  viii. **Mirex** has never been used in Kenya. It will be slated for banning
  ix. **Toxaphene** was banned in 2004.

2.3.4 Assessment of Annex A, Part III Chemicals (PCBs)

The POPs inventory findings are that industrial POPs (PCBs) exist in Kenya. They are mainly in electrical transformers and capacitors that were manufactured and imported before 1985. A total of eight locations spread throughout all regions of Kenya (Rift Valley, Nyanza/Western, Central and Eastern) were found to have PCB-containing equipment and PCB-containing wastes.

2.3.5 Historical use of PCBs

Awareness of the potential dangers of PCBs in Kenya started in 1985 with waste stockpiles belonging to the KPLC. At that time, some of the PCB capacitors had started leaking. The leaking capacitors were subsequently buried at the Juja sub-station in Nairobi. The supplier of the equipment was concerned and immediately started looking into ways and means of how the PCB capacitors in and out of circuit could be safely disposed of.

In the past, there has been some awareness of the PCB concerns in Kenya. Some companies were found to have made an effort to get rid of PCBs by various means, including incineration in countries with incinerators facilities and

exporting equipment containing PCB to the countries of origin. For example, the Kenya Power and Lighting Company has operated Decabit ripple control technology for the regulation of non-essential loads during periods of peak demand and the commitment of loads during off-peak periods. Such loads are generally water heaters and irrigation pumps. The ripple control equipment installed in 1979 contained PCB-containing capacitors.

Kenya does not have a record of producing PCBs. The production of PCBs was prohibited worldwide in 1984 with the continued use of sound PCB-containing equipment allowed for a limited period.

2.3.6. Assessment of Annex B Chemicals (DDT)

2.3.6.1 Historical Use of DDT

DDT was used as a wide spectrum insecticide in agriculture, livestock rearing and malaria vector control[68]. It was first used in the control of highland malaria in 1947. The product was banned for use in livestock rearing and agriculture in 1976 and 1986 respectively. It was further restricted for use in disease vector control in the same year (1986). It has not been used in vector control activities since.

The POPs inventory indicated that most of the residual DDT is held by the Kenya Farmers Association in Nairobi, the Rift Valley and Central Provinces. The total amount of obsolete DDT identified nationwide was 1,338 kg.

Kenya has indicated a strong commitment to developing alternatives to DDT. Several products are currently under investigation. NIP activities will target the further development and commercial roll-out of alternative disease vector control strategies that avoid the use of DDT. Chief among the alternatives are the use of natural pyrethrins and integrated vector control. In September 2006 the Ministry of Health issued a statement on the fact that it was not the poicy of the Ministry to reintroduce DDT.

2.3.6.2. Pyrethrins

Pyrethrins are currently rated as safer alternatives to DDT. The Pyrethrum Board of Kenya recently produced Pylarvex, Pymos and Pynet to be used in various settings in the control of malaria vectors. These products (Pymos™ 0.6 EC, Pynet ™ 5 EC and Pylarvex 0.5 EC) consist of natural pyrethrins, synergists and emulsifiers. Under limited laboratory testing, Pymos™ 0.6 was found to have an enhanced residual capacity greater than 5 months.

68

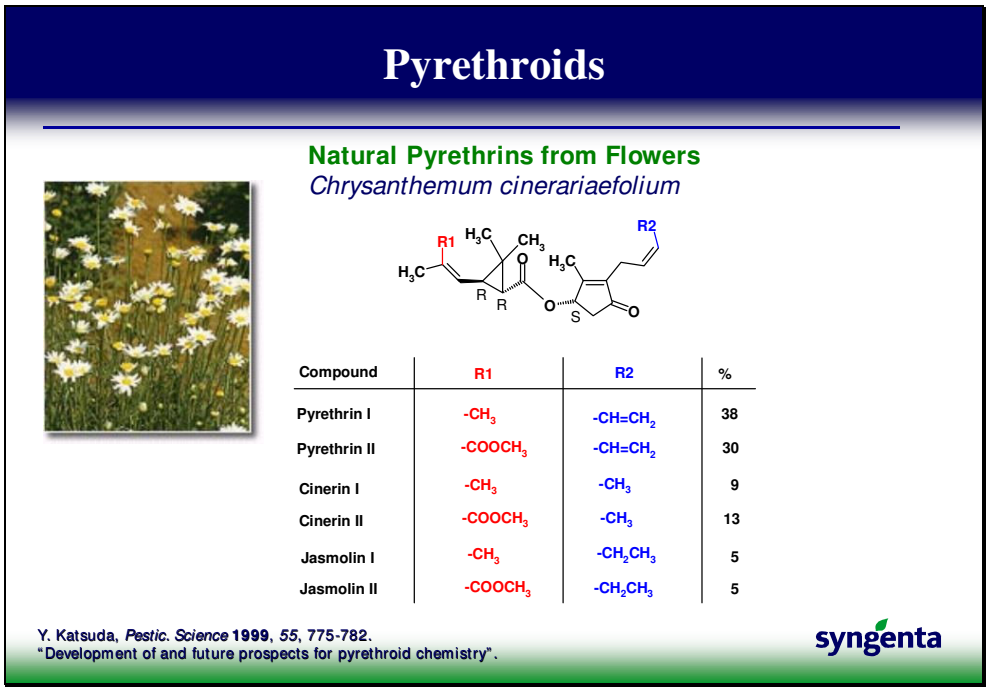


Fig 2.4. Pyrethrum Flowers and the Formulae of Pyrethin

Table 2.12 summarizes the legal and administrative status of DDT.

CHEMICAL	MEASURE	DATE
(1,1,1-trichloro-2, 2-bis (4-chlorophenyl) ethane) CAS No: 50-29-3	Banned for agricultural use through the Pest Control Products Act. Insecticides restricted for use in public health applications for mosquito control in mosquito breeding grounds. Authority to import can only be given by the Secretary of the Pest Control Products Board on request from the Permanent Secretary, Ministry of Health. Searches and evaluations of non-chemical alternatives are being encouraged.	1986

2.3.7 Assessment of Releases From Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB, AND PCBs).

2.3.7.1 Convention Requirements for Kenya

Article 5 of the Stockholm Convention requires parties to take measures to reduce or eliminate releases from unintentional production sources as elucidated in Annex C of the convention. These measures include:

i) Reduction of total annual releases from anthropogenic sources of each of the chemicals listed in Annex C with the goal of minimization and, where feasible, ultimate elimination.

ii) The development of a National Action Plan for implementation of the provisions of the Convention by Kenya by December 25, 2006.

iii) The use of practicable Best Available Techniques (BAT) for new sources in Part II of Annex C by December, 25, 2008;

iv) Promotion of Best Environmental Practices (BEP) and incorporation of BAT.

It is be noted that Draft Guidelines for Best Available Technology (BAT) and Best Environmental Practices (BEPs) have been developed by the Expert Group on BAT and BEP (EGB) appointed by the Intergovernmental Negotiating Committee at its 7th Session in which Kenya is a member. These guidelines were completed at the second EGB meeting held in Geneva in September 2006.[69].

2.3.7.2. UPOPs Inventory

A preliminary inventory of the sources of unintentional POP emissions has been carried out. The findings were as follows:

i) Facilities producing or using hexachlorobenze could not be assessed;

ii) Understanding use of the UNEP dioxin/furan Toolkit

iii) There is no laboratory capacity to analyse dioxins and furans

iv) Assessment of unintentional releases of PCB could not be made;

v) A priority list of sources relevant to Kenya has been defined;

vi) The major sources of U-POPs are identified as incineration of medical wastes; open burning of municipal and agricultural wastes and pulp and paper production using elemental chlorine.

vii) No legislation requiring minimizing emissions of UPOPs.

viii) Other categories also emit smaller quantities of dioxins and furans

The inventory also established that there are inadequate air pollution control measures in place to reduce releases. There are also weaknesses in the administrative and legal requirements that require such control measures to be introduced. In the case of some sources, mainly industries, efforts are underway to increase controls on the discharge of U-POPs to water and land.

2.3.7.3. Priority Emission Sources.

[69] www.pops.int/meetings/ 3rd meeting of EGB,Tokyo

Priority category sources were identified as follows:

- Open burning of waste,
- Pulp and Paper manufacturing using elemental chlorine;
- Residential combustion,
- Fossil fuelled plants,
- Firing installations for wood and other biomass fuels,
- Crematoria and the destruction of animal carcasses,
- Motor vehicles burning leaded petrol,
- Textile and leather dyeing,
- Smoldering of copper cables and waste oil refineries.

These sources require the promotion of both BAT and BEP.

The largest pulp and paper installation in Kenya is Pan African Paper Mills located along the Nzoia River which discharges into Lake Victoria.

Pan African Paper has not been able to deal with its hazardous waste adequately, especially sludge. Up to now, concern has been focused on the effluent treatment ponds. However, there are also concerns regarding air pollution. The release and fate of dioxins and furans has not been considered by the company. The main constrain is the high cost of the anticipated shift to adopt more environmentally friendlier production technologies. The company needs to change from the use of elemental chlorine bleaching method to more friendlier alternatives as per BAT and BEP guidelines.

i) **Waste Incineration**

The inventory established that the medical sector accounts for the bulk of releases from this sector. With the exception of the major hospitals like Nairobi Hospital, Agah Khan, Kenyatta Hospital that operate commercially acquired incinerators. The majority of the medical institutions in Kenya operate the De Montfort type of incinerators. Most of these incinerators do not have effective air pollution control systems (APCs). There is no method currently in place to ensure whether they are actually reducing air pollution.

Hazardous wastes or waste oils are not currently used as fuels for firing cement kilns for fear of compromising cement quality. The total TEQ from this category was 249.06g which is about 7% of the total. However Bamburi Portland Cement located in Mombasa is considering introducing waste as a source of fuel for its kilns.

One of the few working incinerators is based at the Kenya medical Research Institute in Nairobi and another in its station in Kisumu as show in photo 2.3. Fig 2.5 shows the contribution of the medical waste. The other incinerator is at the Environment Combustion Centre in Kitengela.

Thus medical waste combustion sometimes wrongly labeled as incineration is the single most important sources of dioxin emissions from those sources claiming to have incinerators.

Fig 2.5 Comparison of Potential Releases from Category 1

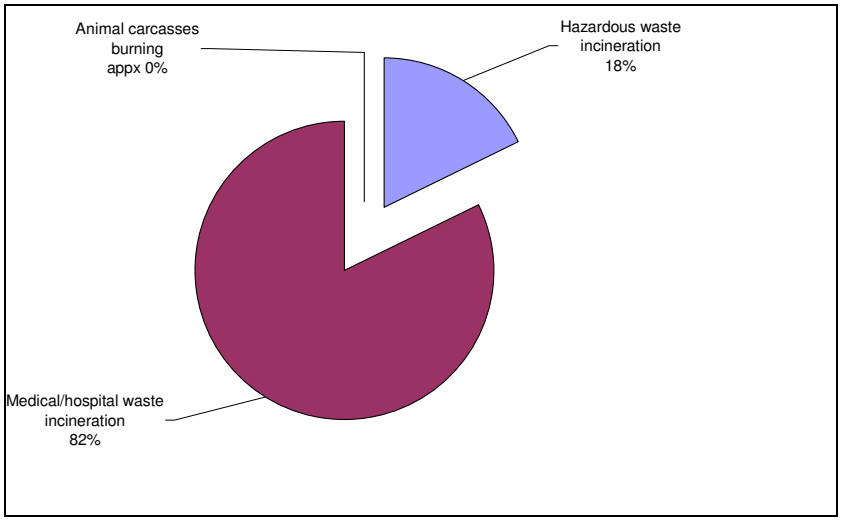


Plate 2.4. Incinerating contraband cocaine at the Kenya Medical Research Institute.

(Source: East African Standard)

i) Ferrous and Non Ferrous Metal Production

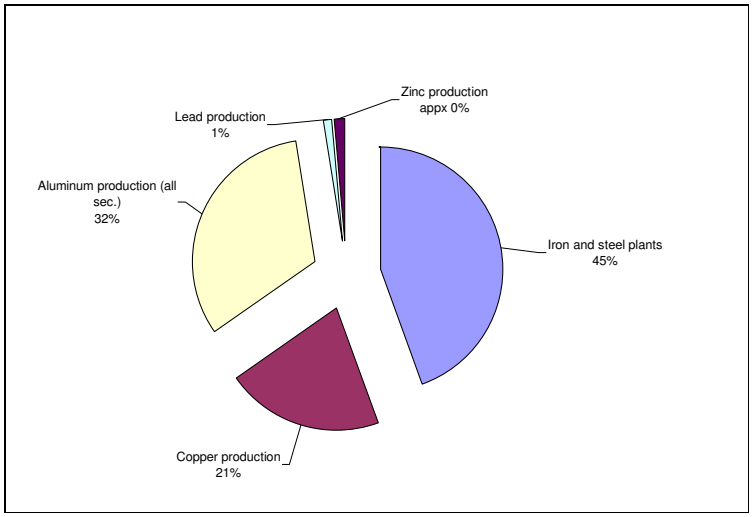
There are two steel smelters in Kenya which are currently operational .The total smelting capacity is 165,000 tonnes. Steel smelting involves the conversion of steel scrap into invention raw materials known as Ingots.

There 14 companies in Kenya with hot rolling facilities. The total release from

this sector is 6,402 g TEQ There is potential for this figure to increase since the technologies employed in the category are undeveloped. There is potential for total elimination in this sector by application of BAT and BEP.

Fig 2. 6 shows the contribution of the various metal types and operations for the sector.

Fig.2.6 Releases from Metallurgical Sectors

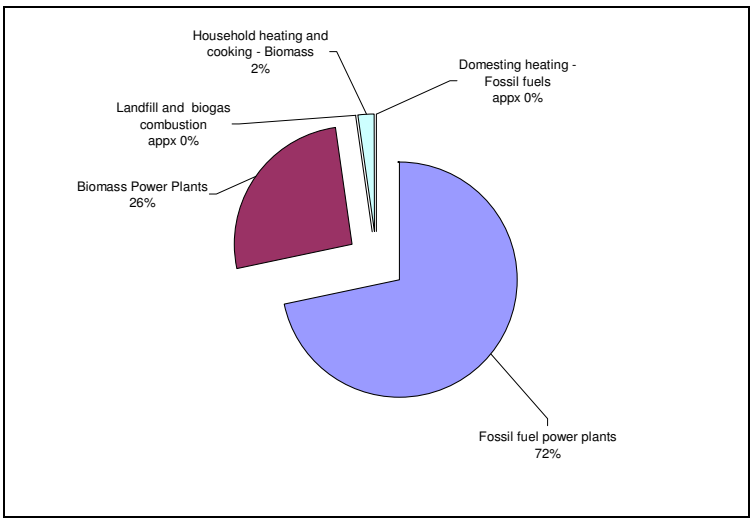


iii) Power Generation and Heating

This category produced 4.05 g TEQ arising principally from biomass combustion processes. Introduction of BAT would assist in minimizing, if not entirely eliminating, these emissions.

Fig 2.7 shows the contribution of each source for the category.

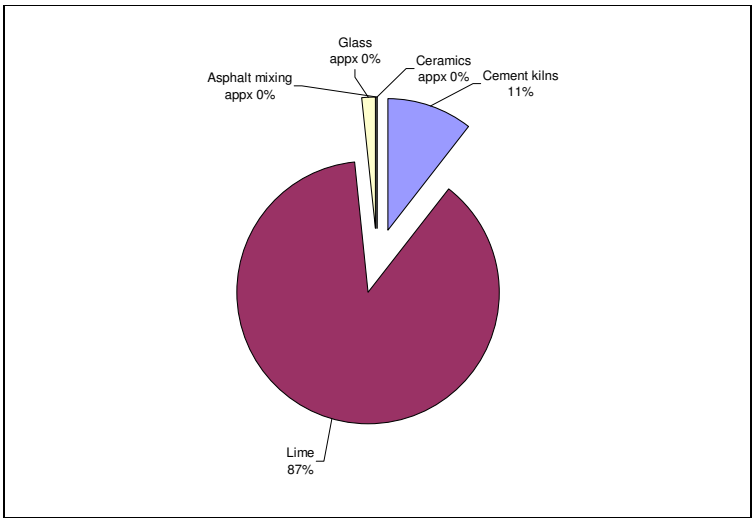
Fig 2.7 Dioxin Emissions from Power Plants and Heat Generation.



iv) Production of Minerals

This category produced 0.92 g TEQ mainly from the production of lime. Similarly, the introduction of BAT would be pivotal in the control of releases in this sector.

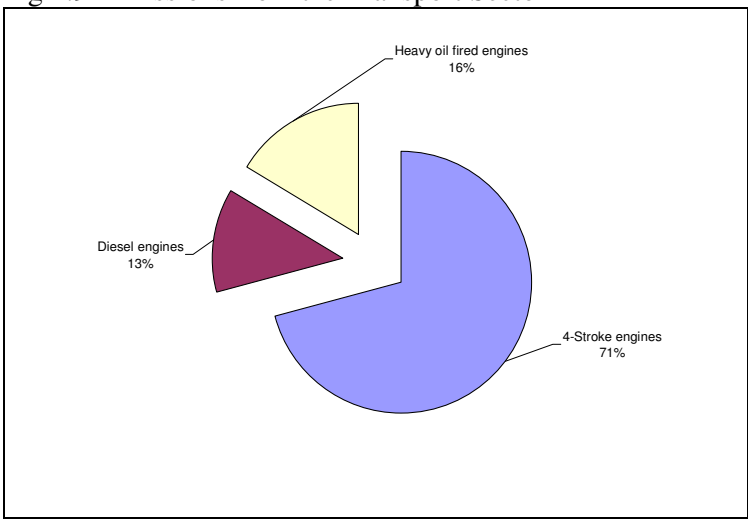
Table 2.7 Emissions fro Production of Minerals



v) Transport

This sector accounted for 1,194 g TEQ. This was primarily due to the combustion of leaded gasoline. It is hoped that, with the introduction of unleaded gasoline and the phasing out of leaded gasoline, releases from this sector will be reduced significantly. Currently due to the success in lead phaseout, these emissions must be minimal now

Fig 2.9 Emissions from the Transport Sector



vi) Uncontrolled Combustion

This was the main contributor to releases accounting for 3,164.4 g TEQ or 93% of the total release from all categories. The lack of controls on open air burning and, indeed, its encouragement for the purposes of reducing the volume of waste is a key concern. Use of BEP, especially in agriculture, would greatly reduce the amounts released.

Plate 2.4 is a picture of a typical open combustion of waste in a landfill. This one is for Dandora. Emissions are to air, water and into water.

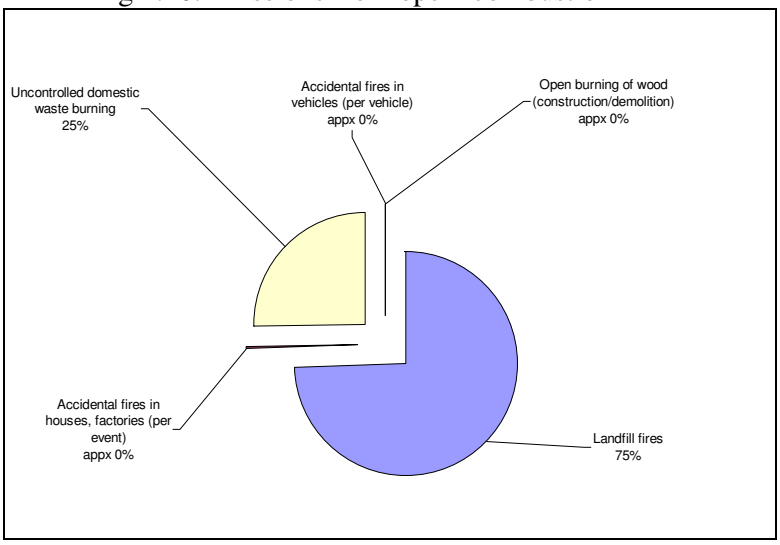
During the rains all the POPs residues are transferred to water and thereafter downstream to rivers such as Nairobi River, Athi River, River Nzoia, Lake Nakuru etc.

Fig. 2.9 shows the contribution of various sectors to this.

Plate 2.5 Open Burning of Waste at the Dandora Dumpsite.

Source: Rechal Wambui-iLima Kenya)

Fig 2.10.Emissions from open combustion



vii) **Production of Consumer Goods**

The contribution from this sector is relatively very small, 0.102 g TEQ, but it should be noted that this is from one main source, Webuye pulp and paper manufacturing.

viii) Miscellaneous

This category of sources contributes a relatively small amount, 0.032 g TEQ, mainly from crematoria. Adequate control in this area can be achieved by the introduction of BAT.

2.3.7.4. Projected Releases of PCDD/PCDF

As mentioned earlier, Kenya has undertaken an evaluation of current and projected releases derived from anthropogenic sources of the categories listed in Annex C of the Convention. This projected estimate is assumed to be the releases when no action has been taken.

Article 5 of the Convention contains obligations to minimize and eliminate the release of UPOPs. The following are the basis for action in respect to the obligations under this Article:

i) Article 5(c): There is currently little appreciation and understanding of the concepts of Best Available Techniques (BATs) and Best Environmental Practices (BEPs) that are required under this Article for many Kenyans. Addressing this will be key to minimizing dioxin/furan emissions.

ii) Article 5 (d): There is inadequate capacity in Kenya to adopt and apply BATs and BEPs.

iii) Article 5 (e) (i): There is an of opportunity for the administrative provisions for introducing BATs and BEPs to new sources exists under the Environmental Management and Coordination Act through Environmental Impact Assessment licenses and environmental audits

iv) Article 5(e) (ii): For old sources, the goal of continuous reduction can be achieved through annual environmental audits that are also required under the EMCA.

v) Article 5(f): The National POPs Committee is prioritizing the use of BAT and BEP guidelines. There is no reported industrial use of HCB and therefore no releases are anticipated.

vi) Article 5(g): Kenya lacks capacity to evaluate performance of achieving release limits more training for the UNEP Dioxin Furan Toolkit.

In line with past policies on environmental protection actions are being taken to reduce pollution in general by services and industry .This may have benefits in reducing releases. These measures include phasing out the use of leaded petrol and improved management of solid waste as a result of increased urbanization.

In 2007, it is expected that releases from vehicular sources will be essentially nil but these gains will be minor compared to the additional dioxin/furan releases from the combustion of an increased volume of solid waste. Pursuant to Article 7 of the

Convention, Kenya is developing an action plan to identify, characterize and address the release of chemicals listed in Annex C and facilitate the implementation of sub-paragraphs (b) to (e)..

For Annex C category III sources, project proposals have been made of procedures to minimise emissions in the following documents.

2.3.8. Measures to Reduce Or Eliminate Releases From Stockpiles and Wastes

2.3.8.1. Obsolete pesticides

The national inventory indicated that the total amount of obsolete pesticides, including contaminated soils, was 1,500,000 kg. These obsolete pesticides are located throughout various parts of the country mainly in the Nairobi, Western, Coast, Rift Valley, Central, Nyanza, Eastern and Northeastern provinces. The main holding facility was at Kitengela Store in Athi River.

2.3.8.2. Kitengela Store

This store, which was constructed in 1967. It covers an area of 21,000 ft² and is made of a mixture of wooden off-cut and sheet iron walls and having sheet iron roofing. It was constructed as a temporary storage facility for chemicals from Desert Locust Control Organization (DLCO) but, over time, has gradually converted to a general store for obsolete pesticides and other chemicals under the management of PBCB. However, this change in use was effected without upgrading the physical facilities of the store.

The chemicals accumulated in the store were collected from KFA stores, agricultural cooperative societies around the country, coffee and flower farms, and the Desert Locust Control Organization of East Africa (DLCO). As shown in photo 2.5. Map 2.6 shows the location of the store.

The chemicals deposited at the store were aldrin, dieldrin, heptachlor, endrin and furandan. Other chemicals included carbamates for malaria vector control, organophosphates such as endosulfan as well as fungicides and paints.

In the year 2000, AAK undertook to cleanup the Kitengela store and hired the Kenya Institute of Waste Management (KIWM) as consultants for this purpose.

The store is currently almost empty as most of the stockpiles were disposed of in 2000. The stockpiles remaining at the store comprise about 40 drums of contaminated soil and a few other chemicals for desert locust control such as quelotox and fenitrothion from DLCO at Wilson airport in Nairobi.

The insecticides used to control desert locusts included dieldrin and other organochlorine insecticides, which were eventually banned because of persistence, environmental effects, and accumulation in fatty tissues. Replacement insecticides included the organophosphate products fenitrothion, malathion and diazinone, and the carbamates carbaryl and propoxur. These are less hazardous to the environment but more hazardous to human and animal health

Between the time of its construction (1967) and the year 2000, the store had a dirt floor. The floor was cemented in the year 2000 but has since corroded and does

not offer much containment of toxic chemical leachates.

Plate 2.6. Drums of Waste at the Kitengela Store

Source: Ilima Kenya

Map 2.6. Map of the Kitengela Site

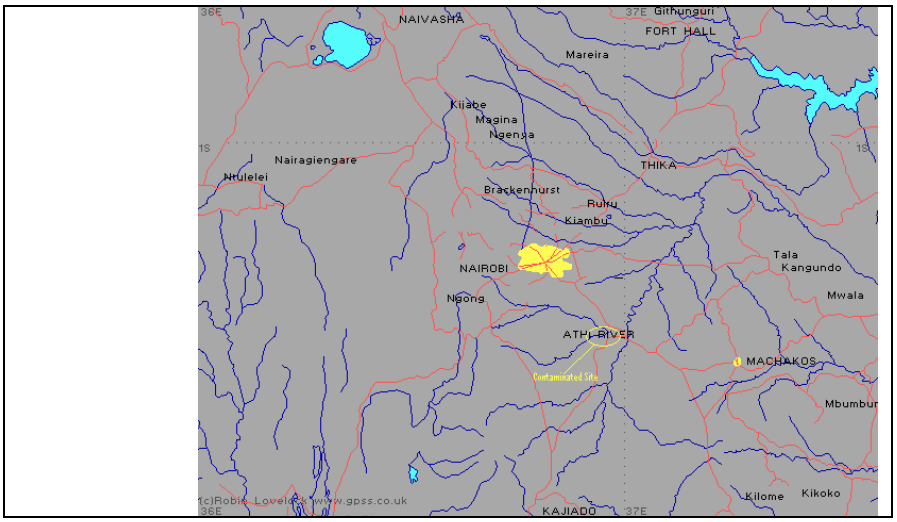


Table 2.14. Location and Quantities of Obsolete Pesticides by type

Substance	Volume		Weight	Location / Condition
	Liters	m^3	kg	
Aldrin			13.6	Kenya Farmers Association stores in Nairobi stores
			362	Ruiru Tatu Estate
	10		10	Egerton University
			5200	Contaminated with soil at Wajir Army Camp
Aldrin/Dieldrin		800		Contaminated soil at the Livestock Marketing Department
		2000		Contaminated soil at Mandera Airstrip
DDT	40			Faida Seed Nakuru
			80	Egerton University
			10	NIB Mwea
			740	KFA Nairobi
			125	KFA Nairobi
Lindane	180			Murphy Chemicals, Nairobi
	109			Thuti Factory
	198			Kiruga Factory

(Source: Kenya POPs Inventory, UNES, 2005)

Table 2.15. POPs Stockpiles and Wastes

Area/Site	Stockpiles of POPs Pesticides (tons)	POPs-contaminated Wastes (tones)
Nairobi	1.189	0
Kajiado	0	400
Kericho	0	2.5
Transnzoia	0	1
Nyandarua	0	6
Nyeri	3.0332	5
Meru central	0.1204	4
Meru north	0.52	0
Machako	0.181	0
Mandera	0	170
Embu	0.2773	0
Kisumu	0	9
Kisii	0.523	0
Wajir Livestock Marketing Project	0	350
Kirinyaga	0.6	
Total	**6.4439**	**947.5**

Plate 2.7. Measuring the depth of a contaminated area at Wajir Livestock Development site
(Source: Kenya POPs Office)

During the inventory exercise, it was claimed that Jir, Habaswein and Tarbaj are additional sites in the North Eastern province that could have a variety of buried POPs pesticides. This was verified and none was found. It is alleged that pesticides dumped in these sites could include lindane, dieldrin and aldrin. The three areas are estimated to have some 6,000 m^3 of *c*ontaminated soil.

Comprehensive and detailed information on these sites is provided in Table 2.10.

2.3.8.3. PCB Wastes.

The POPS inventory indicates that industrial POPs can be found in nearly all regions of Kenya.

PCBs are to be found in electrical transformers and capacitors in older factories, especially those built before1985. A large number of large factories were closed down in the 1980/90s and others relocated to neighboring countries as a result of unfavorable economic policies in Kenya then. It is possible that these closed facilities contained industrial POPs..

In 1995, the Swiss government advanced to KPLC 1.2 million Swiss francs for a disposal project that conducted the following activities:

- Analytical investigation (site survey);
- Excavation and packaging of contaminated soil and decontamination of sites;
- Transport and disposal; and
- Disposal of buried PCB-containing capacitors to avoid further contamination of soils.

The buried capacitors had leaked and had therefore contaminated the soil. Analyses revealed levels of contamination of up to 300,000 ppm (vs the safe level $\leq$ 50 ppm). To ensure that the environment was fully cleaned, all contaminated soil containing PCBs > 30 ppm was removed for disposal.

The hazardous equipment and materials were packed in UN-approved steel drums. A total of 449 drums were loaded into containers and transported to Helsinki, Finland, on December 3rd 1997. Unfortunately KPLC cannot be said to be PCB-free because the operation only focused on Ripple System capacitors. Transformers were not included. The KPLC is in the process of formulating a disposal policy.

The possibility of making the suppliers of equipment responsible for disposal is also being examined. Since this cleanup activity was undertaken in 2004 Unilever has exported its stocks of PCBs for disposal. The use of PCB-containing capacitors and transformers has been discouraged although no administrative control or restrictive directive to this effect has been imposed on any of the enterprises in Kenya.

b) Awareness of PCB Problem

The general public and many industrial employees, including managers, lack awareness of the hazards posed by the PCBs. They also lack knowledge of safe methods for handling equipment containing PCBs the local and national capacity to handle, manage and dispose of industrial POPs is inadequate. Technologies and techniques that are used to handle and destroy industrial POPs safely in developed countries are not available in Kenya.

The following constraints have been identified:

- The capacity to conduct analyses for PCBs in various media(air, water

and land) is also inadequate. Kenya's leading laboratories lack PCB reference standards and specialised laboratory equipment to enable timely and reliable analyses of samples.

- Although Kenya has enacted laws and regulations relating to a wide variety of chemical substances, industrial chemicals are not subject to regulations except in terms of meeting commercial standards. However, under the EMCA there is now a draft regulation for their registration. It will be finalized soon.
- Field assessment shows that the management and disposal of PCBs has been the responsibility of the equipment owners. These individuals may have gained disposal information from the equipment manufacturers, environmental awareness workshops and seminars, or from other sources.
- Accordingly, the equipment owners may have adopted various ways of handling and disposing of PCB-containing equipment and PCB-containing wastes.
- The release of information regarding the status of industrial POPs in premises proved to be difficult.

c) **Action on PCBs. Awareness**

Pursuant to SC Article 6 (a)(ii), Kenya has developed an inventory identifying products and articles in use and wastes consisting of, containing, or contaminated with, chemicals listed in Annex A, B or C, as **part** of the development of the National Implementation Plan.

The existing legal framework in Kenya is not yet specific enough to deal with PCBS. The technologies for handling and management are also lacking. There is a need to identify those technologies that can be introduced for the management of industrial POPs. In line with regulations developed under the Basel Convention on the Transboundary Movement of Hazardous Waste and their Disposal.

Plate 2.8. Kenya Power and Lighting Company depot for decommissioned transformers at Kisumu

Table 2.16. National Inventory of In-use and Waste PCB-containing Equipment

Equipment Type	In-Use Equipment Containing Askarel (tonnes, net weight)	Waste Equipment in Storage Containing Askarel (tonnes, gross weight)
Transformers	**23**	**41**
Capacitors	**26**	**1**
Other equipment	**Not Quantified**	**Not Quantified**
Total	**49**	**42**

Article 6 a(c) Measures to Reduce Releases from Wastes

The preliminary inventory of industrial POPs across s the country revealed a number of issues particularly in respect to PCBs. These include:

i The documentation that could have aided in identifying the manufacturer and the dates and scale of imports and exports of industrial POPs within departments, such as the Kenya Ports Authority, was inadequate. This made rationalizing the industrial POPs inventory difficult.

ii There was limited awareness of industrial POPs, particularly among multinational companies, including Firestone East Africa Limited, East African Breweries Limited, and Brooke Bond of Kenya Limited, KPLC Limited, Pan African Paper Mills Limited, major oil companies and the Magadi Soda Company.

iii It is widely believed that transformer oil from KPLC is generally sought after by garages in *Jua Kali* (informal sector)to be used as a coolant. In addition, PCB stocks may be in the hands of members of the general public who use it as ointment for medicinal purposes. The danger posed by such use is obviously substantial. It was not possible to assess either the quantities of PCBs held by Jua Kali garages or the general public.

iv It is common practice, following the construction of power stations, to bury in unmarked sites the wastes generated during the construction process. Such

sites are suspected of containing hazardous materials, including industrial POPs. The possible locations of such sites are the Seven Forks, Olkaria, Turkwell, and Kipevu. A specific concern arise from the fact that such sites are located within water catchments and therefore are potentially sources for the contamination of water resources with hazardous materials.

2.3.8.4. Possible Intervention Measures in Relation to PCB Management

The outcome of the preliminary inventory reveals a number of key areas that need to be addressed at the national level so that the country can comply with the requirements and obligations of the Stockholm Convention. The situation of careless disposal such as in Photo 2.9 could be minimised.

Pursuant to Article 6, paragraph 1(e), Kenya has develop appropriate strategies for identifying sites contaminated by PCBs for existing sources, a compulsory annual environmental audit; and new sources, an environmental impact assessment;

2.9 Waste Capacitors Possibly Containing PCBs in the Kenya Power and Lighting Waste Yard

Table 2.17. Location and Approximate Quantity of PCB-containing Equipment

Region	Company Name	Type of Equipment	No of Pieces of Equipment	Estimated PCB Content (kg)
Eastern	KBPC	Transformer	1	1350
Nairobi	Unilever (K) Ltd.	Capacitors	Containerized in a box	1500
	KPLC	Transformer	1 labeled PCB	500
C Central	Premier Bags and Cordage Industries	Capacitors	6	60
Rift valley	Brooke Bond (Chagaik Tea Factory and Kimari Tea actory)	Capacitors	7	84
Western /Nyanza	Pan African Paper Mills	Transformers	20	39075
	Swan Industries	Capacitors	6	60
	Muhoroni Sugar company	Capacitors	6	45
Total				**42,175**

Plate 2. 9: Waste Transformers

(Source Ndirangu KPLC)

Kenya has enacted regulations on wastes as part of the legislative and administrative measures pursuant to paragraph (d) of Article 6 of the SC. These measures are not part of the implementation plan but will be recognised as such when the NIP is endorsed. In fact, some of the considerations for capacity assessment recognised that Kenya is undergoing a systematic analysis of its legal and administrative capacity to implement the EMCA in general. From the inventory, some sites were recommended for further investigation as shown in Table 2.18 below.

2.3.9. Summary of future production, use and releases of POPs - Requirements for Exemption

An addition, there are likely to be releases of POPs from contaminated sites unless they are rapidly rehabilitated.

Table 2.18. Sites Suggested for Further Detailed Investigation

Sites	Reasons
Pan Paper Mills Kitengela	Bleaching using elemental chlorine produced without graphite electrodes Sites of application of dioxin-contaminated pesticides
Timsales, Several timber preservation sites	Using pentachlorophenol and other dioxin-containing preservatives in timber industry
Kenya Power and Lighting Company Sites, Pan Paper Mills, Kenya Airports Authority	Possibility of the presence of equipment containing: Low chlorinated, *e.g.,* Clophen A30, Aroclor 1242 Medium chlorinated, *e.g.,* Clophen A40, Aroclor 1248 Medium chlorinated, *e.g.,* Clophen A50, Aroclor 1254 High chlorinated, *e.g.,* Clophen A60, Aroclor 1260
Municipal Dump Sites	Possible dumps for wastes/residues from above activities and sources

2.3.10. Programmes for Monitoring Releases and Environmental and Human Health

Article 11 of the SC requires contracting parties to undertake research on POPs, development and monitoring in respect to:

(a) Sources and releases into the environment;
(b) Presence, levels and trends in humans and the environment;
(c) Environnemental transport, fate and transformation;
(d) Effects on human health and the environment;
(e) Socio-economic and cultural impacts;
(f) Release reduction and/or elimination; and
(g) Harmonized methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

2.3.10.1 Pesticides

a) Sources/ Releases into the Environment

In Kenya, there is no systematic monitoring of POPs in air. There has been sporadic monitoring of some POPS in water, sediments, and fish from marine and fresh water lakes and rivers. However very little work has been done in respect to land, residues and products. This has been due to lack of monitoring protocol;, limited funds and appropriate capacity to conduct the required analyses. A training workshop sponsored by the UNEP/GEF on the analysis of POPs pesticides and PCBs was conducted on 8-15 January 2007 at the University of Nairobi. Some training activities have also been carried out in the past at the same institution on analysis of POPS pesticides and almost none in respect to land, residues or products.

DDT has not been used in the control of vector borne diseases since 1986 and, accordingly, there has not been any systematic monitoring of DDT in the country yet sporadic academic publications have indicated the presence of DDT and its metabolites in the environment as well as in the food chain. The studies have reported.

a) Lake Victoria

Although few studies on the presence of DDT or its derivatives have been done in Kenya and especially the ecologically sensitive Lake Victoria In 1990. A study on Nile perch from Lake Victoria in detected mean levels of DDE in the range of 0.99 and 0.45 ppm in fat and fillet with a range of 0.002 to 4.51 kg^{-1} and 0.004 to 0.19 mg kg^{-1} fat lipid. The study concluded that DDT and its metabolites constituted the largest proportion of organochlorine residues in the fish species studied. The source of DDT could however not be explained. It needs follow-up.

b) Indian Ocean

Wandiga *et al., 1999*[70] indicated significant DDT use in agriculture. The study entitled" indicated that, in 1997, seawater samples were contaminated with lindane, aldrin, α-endosulfan, p,p DDE, dieldrin, p,p DDD and p,p DDT. Water samples from the confluence of River Sabaki that flows from the central highlands, which is a region of intensive agricultural and human activities, p,p DDT was detected (0.295 $ng.g^{-1}$) during the rainy seasons during the same year. Table 2.20 Shows the Concentration at various sites.

Table2. 19. DDT Levels measured at Four Sites at the Kenyan Coast

Mean Residue Concentrations in Water ($ng.g^{-1} \pm sd$)

DDT Type	Sabaki	Kilifi	Mombasa	Ramisi
P,p – DDE	0.213±0.032	0.299±0.175	0.175±0.456	0.064±0.035
P,p – DDD	0.295±0.231	0.177±0.146	0.072	0.058±0.017
P,p – DDT	0.168±0.067	0.370	BDL*	0.194±0.073

* BDL – Below Detectable Level.

The distribution of organchlorine pesticides along the Indian Ocean Coast of Kenya is given in Figures 2.1 and 2.2 below . The lowest concentrations of pesticides were found in water followed by sediments and fish. The concentrations were much lower than those found in many other parts of the world. There were no observations of high levels of DDE and DDD in the samples but the detection of various organochlorine pesticides indicates the ubiquitous nature of the pesticides in the tropics.

There is potential for proliferation of DDT into the country from Uganda and Tanzania, which have indicated they will DDT in disease vector control Ethiopia, is not only a user but also a producer. This underlines the urgent need to establish DDT surveillance and monitoring system capable of detecting new DDT sources. Coupled with this is the urgent need to mark potential sources of acquisition of

[70] "(Source: Wandiga et al., 1999), Distribution of organochlorine Pesticides in Marine Samples along the Indian Ocean Coast of Kenya

DDT and strengthen regulation mechanisms to ensure the substance is prevented from entering the country.

Kenya is in the process of taking preliminary measures to implement Article 11 of the Stockholm Convention. These include the identification of research institutions to conduct routine research and monitoring of DDT and other banned POPs substances countrywide. However they require capacity building to enable them to effectively undertake these activities.

Fig 2.11. Observed Mean Concentrations of Pesticides in Kenyan Marine Fish Lipid Tissue

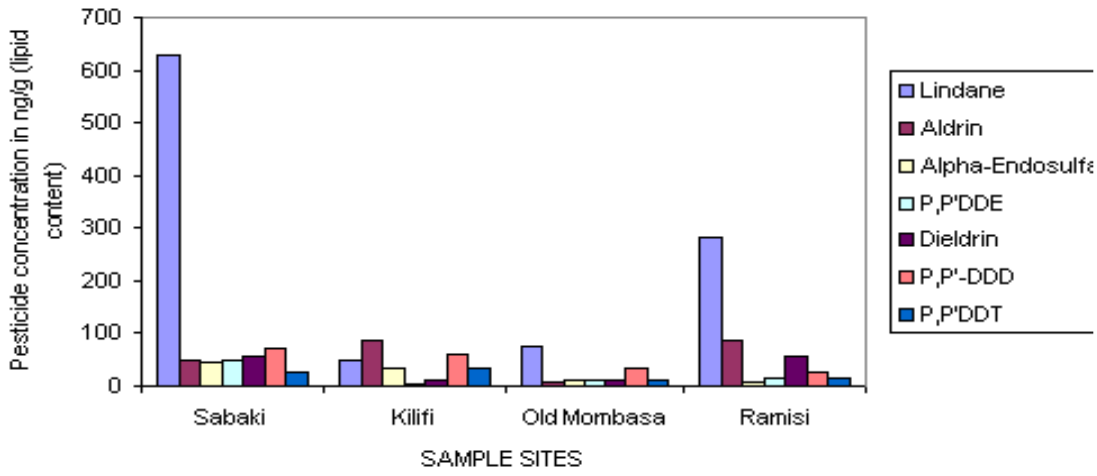
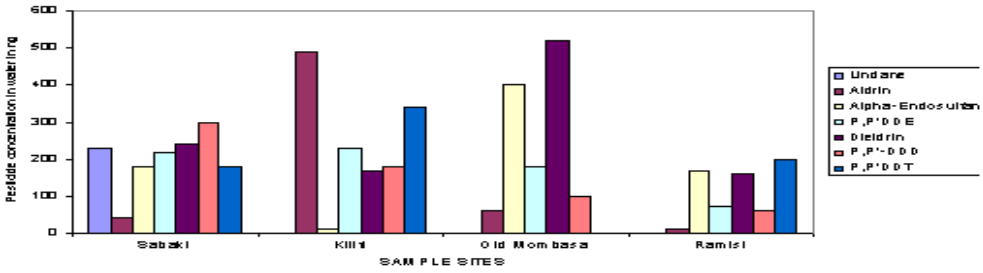


Fig 2.12. Observed Mean Concentrations of Pesticides in Seawater in Kenya
(Source: Wandiga et al., 1999)



c) Dioxins and Furans

To help understand the need to examine sources of U-POPs, the International POPs Elimination Network (IPEN) asked whether free-range chicken eggs might contain U-POPs if collected near potential sources of U-POPs as specified by the Stockholm Convention. Chicken eggs were chosen for several reasons; they are a common food item; their fat content makes them appropriate for monitoring chemicals that dissolve in fat and eggs are a powerful symbol of new life. To determine the level of contamination of the environment, it was important to collect free-range chicken eggs instead of store-bought eggs from each country and locality examined. Free range hens can easily access and eat soil animals and therefore their eggs were found to be a good tool for biomonitoring of contamination by U-POPs.

The Dandora dumpsite located in the Eastlands suburb of Nairobi (1°15'' South, 37 ° East). It is at an altitude of 2000 metres and has a population density of over 100 persons per square kilometre. The most obvious potential source of POPs releases at the site is the burning of PVC. There are several likely exposure pathways for POPs contamination. One would be through the consumption of free-range chicken eggs or other products from animals (such as goats, pigs and cows) that feed and drink from the surrounding area. Another would be through the consumption of vegetables grown along the banks of the river that passes around the edge of the dump. The direct inhalation of fumes from the site would be the other obvious pathway. The predominant wind direction is northwesterly where there is significant human habitation..

Just below the dumpsite is the Nairobi River (as seen in the pictures) that eventually drains into the Indian Ocean. The soils that are found on this site are usually well drained to moderately well drain. This means that chemical compounds like PCDD/PCDF in the ash can easily find their way into groundwater and end up in the river. There is also the possibility of rains washing off ash residues into the river. This river eventually empties into the Indian Ocean

Plate 2.10. Open Burning of Wastes at the Dandora Dumpsite

The levels of dioxins found in sampled eggs from Dandora were over six times higher than the EU dioxin limit for eggs. In addition, the samples exceeded the proposed limits for PCBs (in WHO-TEQs) by more than a factor of four. Table 2.20 shows that the level of dioxins in eggs (shown on the basis of fresh weight) exceeded one and half times the limit for commercial eggs in the USA.

Table 2.20. Levels of POPs in Lipids in Egg Samples from the Vicinity of the Dandora Dumpsite[71]

Substance	Mass per gm lipid
PCDD/Fs in WHO-TEQ	22.92 pg
PCBs in WHO-TEQ	8.10 pg
Total in WHO-TEQ	**31.02 pg**
PCBs (Σ7 congeners)	31.1 ng
HCB	4.40 ng

The US Food and Drug Administration estimates a lifetime excess cancer risk of 1 in 10,000 for eggs contaminated at a concentration of 1 pg/g TEQ. The samples collected near the dumpsite at Dandora substantially exceeded this concentration[64].

Table 2.21. Levels of POPs (fresh weight) in Egg Samples from the Vicinity of Dandora Dumpsite.

Type of UPOP	Concentration
PCDD/Fs in WHO-TEQ	2.64 pg/g
PCBs in WHO-TEQ	0.93 pg/g
Total WHO-TEQ	3.57 pg/g
PCBs (Σ7 congeners)	3.58 ng/g
HCB	0.51 ng/g

Levels of PCDD/Fs in eggs from Dandora were compared with other measurements of these compounds in eggs. These comparisons are made between the means for pooled samples at Dandora dumpstes with measurements of pooled sample mean values obtained from larger studies in other countries.

The composite egg sample from Dandora exceeds 18 times background levels (*i.e.,* 0.2 - 1.2 pg WHO-TEQ/g lipid) but is lower than concentrations found near an old waste incinerator in Naincy (France) and in an area affected by waste incineration residues in Newcastle (UK)[i]. Mean values of 42.47 pg and 31 pg WHO-TEQ/g lipids respectively were obtained at these latter locations.

Plate 2.11. Residues of Open Burning at The Kangoki dumpsite in Thika

[71] (Source: IPEN Egg Report)

2.3.11 Human Health

a) Malaria

The resurgence of highland malaria has been the main driver of the debate to re-introduce DDT in Kenya. Currently malaria accounts for more than 30% of the total national disease burden[72]. Children under 5 years of age are the most vulnerable as malaria claims 2,000 childhood deaths monthly. It is estimated that 26,132 deaths occur each year due to malaria. This translates into the deaths of 3-5 children per hour. In Kenya, *plasmodium falciparum* is the commonest malarial infection agent (accounting for 98%) while *plasmodium malarie* and *plasmodium ovale* contribute only 2% of the total malaria infection. Currently, malaria is spreading to other areas that had previously been free of the disease. This is attributed to global warming that has made it possible for the malaria parasite to develop (in mosquitoes) in new areas which were in the past considered too cold for the malaria breeding mosquito..

Most malarial infections take place in villages far removed from health care facilities. This impedes prompt and correct diagnosis, which is crucial to early successful treatment and disease management. Equally crucial is compliance with the treatment regime that is often difficult to monitor especially in cases where the patients are poverty-stricken. This infers the urgent need to

[72] Government of Kenya/Ministry of Health, DDT Position Paper, 2006

decentralize diagnostic and treatment facilities to the areas affected. On the other hand, community education on diagnosis and treatment could help stem the death toll from malaria. This concept is reflected in the 1994 Ministry of Health policy framework, which also proposes *inter alia* strengthening of case management as a matter of priority. Development of guidelines for malaria diagnosis, treatment and prevention in the face of drug resistant malaria strains requires new methods and approaches for its containment.

b)Alternatives to DDT

Alternatives to DDT are expected to focus on the use of effective vector control strategies and methods. These strategies will be promoted through inter-institutional cooperation. Primary research will, on the other hand, focus on the following critical areas:

- The development of integrated pest and vector management strategies (IPM/IVM);
- Integrated management programmes;
- managerial support systems that facilitate the implementation of IVM;
- Research on the incorporation of risk assessment and management measures into infrastructure projects;
- Research on social and behavioral aspects of perceived needs and the willingness of communities to participate in malaria control activities;
- Use of biological malaria control methods such as *Bti, Bs*, fungi, nematodes, copepods and other botanicals in routine programmes;
- Development of cost-effective pyrethroids and other mosquito adulticides for indoor residual spraying in operational settings;
- Development of sectoral insecticide management programmes; and
- Promotion of impregnated bednets in malarial regions.

Establishing Pollutant Release Register: A Case Study at Nakuru

The Municipal Council of Nakuru has been involved in environmental monitoring since 1994 when the council prepared environmental by-laws. These by-laws oblige industrial and commercial enterprises to undertake environmental audits. Non remittance of Audit Assessment and Reports can lead to a fine of Kshs.60, 000, to a period of imprisonment not exceeding twelve months or both. Though it is costly to meet these requirements, the level of awareness and compliance has been high because of the penalties of non-compliance.

The Council has two open-air solid waste disposal sites that handle industrial, clinical and domestic wastes. There is growing concern within the Municipality and also by the JICA funded Environmental Monitoring Project, the AFD Solid Waste Management Project and the Joint Programme with the World Wildlife Foundation (WWF) that lake contamination by effluents is increasing.

CHAPTER 3: STRATEGY AND ACTION PLAN: ELEMENTS OF THE NATIONAL IMPLEMENTATION PLAN

3.0 Introduction

Development of the NIP has taken into account relevant national circumstances, Following a step-wise process as outlined in the convention guidance document. Throughout this process, it has become apparent that the Government of Kenya (GoK) recognizes the urgency of addressing POPs issues as provided for in the Convention. This was emphasized by the statement of the GOK to the First Conference of the Parties (COP 1) of the Stockholm Convention, held in May, 2005, in Punta del Este, Uruguay. In this respect, the Head of Delegation to COP 1, Mrs. Rachel Arungah, the then Permanent Secretary Ministry of Environment and Natural Resources, stated:

> *"This Convention is one of the most important multilateral Environmental Agreements as it addresses health and environmental quality issues and we are gratified to be party to it.*
>
> *Although Kenya does not manufacture any of the POPs, the national POPs inventory indicates the presence of some of the twelve POPs either as obsolete waste awaiting disposal or having polluted the environment.*
>
> *The preparatory activities for development of our National Implementation Plan have highlighted health, environment and socio-economic impacts caused by these pollutants. This phase has also identified Kenya's management priorities that require development of appropriate short and long-term interventions. We are convinced that implementation of this Convention will result in improved quality of life for our people in terms of better health, job creation, poverty reduction and improved environment"*

The greatest challenge for Kenya is to develop an implementation framework that comprehensively domesticates the Stockholm Convention and other relevant international agreements. This will most effectively be dealt with by the promulgation of relevant policies, subsidiary legislation, voluntary tools, economic instruments and political commitments.

3.1 Drivers of Implementation

Subsidiary legislation on chemicals' management has a precedent to follow with the development of regulations for the management of Ozone Depleting Substances (ODS). As the SERC of EMCA prepares to develop regulations to manage chemicals in the country the following must be considered in order to effectively manage POPs.

Firstly, there is need to harmonize the policies and legislation regulating chemical management. Thus, there may be a need to repeal, merge or amend some provisions of the current laws to avoid duplication or conflict. It is

suggested that chemical control legislation should be comprehensive and specific, laying out requirements of handling chemicals, restrictions, direction in the manner of production and requirement for mitigation measures where damage is expected.

It is crucial that the legal capacity in Kenya be built in order to effectively manage POPs. This can only be achieved through the following ways:-

- Immediate development of specific POPs regulations;
- Establishment of an adequately staffed and chemical unit at MENR;
- Acquisition of appropriate equipment for use in monitoring and analysis of POPs;
- Recruitment of trained prosecutors and customs officials well inducted in their role in chemical management; and
- Establishment of a coordination mechanism for institutions involved in the NIP.

3.1.1 Synergies among Multilateral Environmental Agreements.

Kenya stands to have a comprehensive system of dealing with POPs by adoption and domestication of the provisions of Conventions and Protocols that deal with POPs and waste in general. The Stockholm Convention recognizes this in its preamble. It recalls the pertinent provisions of the relevant international environmental conventions, and in particular the Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous chemicals and pesticides in international trade and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal.

To minimize duplication of efforts and ensure timely delivery of adequate technical assistance, synergies will be identified and promoted with other relevant multilateral environmental agreements. Some of the international treaty law that deals with POPs and for which there will be synergies discussed below:

(i) The Rotterdam Convention PIC[73]

This Convention preceded the Stockholm Convention and prescribes the prior informed consent(PIC). The Convention was adopted on 11th September 1998 and came into force on 24th February 2004. Kenya deposited her instruments of ratification on 4th February 2004.

The scope of the Convention covers pesticides and industrial chemicals banned or severely restricted for health or environmental reasons. Many of the chemicals listed in the Rotterdam Convention are also in Annexes A and B of the Stockholm Convention. Most of the chemicals included in

[73] www.pic.int

the latter were included in the former this subjects them to national regulatory actions to ban or restrict them.

The Rotterdam Convention emphasises on the Prior Informed Consent (PIC) Procedure and the eventual ceasation of use of harmful pesticides and industrial chemicals. Under the Convention the exporter of these chemicals is supposed to provide extensive information to the proposed importer on the potential hazards that the chemical may cause human and environmental health. Kenya's ratification of the Rotterdam Convention will evidently boost the success of POPs management in the country. Any POPs which may continue to be needed will be imported subject to the PIC procedures.

ii) The Basel Convention

The Basel Convention on the control of transboundary movement of hazardous wastes and their disposal was adopted on 22nd of March 1989 and came into force on 5th May 1992. This Convention provides for import and export management and control regimes relating to hazardous wastes. Whereas the Rotterdam Convention focuses on chemicals in commerce, the Basel Convention is concerned about hazardous wastes. The Convention has developed guidelines for managing wastes contaminated by chemicals in Annexes A and B of the Stockholm Convention and recognizes these guidelines as BATs and BEPs.

Responsibilities of Party States include minimization of the generation of hazardous wastes, provision of adequate disposal facilities, prevention of pollution, reduction of the transboundary movement of hazardous wastes and provision of information on hazardous wastes imported into the country. Use of ESM in managing wastes and stockpiles could, therefore, follow the guidelines provided by this Convention that were approved at the 8th Meeting of the Conference of Parties to the Basel Convention which Was Hosted by Kenya on 27th November -5th December, 2006.

Kenya acceded to this Convention on the 1st of June 2000. The provisions of the Convention have been domesticated in EMCA Section 141, which makes it an offence to import, dispose or otherwise manage hazardous wastes contrary to the provisions of the Act. NEMA has formulated regulations on waste management that have been gazetted.

A successful POPs management regime will require harmonization on several fronts. As discussed, Kenya's POPs management system could benefit from synchronization of national legislation, the Stockholm Convention and other international and regional agreements whose contents may be related.

3.1.2. Harmonization of Regulations on Chemicals

Harmonization of POPs management nationally is of utmost importance. In the first instance, national policy should focus on developing an acceptable plan on environmentally sound management of chemicals and waste. To achieve this, it is important to involve key stakeholders in development, improvement and implementation of the policy. As Kenya moves towards industrialization by 2020, the chemicals industry; making POPs management as important as management of other hazardous chemicals and wastes. Thus:

- POPs management policy must be acceptable, based on universally accepted scientific risk- based assessment of POPs and should incorporate core principles of safety and environmental conservation.

- Sustainable management and development should focus on risk reduction management;

- According to the precautionary principle, threats of damage to the environment; even if there is lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation;

- The "cradle to grave" approach to chemical/waste safety relates to the management of risk throughout the process of chemical management from start to finish.

The second step towards harmonization includes the establishment of Standards. The Standards Enforcement Review Committee (SERC) created under EMCA, 1999 is charged with this responsibility in Kenya.

The concept of exchange of information is embodied in all the three Conventions, namely, Rotterdam, Basel and Stockholm. The availability of a pool of information is key in understanding the state of affairs in chemical management and equips Kenya in the development of a framework to deal with possible risks that may arise to human health or the environment. The Kenyan policy and legislative framework applicable to POPs management is embodied in several statutes that deal with chemicals management, either directly or indirectly. Most of the statutes are sectoral apart from the EMCA, 1999 which provides the legal framework. However, as the Stockholm Convention has only recently come into force, there is no statute that is specific to POPs. Thus, the regulatory regime within which implementation of the Convention will occur includes several pieces of legislation as follows:

(i) Public Health Act (Cap 242 Laws of Kenya)

The objective of this Act is to provide for measures to secure and maintain the health of the public. One of the sources of POPs is pharmaceutical and health-sector generated wastes. The relevant provisions with regard to POPs and chemicals management in general are in Part IX of the Act. Section 115 of the Act prohibits any person from causing a nuisance, or

from keeping in their premises any nuisance or condition, that may be injurious to human health. POPs, as well as other chemicals, are captured within the ambit of this section. Section 118 of the Act provides:

"*The following shall be deemed to be nuisances liable to be dealt with in the manner provided in this part-*

Any accumulation or deposit of refuse, offal manure or other matter whatsoever which is offensive or which is injurious or dangerous to health and Any factory or trade premises causing or giving rise to smells or effluvia which are offensive or which are injurious or dangerous to health

(ii) Malaria Prevention Act (Cap 246 Laws of Kenya)

Malaria Prevention Act does not provide for chemicals management specifically. Its role is limited to malaria prevention involving the use of DDT. Under Annex B of the Convention, use of DDT is restricted to disease vector control. The Convention sets out registration requirements prior to use of DDT by any Contracting Party. This Act could be used to legislate the use of alternatives to DDT for malaria vector control.

(iii) Local Government Act (Cap 265 Laws of Kenya).

With regard to chemicals management, local authorities have the powers as set out by laws specific to circumstances of the area under their jurisdiction. The Act further empowers local authorities to:

"*control or prohibit all businesses, factories and workshops which, by reason of smoke, fumes, chemicals, gases, dust, smell, noise, vibration or other cause, may be or become a source of danger, discomfort or annoyance to the neighbourhood, and to prescribe the conditions subject to which such businesses, factories and workshops shall be carried on"*

These provisions may be enforced to cover many of the POPs source categories, thereby placing them under the jurisdiction of the Local Government Act and introducing BAT and BEP guidelines. Through these powers, local authorities can impose, control and manage sources of POPs within their jurisdiction. In addition, by-laws can be developed to facilitate implementation of any laws that may deal specifically with POPs. The local authorities are pivotal agents in this regard as they are able to engage communities at the grassroots level, various other stakeholders and the public at large.

(iv) Factories and Other Places of Work Act Cap

The objective of this Act, as set out in its preamble, is to provide for the health, safety and welfare of persons employed in factories and other work places.

The role of the Act with regard to POPs management is in respect to the protection of human health in the work place. Section 51 of the Act provides that:

"In every factory in which, in connection with any process carried on, there is given off any dust or fume or other impurity of such character and to such extent as to be likely to be injurious or offensive to the

persons employed, or any substantial quantity of dust of any kind, all practicable measures, shall be taken to protect the persons employed against inhalation of the dust or fume or other impurity and to prevent its accumulation in any workroom…"

(v) Water Act No. 8 of 2002

This Act plays a unique role in protection of water resources. Like the EMCA, 1999; the Act adopts a supervisory and precautionary approach. The provisions of the Act that contribute to the control of POPs are the permit requirements provided for under Section 25 (1) namely:

a) "A permit shall be required for any of the following purposes: -

b) the discharge of a pollutant into any water resource.

c) No person shall, without authority under this Act:

Throw or convey, or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource."

Section 25 (2) states:

"A person who contravenes this section shall be guilty of an offence."

The current water standards do not include reference to POPs. This will need to be addressed in the implementation phase.

(vi) Pest Control Products Act (Cap 346, Laws of Kenya)

The Pest Control Products Act was enacted to regulate the import, export, manufacture, distribution and use of products that control pests and the organic functions of plants and animals.

The Act adopts a prohibitory approach in regulations as is illustrated in its key provisions:

Section 3(1) prohibits persons from manufacturing, packing, storing, displaying, distributing, using or advertising any pest control product except in accordance with the regulations made under the Act.

Section 4(1) provides that no person shall import into Kenya any pest control product unless that product has been registered, packaged and labeled in accordance with the regulations made under the Act and it conforms to the standards specified in those regulations. Export and re-export is also prohibited in the same manner (under Section 4(2)). Majority of the POPs are pesticides and seven(7) of the 9 intentional POPs have been banned in Kenya or are restricted for their impacts to health and mirex has never been authorized to be imported.

The Pest Control Products Board is established under Section 5 to enforce the provisions of the Act. The Board's functions include assessment and evaluation of pest control products and registration of the same. It takes into consideration both the local and international regulatory regime for the substances.

Some of the regulations promulgated under the Act include:

- The Pest Control Products (Licensing of Premises) Regulations, L.N. 145/1984;
- The Pest Control Products (Labeling, Advertising and Packaging) Regulations, L.N. 89/1984;
- The Pest Control Products (Registration) Regulations, L.N No 46/1984, and
- The Pest Control Products (Importation and Exportation) Regulations, L.N No 146/1984.

(vii) The Environmental Management and Coordination Act, 1999

The statutes related to chemicals generally deal with chemicals in terms of pollution, import, export and the protection of persons from their harmful effects. These laws are not entirely effective with regard to POPs management as the chemicals that fall within the ambit of their control were not classified according to the characteristics assigned to POPs. Furthermore, at the time of their enactment, emphasis was not on the preservation and management of the environment. Accordingly, they cannot alone form an adequate legislative base for POPs management.

These shortcomings are being addressed in subsidiary legislation. However, the EMCA, 1999 does not fully provide a comprehensive legal framework for the management of POPs. The EMCA, 1999 contains a framework of provisions for the management of toxic and hazardous chemicals and calls for development of regulations in respect to specific chemicals.

3.2. IMPLEMENTATION STRATEGY

The proposed strategy follows closely the recommendations of the First Conference of Parties to the Convention held in May 2005.It calls for intensive coordination among the statkeholders of POPs and a serious mobilization of technical and financial resources.

3.2.1. Coordinating Mechanisms and Organization of Process

(i) Identification of the focal point

The National Environment Management Authority (NEMA) has been identified as the Focal Point for the implementation of the Stockholm Convention and has created a National POPs Policy Committee.

(ii) Establishment of a multi-stakeholder coordinating committee

A multi-stakeholder National Coordinating Committee (NCC) has been established with members selected on the basis of a stakeholder analysis. Stakeholders include individuals in the sectors of environment, agriculture, industry, import and export, public health, trade and transport.

The NCC has the following responsibilities:

- Identification and assignment of responsibilities among the relevant government departments and other stakeholders for the

various aspects of POPs management;

- Carrying out an inventory of POPs in Kenya and an assessment of infrastructure;
- Setting priorities and overseeing the development of the NIP; and
- Ensuring the endorsement of the NIP by the Standards Review and Enforcement Committee.

3.2.2. Assessment of Capacity

Assessments of capacity have been made in the areas of policy, legal and socio-economic factors, financial mobilization and information exchange, public information, awareness and education, socio-economic issues and research.

It was found out that there is need to develop activities that promote capacity building, human resource development and institutional development and strengthening.

3.2.3. Establishment of Priorities

The NIP priorities identified at the Priority Setting workshop held in Kakamega in October 2003 and in Naivasha in July 2004 included the following:

- Development and updating of NIP as called for in Article 7 of the Convention
- Constant review of the infrastructure, capacity and institutions at the national and local levels and the potential to support them in the light of the convention;
- Training for decision makers, manager and personnel responsible for POPS issues;
- Strengthening research capacity at the national levels;
- Development and establishment of laboratory capacity;
- Promotion of standard sampling and analysis procedures;
- Development and commercialising alternatives to DDT;
- Disposal of POPS waste according to guidelines adopted at COP8;
- Identification and promotion of BATs and BEPs according to the guidelines likely to be approved at COP3;
- Identification and remediation of sites contaminated with POPs;
- Promotion of awareness-raising and information disseminations programmes including awareness raising among the general public on issues related to POPs; and
- Identification of obstacles and barriers to transfer of technology and means to overcome them.

3.2.4 Sectoral Action Plans

Identified priority action plans included:

- Disposal of contaminated soils in an ESM;
- Promotion of awareness of pyrethrum alternatives to DDT;

- Commercial development of alternatives to DDT;
- Identification and labelling equipment with PCBs higher than 50 ppm;
- Introduction of BAT/BEP to minimise U-POPs emissions;
- Education and awareness on all POPs;
- Capacity building at ENR, MOH, NEMA, PCPB, GC;
- Mobilising resources to prepare and implement the NIP; and
- Dissemination of research findings through sector specific symposia, workshops and seminars.

3.2.5. Monitoring

Previously, monitoring of POPs in air, water and land has not been carried out. Thus, monitoring was needed on Lakes Victoria, Nakuru and Naivasha and all rivers located in agricultural areas or regions with major POPs emissions. Further, there is need to undertake monitoring of POPs in air and land especially around suspected contaminated sites.

3.3 STRATEGIES AND ACTION PLANS

3.3.1 Overview

Key objectives of the NIP are as follows:

- To minimize exposure of Kenyans to POPs through implementation of chemical safety measures;
- To mobilize financial resources from private, local, regional and international financing mechanisms;
- To catalyze and guide environmental activities undertaken by all national stakeholders to comply with the Convention;
- To ensure integration of POPs management concerns into planning and development frameworks for NEMA and other lead agencies through AIEs and EAs;
- To ensure compliance and enforcement of regulations, guidelines and standards made in furtherance of the Convention through education, awareness and facilitaion;
- To coordinate, document and disseminate POPs-related research activities;
- To cooperate with the POPS global community in the implementation of the Convention;
- To develop national and subsidiary legislation for proper management of POPs; and
- To ensure that POPs management are included in the chemical regulations in Kenya.

3.3.2 Institutional and Regulatory Strengthening Measures

There would be a need to harmonize the legislation regulating chemical management. There may be a need to repeal, merge or amend some provisions of the current laws to avoid duplication or conflicts in the law.

It is suggested that chemical control legislation should be comprehensive and specific, clearly laying out requirements for handling chemicals,

restrictions in the use of chemicals, direction in the manner of production, and the requirements for mitigation measures where damage is occasioned or probable. In this context, the immediate development of chemical regulations is emhasised include Introduction of the polluter pays principle to potential users of POPs and current and potential sources of POPs compounds and promotion of the precautionary principle as a way of buying in the BAT and BEP.

3.3.2.1. Enforcement

It is crucial that the legal capacity be built to effectively promote enforcement of POPs chemical regulations. This will involve establishment of an adequately staffed chemical unit in the MENR; acquisition of appropriate equipment for use in monitoring and analysis of chemicals; and recruitment of prosecutors and customs officials well trained in all relevant aspects of chemicals management**.**

3.3.2.2. Institutional Coordination

Effective co-ordination among the whole range of those who have responsibility for or a stake in chemicals issues means that all those involved:

- Familiarize with each others' POPs-related activities, priorities and positions, and the underlying reasons for each; and
- Use that information to make better and strategic decisions on chemicals issues.

Benefits of such co-ordination can include:

- Common positions on issues are identified and reinforced;
- Synergies are created - work can take place in collaboration instead of in isolation, resulting in additional benefits to institutions;
- Duplication of efforts is avoided where possible, freeing up scarce resources for other priority issues; and
- Gaps in chemicals management are identified and understanding of divergent issues is increased, thereby decreasing potential for misunderstanding.

Various national institutions charged with coordination and the management of POPs will provide guidance on compliance measures in a synergetic manner. To facilitate this, it is critical that MENR, as the SC focal point, actualizes the implementation of the provisions of the Convention and incorporates relevant actions into its strategic plan. Furthermore, activities will be developed that inform and sensitize members of the public on the importance of the safe management of POPs for human health and environmental protection purposes.

During the course of implementation, it will be necessary for the Government of Kenya to ensure, through its policy pronouncements, that the private sector has a responsibility to educate and train persons working with POPs on the utilization, storage, disposal and other management issues relating to POPs. Also, the business environment for private investors facilitates foreign direct investment (FDI) into Kenya that can introduce appropriate technologies for management of POPs and their environmentally sound disposal.

3.3.3. Import and Export, Use, Stockpiles and Wastes

3.3.3.1. Production

None of the POPs pesticides are produced in Kenya. Importation, export and use of pesticides is regulated under Pest Control Products Act while stockpiles and wastes containing POPs are controlled under EMCA, 1999. The following areas constitute NIP activities:

- Preparation of detailed inventory of pesticides, stockpiles and wastes that could have been omitted from previous inventories plus the containment of, and access restricted to, those already identified and included in inventories;
- Disposal of stocks already identified and decontamination of sites;
- Development of legislation to address the issue of POPs-containing wastes, especially future imports, and the consideration of possible registration for candidate POPs;
- Development of arrangements for the acquisition of appropriate technologies for the purposes of management and destruction of POPs-containing wastes to low POPs content;
- Development of projects for clean up activities for obsolete POPs pesticides for all sites identified in the inventory;
- Making arrangements to use regional technologies and mechanisms of management where they exist to good purpose;
- Development and adoption of practical and affordable practices for protecting workers and communities handling obsolete POPs pesticides;
- Adopting the guidelines under the Basel Convention regarding wastes containing POPs pesticides;
- Adapting BAT and BEP guidelines to disposal;
- Developing cooperation among institutional and private stakeholders with the capacity, or potential capacity, to manage obsolete pesticides;
- Development of national and international linkages in collaboration with relevant parties especially neighbouring East African countries; and
- Seeking local civil society, private sector and donor support to

sustain the management of obsolete POPs pesticides and management of other chemicals.

3.3.3.2. Priority Actions

These will include:

- Immediate stoppage of open-air burning of old plastic pesticide containers through the issuance of a circular by NEMA;
- Recycling of certain chemicals and plastic containers after use in association with pesticides stopped/prevented;
- Exploring the use of alternative containers which are biodegradable;
- Supporting organic farming on small and large scales ;
- Enforcing pesticide disposal regulations according to the Pest Control Product Board regulations;
- Ensuring containment of obsolete POPs pesticides to minimize further exposure of the public and contamination of the environment;
- Adoption of comprehensive education programmes to cover knowledge, attitude and practices (KAP) and protection of stakeholders and workers dealing with the obsolete POPs and other chemicals from the point of generation to the point of disposal, especially by women and children; and
- Introduction of Integrated Pesticide Management strategies.

3.3.4 DDT

There is a need to strengthen the national capacity and capability to perform chemical analysis and monitoring of POPs. This requires significant investment and sustained resources both in human and financial terms that may not have been prioritized by the government previously. To achieve this, there is need :

i. To ensure that a legal framework, including infrastructure for compliance assurance and enforcement, is adopted at the national level and where necessary, existing international experiences should be consulted and fully utilized;
ii. For collaborative studies and analyses among laboratories, both at national and international levels to fulfill the requirements of the Convention and other agreements;
iii. To create properly trained personnel and research and development facilities (*i.e.,* laboratories, analytical equipment and its maintenance, availability of reagents and standards, etc.) including identification and strengthening of existing laboratories having trained personnel that can coordinate and initiate collaborative studies and analyses and train others; and
iv. To establish financing and other assistance mechanisms that would

contribute to high quality laboratory capacity, *e.g.,* working in partnership with donor countries.

3.3.4.1 Short Term Activities

The following actions are to be achieved in the first 18 months:

i) Disposing of obsolete DDT stocks in all areas while promoting the use of ITN, especially where it has not been tried;

ii) Building national awareness of the health effects of DDT, especially in malaria endemic areas;

iii) Undertaking laboratory analyses to determine the distribution of DDT in the environment;

iv) Undertaking sustained and continuous monitoring of DDT in the environment;

v) Encouraging more investment in research for development of effective and affordable alternatives to DDT;

vi) Undertaking a comprehensive review and assessment of current alternatives to DDT followed by epidemiological surveillance;

vii) Identifying the social aspects of banning DDT;

viii) Strengthening the national and local institutional capacity to control malaria without the use of DDT, e.g., National Malaria Program, African Academy of Sciences; and

ix) Promoting IVM / IPM programmes in Kenya.

3.3.4.2. Medium Actions

The following actions are included in the NIP in respect to DDT to be achieved in the first 3 years:

i) Conducting of pilot projects using alternatives to DDT in specific areas and subsequent assessments;

ii) Applying non-chemical methods for eradicating mosquitoes, such as biological control, in some areas for several seasons followed by assessments of efficacy;

iii) Improving of socio-economic conditions in malaria prone areas to obviate environmental circumstances that encourage mosquitoes to breed;

iv) Strengthening research on pesticides with lower persistence;

v) Improving/strengthening Kenya's farming and public health practices with administrative/legal enforcement mechanisms for the management of DDT and its alternatives.

vi) Monitoring DDT presence in biological samples and assessing the health impact on the population;

vii) Looking into ways of coping with adaptation mechanisms of malaria vectors to avoid the use of DDT;

viii) Promoting environmental management alongside the introduction of alternatives;

ix) Promoting IVM, while taking account of the fact that mosquitoes have synchronized habits with preventive measures; and

x) Considering the economic and other effects of DDT reintroduction in Kenya.

Table 3.1: Summary of Issues in Relation to DDT and Recommended Activities

Item	**Issue**	**Recommended Activity**
1	Obsolete DDT still held in some stores	Immediate disposal of obsolete DDT in stock in all areas in an environmentally sound manner
2	DDT still in the environment	Continuous monitoring of DDT in the environment Promote alternatives to DDT. Update o data on DDT in mothers milk
3	Data on environmental monitoring inadequate	Strengthen analytical capability in selected laboratories for the purposes of monitoring DDT
4	Social impacts of banning DDT	Identify success of alternatives
5	Alternative to DDT not fully exploited	▪ Identify all available alternatives and exploit all malaria prevention tools ▪ Strengthen research and capacity building, training and carry out epidemiological studies and surveillance of alternatives ▪ Collaborative studies should be planned and implemented .
6	Public awareness on environmental health hazards and waste disposal	▪ Organize workshop on awareness to reach rural people ▪ Promote environmental management together with the introduction to alternatives (This may require technology transfer from existing programmes) ▪ Promote IVM and IPM programmes and monitoring. ▪ Review the inventory on DDT
7	Regulate transboundary movement of DDT wastes from the region	▪ Adhere to Basel Convention provisions ▪ Clear and specific legal and institutional framework required
8	Countries, including Kenya, that previously used DDT, especially for indoor spraying, had the highest levels of DDT in mothers' milk	▪ Strengthen the national and local institutions capacity to control malaria without the use of DDT ▪ Promote and introduce ITN in all malaria prone areas ▪ Use media used to enhance awareness

3.3.5. PCBs

3.3.5.1. Summary of Priority Actions

The following are NIP activities:

i) Preparing detailed inventories;

ii) Labelling PCB-containing transformers;

iii) Creating awareness on the dangers involved in the use of PCB-containing oils for domestic purposes; and

iv) Establishing legislation for the control of imports, exports and use of PCBs to be established.

Plate 3.1 Training on Management of PCB Sources (Source: UNEP)

3.3.5.2. Priority Areas For PCBS

For the purpose of drawing up a National Implementation Plan (NIP) to comply with the requirements of the Convention relating to industrial POPs, the priority areas are:

i) Preparing a comprehensive inventory of industrial POPs undertaken of missed site;

ii) Providing special attention to closed down industries that were high power consumers. (A list of these industries is shown in the inventory);

iii) Determining location of the so-called "*unmarked graves*" belonging to Kenya Electricity Generating Company (KenGen to characterise the presence of POPs and the extent of contamination;

iv) Establishing extent of use of used transformer oils in the *Jua Kali* sector;

v) Creating an electronic database for POPs that includes, among other things, the name and address of the equipment holder, the location and description of equipment, the quantity of PCBs contained therein and the dates and types of disposal envisaged;

vi) Ensuring that updating of the national inventory is a responsibility of the PCB users.

vii) Analyzing the levels of PCBs in soils and the tissues of animals and plants to establish the extent of environmental contamination with PCBs..

Photo 3.2: Promoting Hands-On Training (Source UNEP)

Table 3.2: Summary of Actions Relating to PCBs

	Issue	Recommendation
1	Awareness of PCBs lacking among employees and the public	Awareness needs to be increased among employees and the public through various media
2	Inadequate capacity to analyse PCBs POPs in terms of laboratories and equipment	Local capacity to test/screen industrial POPs should be boosted by identifying laboratories in institutes of research and higher learning that whose analytical capacity could be strengthened and thus could be assisted in acquiring the necessary testing equipment. Staff in identified laboratories to be trained to test for PCBs. Develop awareness raising packages for employees.
3	There are many closed factories and some that did not cooperate	The relevant government agency should liaise with the owners of suspected PCB-containing equipment to facilitate access to factories. Carry out detailed investigation and inventory in closed down factories.
4	Transformers belonging to KPLC.	KPLC should allow the relevant government (NEMA) to have access this equipment or provide all necessary information regarding the PCB status of such equipment. Carry out detailed inventory of transformers with PCBs already in place.
5	Unmarked burial sites at power generating stations could contain POPs and hence pose health and environmental hazard through the contamination of surface and sub-surface water resources	The locations should be identified and analysis of possible contamination carried out as part of the National Implementation Plan; Map showing contaminated sites; Identify and carry out exhaustive analysis of possible contamination.
6	Uses old transformers by The Jua kali.	An investigation on the extent to which used transformer oil is being re-used by informal sector ..
7	No legislation touches directly on industrial POPs (PCBs and hexachlorobenzene).	A legal notice referencing the provisions of the PCBs. Enforcement of a labeling requirement
8	There exists no capacity to handle and destroy PCBs in the country	An in-depth evaluation of available PCB destruction technologies needs to be carried out. Evaluation of the available and cost effectiveness of destruction technologies.
9	On-site assessment of PCBs not possible due to lack of suitable screening kits	Procure PCB screening kits

3.3.6. Measures to Reduce or Eliminate Releases from Unintentional Production Pursuant to Article 5 of the Convention

This section addresses measures to reduce the total releases from the unintentional production of POPs pursuant to Article 5 of the Convention. It constitutes Kenya's National Action Plan (KNAP) in respect to the release of unintentionally produced POPs from anthropogenic sources.

It covers the the development of an action plan to identify, characterize and address the release of the chemicals listed in Annex C to the Convention; as well as the implementation of sub-paragraphs (b) to (e) of Article 5 of the Convention. This has been incorporated into the National Action Plan that will form part of the NIP. In this context the following measures have been taken:

- A preliminary inventory detailing the sources from unintentional production has been carried out;
- A priority list of sources has been defined;
- Major sources of U-POPs have been established to be incineration of medical wastes, open burning of municipal and agricultural wastes, and pulp and paper production using elemental chlorine;
- Establishment that there are neither adequate air pollution control measures nor administrative and legal requirements to reduce releases. For selected sources, mainly industrial sources, efforts are in place to control discharge of U-POPs to water and land.

The action plans for the minimization of UPOPS releases will include the following components:

- Review of laws and policies;
- Education, training and awareness-raising;
- Development of strategies for 5 year review as required by the Convention; and
- Preparation of an implementation schedule for category C sources.

3.3.6.1. Introducing BAT/BEP into Emission Sources

Article 5 and Annex C of the Stockholm Convention, when considered together, suggest that whenever Kenya require the use of best available techniques for new sources, it should do so in a way that givens priority consideration to alternative processes, techniques or practices that have similar usefulness but which avoid formation and release of chemicals listed in Annex C of the Convention. More specifically:

- Kenya shall "promote and, in accordance with this NIP require the use of best available techniques for new sources within source categories which Kenya identified as warranting such action in its action plan, with a particular initial focus on source categories identified in Part II of Annex C and within EMCA.

- When applying best available techniques and best environmental practices, Kenya will take into consideration the general guidance on prevention and release

measures in Annex C and in the draft guidelines on best available techniques and best environmental practices expected to be adopted by COP 3 and in which Kenya has been an active participant.

- On deciding on "prevention measures relating to both best available techniques and best environmental practices, priority will be given to the consideration of approaches to prevent the formation and release of the chemicals listed in Part I."
-
- "The concept of best available techniques will not be aimed at the prescription of any specific technique or technology, but will take into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions."
- Under circumstances in which authorities will determine best available techniques are to be applied, and when considering proposals to construct new facilities or significantly modify existing facilities using processes that release of dioxins and furans, priority consideration will be given to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of POPs."

3.3.6.2. BAT/BEP Activities

The main strategy for minimising emissions of unintentionally produced POPs will be through voluntary, command and control and through economic instruments.

It will take into consideration the following forms:

- Review of criteria for establishing priorities;
- Review of inventory and national emission data;

Identification of source categories which contribute larger than 10 g TEQ/year and develop actions to minimize emissions.

3.3.6.3. Release Reduction and Elimination by Category

i) Incineration

There are two major mechanisms for the formation of dioxins and furans during the incineration of wastes which release dioxins and furans in the presence of chlorinated precursors by a homogenous gas phase reaction at temperatures between 300 and 800^{o}C and the *De novo* synthesis. This involves the formation of dioxins and furans during the cooling of exhaust gases in the temperature range 200-500^{o}C; given an adequate residence time in this temperature range, the presence of a chlorine source, and the presence of oxygen (or air) in the exhaust gas.

Measures will be taken to ensure that these conditions are not attained through the introduction of inappropriate technologies and bad environmental practices.

ii) Medical Wastes

The Ministry of Health has invested large sums of money in the purchase of incinerators for the management of medical wastes, probably because of the

highly sensitive nature of the wastes and the potential health implications of mismanagement. Until such time that other waste disposal methods could meet both the stringent medical waste disposal requirements and social acceptance, incineration will continue to be the method of choice for disposal. Accordingly, the most appropriate management interventions are to:

i) Enforce the existing rules for handling waste;

ii) Provide proper documentation and control of waste disposal procedures;

iii) Ensure that personnel handling the waste wear protective clothing (gloves and boots) during collection, transportation and storage to reduce direct exposures and the transmission of contaminants;

iv) Enforce standards/guidelines for incinerators gazzeted by NEMA,

v) Train all personnel who handle medical wastes on the management of risks associated with medical waste;

vi) Classification and codes of the different waste fractions;

vii) Responsibilities for waste management procedures from generation to disposal; and

viii) The potential health risks associated with mistakes and mismanagement.

iii) Introduction of BAT/BEP to Incineration Equipment

The key measures are to ensure that the facilities currently being inappropriately referred to as incinerators actually meet such criteria. This requires:

i) Installation of air pollution control equipment on all De Montfort incinerators in Provincial and District Hospitals;

ii) Improved management of incineration facilities to ensure that they run under optimum operating conditions;

iii) Screening of feed materials to avoid chlorine-containing matter;

iv) Promotion of alternative methods for the disposal of uncontaminated PVC articles such as recycling; and

v) Ensuring that incinerators are operated efficiently and professionally.

iv)Biomass and Open Burning of Municipal Waste and Landfills

Elimination of dioxins and furans would not sufficiently improve the emissions from open burning so as to make it an environmentally preferred means of waste disposal. It is imperative that the focus in implementation of the Stockholm Convention be on establishing alternatives to open burning rather than simply trying to improve a bad practice. The following options will be applied:

a) Minimizing Open Burning of Waste

Focus on government support of alternative end-of-life and waste management options. Kenya will work diligently to establish and implement sound practices including resource reduction, reuse, recycling, composting, modern sanitary land filling and BAT incineration. Convention implementation efforts and the

convention financial mechanism could be used to support the establishment of model waste management systems as alternatives to open burning.

The primary disposal methods for municipal waste are dumping and open burning. A major problem arises because municipal waste is not sorted into different types. Therefore, the initiatives to be applied to control of waste burning will generally be holistic and include initiatives such as:

i) Waste reduction at source;
ii) The use of degradable packaging and composting;
iii) Reduced packaging with materials with chlorine;
iv) Separation at source, and/or at landfill sites, of wastes into compostable, reusable and recyclable materials;
v) Support to communities whose livelihoods are derived from management of waste disposal sites;
vi) Introduction of disincentives on the use of plastics as a packaging material through the introduction of levy on the use of polythene bags:
vii) Promoting composting agricultural wastes for use as fertilizer (manure);
viii) Creating public awareness programmes on proper handling of wastes;
ix) Enforcement of the polluter-pays principle; and
x) Address accidental fires in factories and slums

There has been a recent increase in accidental fires in informal settlements. This is a topic of increasing concern. The composition of household materials is such that these fires are bound to generate U-POPs. Mechanisms to minimize the damaging effects of such fires need to be developed and to ensure that the fires are arrested quickly to minimize the release of U-POPs.

b) Rehabilitation of known Contaminated Sites.

The known contaminated sites are:

- Kitengela in Athi River
- Kangoki in Thika
- Dandora
- Makupa Causeway
- PCB graves

Some local authorities are responding to public complaints and abandoning dumps. Makupa Causeway is such an abandoned dumpsite that is currently being rehabilitated (see Plates 3.3 and 3.4 below).

Plate 3.3: Makupa dumpsite in Mombasa Causeway following cessation of dumping

Source: Odhengo-NEMA

Plate 3.4: Rehabilitated Makupa dumpsite in Mombasa Causeway (Source Othengo-NEMA)

v) Cement Kilns

Management options include:

i) Control and monitoring of flue gas emissions;

ii) Ensuring that fuels are chlorine-free and, where necessary, substituting with alternative feed materials; and

iii) Ensuring that waste burning is not introduced at cement plants

vi) Pulp and Paper Production

At Pan-African Paper Mills the major releases of U-POPs are to water from pulp bleaching and production of elemental chlorine for bleaching pulp. Management options for the control of emissions include promoting the use of chlorine free bleaching processes, ensuring monitoring of critical conditions during production and waste discharge stages, and enforcing regulations covering the installation and maintenance of waste pre-treatment facilities.

vii) Ferrous and Non-Ferrous Metal Production

Use of poor feed materials, especially dirty recycled ferrous products and poor technologies are the main contributors to the production of PCDD/PCDF. Options to reduce releases include upgrading of inferior technologies through application of BAT and BEP and enforcing regulatory mechanisms and guidelines. An option in the latter context is to require secondary ferrous and non-ferrous manufacturers to meet, deliberate and agree on measures to reduce U-POPs generation.

viii) Hazardous Waste and Crematoria

Discourage the use of open-air crematoria, specifically the Langata crematorium and the Hindu crematorium, both situated in Nairobi.

ix) Disposal of Animal Carcasses

The primary method for the disposal of animal carcasses is land burial. This should be continued. In emergency situations, the use of incineration should be considered subject to the incinerators being appropriate and properly managed according to BAT and BEP guidelines.

x) Waste Oil Disposal

The main source of U-POPs is sludge and low temperature burning. Reduction of emissions should be achieved through the enforcement of regulations governing the disposal of waste oil sludges and ensuring that waste oil does not escape into the environment or become burnt in low-temperature incineration facilities.

xi) Fossil Fuel Combustion

The primary interventions in the context of fossil fuel combustion are the phasing out of leaded fuel by creating public awareness of the advantages of using unleaded fuel and enforcing regulations governing automotive emissions for the purposes of eliminating chlorine contaminants from fossil fuels and additives to automotive fuels.

3.3.6.4. Priority Areas for U-POPs

Based on the foregoing, priority interventions can be summarized as:

i) Promulgation of regulations and guidelines by Ministry of Health handling and disposal of medical waste;

ii) Upgrade current waste combustion facilities and train operators;

iii) Develop public awareness programmes on proper waste handling;

iv) Mandating stakeholders to formulate proper regulatory mechanisms for the handling of wastes and the management of disposal sites;

v) Strengthening public awareness of the advantages of using unleaded fuels; and

vi) Promulgating new regulations governing environmental monitoring under

EMCA specifically requiring continuous minimization of elemental chlorine at Webuye Paper Mill and the review of environmental guidelines at the same installation.

3.3.6.5. Addressing Projected Releases of PCDD/ PCDF

Actions already being taken to reduce pollution generally may have benefits in reducing PCDD/PCDF releases. These include the phasing out leaded petrol and improved management of solid waste. It is expected that transportation emissions will have been reduced to close to zero by the end of 2006. However, the gains in reduced PCDD/PCDF releases will be outweighed by the increased emissions from the burning of an increased quantity of solid waste.

a) **Energy Related Emission Reduction**

Ministry of Energy together with multinationals dealing with petroleum products are supposed to phase-out the use of leaded gasoline in the country by 2005. Notably, the Agrochemical and Food Company (ACFC) in Muhoroni initiated a gasohol project (mixture of gasoline and alcohol) as alternative to leaded petroleum but the project failed due to marketing complications occasioned by multinational corporations.

Action: Revive the following Projects

i) Molasses Plant: should also be revived.
ii) The Report on the review, implementation and enforcement of Traffic Act Cap 403 of vehicular pollution was pre maturely stopped and should be revisited.
iii) The Kenya Petroleum Refineries in changamwe is currently producing leaded gasoline and cost of changing the technology to switch to unleaded gasoline is prohibitively expensive.

Action: Develop project on how best this can be handled.

b) **Emissions from Human settlements and Activities**

i) Open burning of waste;
ii) Residential combustion sources, Cooking etc Management of domestic wastes;
iii) Studies done on biomass for cooking and lighting;
iv) Biomass usage in the Three stone stove Agricultural waste usage as a source of fuel;
v) Use of plastics as a source of fuel in slum dwellings;
vi) Need to assess the dioxin and furan emissions from these energy sources, including fish oil;
vii) Compare dioxin / furan emissions from energy saving jikos / stoves and traditional cooking methods. Monitor the incidences of respiratory complications;
viii) Part V (f): Develop project on the alternative waste management strategy i.e. disposal of medical waste and landfill burning. Coming up with a study to find out best options economically sustainable;
ix) Study to find out animals to recycle solid waste; and
x) Carry out study to establish handling, stunning and separation of alcohol waste.

c) Priority Research areas in the Domestic Sector

i) Efficiency of mosquito coils as a repellant of mosquitoes and a comparative socio

economic study.

ii) Emissions of dioxins from open wick burning of the kerosene stove/ and lanterns.
iii) Comparative dioxin exposure to humans with respect design i.e international/external kitchen
iv) facilities and their related epidemiological complications
v) Capacity building - training of stakeholders on the use of the UNEP Tool kit on (POPs).

Train people in the management of equipments for indoor POPs monitoring. KIRDI to undertake:

i) An incinerator efficiency certification program (optimization);
ii) Monitoring of dioxins/furans from incinerators;
iii) Adoption of alternatives energy sources (solar, wind) as an alternative to biomass burning;
iv) Promoting the zero-tariffs for Environmentally Sound Technologies (ESTs); and
v) Improvement on briquetting technologies on bagasses and awareness of environment benefits.

d) Automobiles

Assess the PCB content of:

i) Automobile spray-painting practices - ingredients in sealants, adhesives, and plastics;
ii) Assessing the impact of engine fuel adulterate on POPs emissions;
iii) Lead pollution along highways; and
iv) Measurement of dioxin/furan emissions in selected household using various types of fuel for cooking and lighting.

e) **Social economic implications**

i) POPs sectors - Private i.e industries - Public i.e. Research Institutions
ii) Proliferation of health services in residential areas.
iii) How these chemical/ wastes end up getting mixed up with domestic waste.

f) **Measurement of dioxins/furans**

i) At Dandora dump site;
ii) Webuye (Pan Paper Mills);
iii) Eldoret (Rai ply woods);
iv) Mombasa environmental management facility Kenya Ports Authority 5. Bamburi Portland Cement;
v) Kenya Railway foundries;
vi) Abandoned Kibarani land fill; and
vii) Scientifically determined sites for incinerators.

Short Term Activities

i) Awareness rising on the availability of leaded gasoline alternatives . Data collection on the current status of automobile lead pollution Assessment of lead pollution trends along central highway reservations;
ii) Socio-economic considerations of leaded gasoline usage in the country. Regional barriers

in the promotion of unleaded gasoline usage;

iii) Formation of a database on health impacts of POPS;
iv) Cost benefit analysis of the reintroduction of gasohol in Kenya as an alternative to leaded gasoline;
v) Ministry of Health to convene a meeting to discuss omissions fonn KEPI incinerators;
vi) Follow up of the flue gas portable measurement equipment by KNCPC;
vii) Training on use ofUNEP POPs Tool Kit by KIRDI;
viii) Dr.afting of Project proposal and awareness raising by the Kenyan POPs office among stakeholders;
ix) Project proposal by the UON on assessment of various alternatives to DDT;
x) KNCPC together with KAM to convene a meeting on energy efficiency, process
xi) optimization, in the domestic/automobile sector;
xii) KNCPC to draft a consultancy to measure dioxins at the selected sites proposed above; and
xiii) Gasohol reintroduction and determination of lead pollution baselines along central highway reservations.

3.3.7. Action Plan: Identification and Appropriate Management of Contaminated Sites

There are six (6) sites in Kenya at which it is suspected dieldrin, aldrin and other POPs have been buried in the ground.

These sites are judged to pose serious risks both to the environment and humans. The sites are at KARI, Egerton, Njoro, Ruiru, Wajir, Mandera, Kitengela, and perhaps any other new sites with potential to contaminate the air, foodstuffs and surface and ground waters.

Activities:

- Initiate environmental monitoring of abandoned sites; and
- Propose rehabilitation activities.

3.3.8. Strategy for Information Exchange

Some of the strategies and activities to be elaborated to assist decision-makers in the implementation of the NIP are:

- Establishment of a mechanism for accessing information held by NEMA, KIRDI, PCPB and the Government Chemist by all stakeholders;
- Implementation of the POPs International POPs Elimination Network (IPEN) project;
- Development and implementation of a comprehensive strategic communication plan at community level.
- Promotion of efficient use of information by the adoption of education and communication measures to bring about changes in attitude and behaviour regarding the management POPs;
- Ensuring that POPs management issues are addressed in the media, *i.e.,* radio, television, newspapers and through the publication of brochures, newsletters and posters;
- Development of a dynamic and regularly updated website that contains

information on POPs; and

- Development of a national strategy for institutional information exchange, education, communication and awareness creation through regular roundtables and workshops to improve public perception of the risks posed by POPs.

3.3.8.1. Dissemination of Public Information

Proposed methods for awareness creation for POPs are:
Electronic media (Radio and Television) - this will be done for groups POPs and in various languages so as enable easy understanding by local communities especially in rural and slum areas.

i) Popularize POPs themes, *e.g.*, risks posed by plastic wastes.

The dissemination of information to professionals will be by the following means:

ii) Organization of POPs thematic workshops, seminars and symposia;

iii) Organization of exhibitions and competitions;

iv) Development of a central database for POPs activities;

v) Development of video programmes, documentaries, clips and CD–ROMS; and

vi) Use Geographical Information Systems (GIS) for mapping sites where POPs are found especially sites contaminated by POP.

3.3.8.2. Institutional Networking

In relation to Article 9 of the Convention, the Director General of NEMA is the national focal point for the exchange of information.

3.3.8.3. Communication with the Convention Secretariat

Kenya, through NEMA, has established good communications with the Convention Secretariat.

3.3.9. ACTION Plan: Public Awareness and Capacity Building

Several activities have to be undertaken to enhance public awareness about POPs for the NIP implementation. In particular, there is the general need in Kenya to provide training programmes in information and data collection, collation and storage and collection, storage, retrieval and dissemination of information relating to POPs hazards and risks of exposure. This includes ensuring that decision makers and the public take proactive steps to reduce reliance on POPs and avoiding the use of technologies that give rise to POPs. They include activities such as:

- Dissemination of new information on science, technology, financing, etc;
- Information packaging to suit various group on POPs sectors;
- Development of a central database for POPs and wastes;
- Organization of seminars, workshops and roundtables on POPs on subject of public interest e.g DDT;
- Creation of a dedicated chemicals hub at NEMA and website accessible at provincial and district offices; and
- Preparation of publicity materials such as brochures, newsletters, posters, etc.

3.3.9.1. Education

Education, public awareness and training are critical to the promotion of sustainable development and improving the capacity of people to address development issues. Most people are not aware of the consequences of their interactions with natural resources and associated environmental problems. Involvement of tertiary Institution is good. The University of Nairobi was involved in the POPs inventory. More universities are to be involved in the NIP implementation stage.

Because there is lack of adequate finance and institutional structure through which informal environmental education concepts could be developed, POPs risk information systems could be integrated in the entire education system, both formal

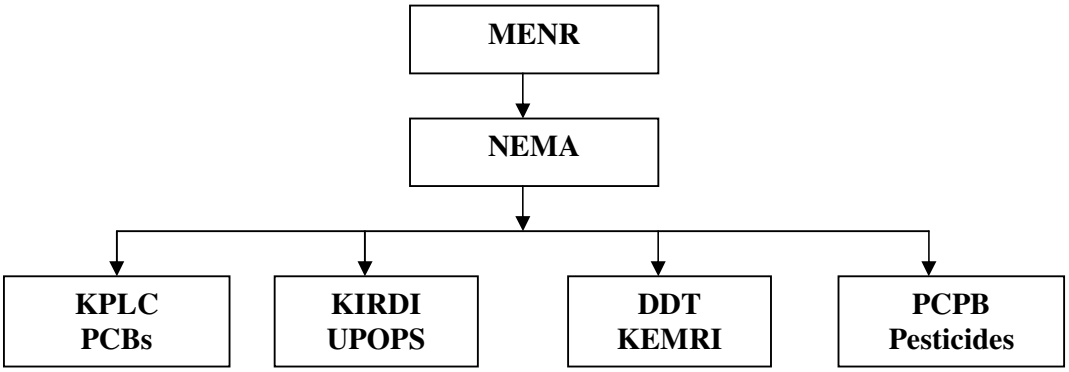
and informal levels and especially in tertiary educational institutions.

3.3.10. Action Plan: Monitoring Implementation

3.3.10.1. Overall Responsibility

The MENR will be responsible for overall monitoring of NIP activities. The process will involve all key stakeholders, including local communities that will be involved in the monitoring and evaluation processes. The Programme Management Unit will backstop NIP activities through planned visits, review meetings and regular progress reporting.

The chain of responsibility will be as follows.



MENR	-	Overall Plan Management
KPLC	-	Will report on PCBs
NEMA	-	Formulation of regulations and enforcement
	-	Awareness Creation
	-	Public Information
MOH	-	Medical Incinerators
	-	Trials for DDT Alternatives
	-	DDT Register
KIRDI	-	Cleaner Production
KEMRI	-	Health surveillance

3.3.10.2. Execution

Monitoring of NIP implementation will involve impact monitoring at all levels through use of benchmarks. Performance indicators for NIP implementation will be set out in the log-frame for the preparation of the NIP Inception Report. The achievement of these benchmarks is to be monitored very closely by the Plan Management Unit, quarterly reports being submitted to the National NIP Steering Committee (NNSC). The Plan Coordinator will prepare and submit yearly NIP Performance Evaluation Reports (NPER) to the NNSC for review. The NNSC

will review progress on the output benchmarks and make recommendations for any appropriate modifications required to enhance NIP implementation and timely completion.

Monitoring and learning activities are integral components of the action plan. Monitoring and learning will be bottom-up, interactive and participatory and will involve all key stakeholders, especially local communities. Independent evaluations may be undertaken as an integral part of the action plan. The need for an in-depth evaluation will be decided towards the end of the plan. Independent impact evaluations will be undertaken for each component to verify the achievements and lessons to learned for replication purposes.

The NIP will be subject to revision with respect to impact benchmarking six months after endorsement of the document and again twelve months after implementation starts. At the end of the first year of implementation, a review will be conducted to assess progress and make suggestions for modification and reorientation of activities as may be necessary. This will be done by the development partners led by the UNEP GEF coordination office.

The action plan design incorporates a logical framework approach as a monitoring and learning tool for each POP or group of POPs. This will be developed, upon the launch of the action plan, to provide a hierarchy of smaller logical frameworks pertaining to each component, detailing required outputs and outputs by quantity, quality and time. The Plan Coordinator will be responsible for initial monitoring and providing reports on a quarterly basis for each POP group

The NIP Steering Committee and the MENR responsible for programme execution will receive these reports. The Coordinator will produce an annual progress report for general circulation.

Effective implementation of the plan calls for the identification of best environmental practices (BEP) and best available technologies (BAT). These will be documented and shared widely for replication purposes among NNSC participating institutions as well as stakeholders.

3.3.11. Reporting.

Under Article 15 of the Convention, Kenya is committed to reporting on its implementation obligations.

1. Each Party shall report to the Conference of the Parties on the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures in meeting the objectives of the Convention.
2. Each Party shall provide to the Secretariat:
   (a) Statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and
   (b) To the extent practicable, a list of the States from which it has imported each such substance and the States to which it has exported each such substance.
3. Such reporting shall be at periodic intervals and in a format to be decided by the Conference of the Parties at its first meeting.

As shown in 3.3.10 Kenya has put in place a mechanism to report under Article 15 in the format and at intervals decided by the Conference of the Parties. Reporting programs that will assist with this obligation include, but are not limited to:

- The National Pollutant Release Inventory;
- Inventory of Releases: PCDD/PCDF;
- The Residual Discharge Information System;
- The National Inventory of PCBs in Use and PCB Wastes in Storage in Kenya;
- Emissions monitoring by government agencies and industries.

These will be done through formats agreed by parties. Kenya is geared to prohibit import and export of POPs listed under the Convention,
NEMA will compile the national reporting information and submit it to the Ministry of Environment and Natural Resources for forwarding to the Convention Secretariat.

As a Party to the Convention and as called for under Article 16, Kenya will cooperate with the Conference of the Parties and the Secretariat in evaluating the effectiveness of the Convention, including assisting with the development of comparable monitoring data and implementation of any ensuing arrangements, in accordance with its technical and financial capabilities.

3.4. DEVELOPMENT AND CAPACITY BUILDING PROPOSAL AND PRIORITIES

This section addresses other commitments to the Conference of the Parties under Articles 8 to16 of the Convention including financial and technical assistance, reporting, information exchange, effective evaluation, and the addition of future chemicals. In the context of Article 12 of the Convention:

i) Kenya is classified as a developing country.

ii) To date, Kenya has received no technical assistance pursuant to Article 12.

3.4.1 Development of research and training capacity

The process will entail the following activities:

- Running training programmes in local institutions (to develop training materials/modules, curricula development, etc;
- Laboratory equipment acquisition, maintenance and servicing;
- The use of cost effective analytical methodology for POPs;
- Training of trainers workshops;
- Utilization of indigenous knowledge for a non-chemical alternatives;
- Generation of national/regional data (*e.g.,* emission factors, bio-indicators, etc.);
- Collaboration with regional centres (*e.g.,* Basel Convention Centres, ICIPE); and
- Laboratory accreditation and establishment of sub-regional accreditation bodies under the EMCA Programme.

3.4.2 Technical Assistance

Kenya has a Donor Coordination Group on Environment whose membership is drawn from multilateral and bilateral agencies. Other members include the Ford Foundation and NGOs, *e.g.,* the World Conservation Union (IUCN) and the World wide Fund for Nature (WWF)). The mobilization of resources and the coordination of various donor initiatives related to the Convention will be strengthened. There is a need to ensure that the process of partnership building and consultation on POPs is formalized through formal structures and mechanisms.

Initially, Kenya would like to utilize the financing mechanism under the Convention to address sectoral project proposals in the following areas:

- Capacity Building;
- Alternatives to DDT;
- Medical wastes;
- Cleaner production; and
- Pulp and paper.

Project proposal summaries are presented in Appendix 4.

3.4.3. Priorities

The NIP process has resulted in development of several priority areas where capacity building will be critical.

3.4.2.1. Adopting environmentally sound technologies through the introduction of BAT/BEP

Selection of technologies that are environmentally sound is a critical factor in improving the environment and complying with the SC. The SC has drafted guidelines and guidance on both. The important thing is to link them with other initiatives, such as cleaner production, cleaner development and good practices that can offer synergies.

3.4.2.2. Financial Resources Mobilization at Local Level

Mobilization of adequate financial resources at national and international levels is critical to the timely implementation of the provisions of the Stockholm Convention. This may include utilizing the following opportunities:

- Provisions of EMCA incentives (*e.g.,* the plastics initiative);
- Promoting technologies through permanent exhibitions at NEMA;
- Studying technical assistance guidelines under various MEAs and aggressively developing associated project concepts;
- Addressing issues of cost-effectiveness of products, processes and alternatives through the introduction of environmental economic instruments as has been done with plastic waste;
- Promoting non-chemical alternatives to current uses of chemicals especially at farm level (*e.g.,* pyrethrum production and the use of composting).

3.4.2.3.Capacity Building Priorities

Specific priority actions that require building of improved capacity for coordination are:

i) Awareness creation among decision makers at local levels;
ii) Synergies with other chemical and waste conventions;
iii) Coordination/management capacity in the Eastern African region;
iv) Scientific assessment and technical analysis of data on POPS;
v) Domestication of the convention with national legal instruments;
vi) Harmonization of policies at sub-regional levels; and
vii) Enhancing regional inspection (at points of entry).

3.4.3.2. Development of Chemical Management Systems

There is a need for the capacity to develop alternative management instruments and the review of the national chemicals profile, national implementation plans, national emergency preparedness and response plans.

This requires capacity building for the following areas.

i) Scientific and technical capacity at the national, provincial and district levels;
ii) Training of personnel on specific POPs; and
iii) Facilities (laboratory instruments, equipment, etc.).

3.4.3.3. Technology Access and Transfer

There is a need for the capacity to develop and apply sound, clean and sustainable technologies in the following areas:

i) Upgrading technologies, especially for small-scale enterprises, as a means of minimizing releases of POPs
ii) Introducing clean technology into the informal sector and services including copper scrap reuse, waste management and reduction of the reliance on POPs pesticides;
iii) Technology development at lead institutions such as KIRDI, ICIPE KEBS, KEMFRI, KEPHIS, KEMRI etc;
iv) Training on BATs /BEPs guidelines to assess what is practical and affordable;
v) Reclamation, recycling and re-use of wastes instead of burning them in the open;
vi) Waste reduction at source through the use of cleaner production technologies;
vii) Stockpile management and disposal of hazardous substances, products and wastes;
viii) Alternative and ecologically sound agricultural practices (including non-chemical use and good agricultural practices); and
ix) Training of custom officers at ports of entry to enforce bans and restrictions.

3.4.3.4. Information Dissemination

For the purposes of acquiring, storing, retrieving and disseminating information, the following capacity improvements are required:

i) Information technology infrastructure e.g computer and internet facilities at provincial and district levels, 7 provinces and 100 districts;
ii) Enhanced facilities at KEMRI, the office of the Government Chemist, KEPHIS, universities, private sector, etc; within their respective mandate;
iii) Use of district, municipality, national and regional websites at DEC offices; and
iv) Preparation of audio-visual programmes at national level for distribution to provinces (8), districts (70) and local authorities.

3.4.3.5 Research and Training Capacity

Development of research and training capacity on POPs-related issues will focus on selected research institutions such as, KIRDI, KEMRI, KARI and KEPHIS in the following areas:

i) Running training programmes in local institutions (KIRDI, KEMRI, KARI, KEPHIS) so that they can prepare training materials/modules, curricula development, etc. specific to their POPs mandates as well as undertake relevant research;
ii) Laboratory equipment, maintenance and servicing at universities in every province

especially for the determination of PCBs, dioxins and furans;

iii) Adoption of cost effective analytical methodology that can be adapted to local needs, especially in the case of hand-held equipment;

iv) Organizing training of trainers workshops and seminars for BATs and BEPs in specific priority sectors at the enterprise and farm levels;

v) Utilization of indigenous knowledge where it offers non-chemical alternatives to POPs;

vi) Generation of national/regional data (*e.g.,* emission factors, bio-indicators, etc.);

vii) Collaboration with regional centres (*e.g.,* Basel Convention Centres, ICIPE); and

viii) Laboratory accreditation and the establishment of sub-regional accreditation bodies under the EMCA programme.

3.4.3.6. Targetted Areas for Research.

i Reducing Industrial POPs run off into Rivers feeding Lake Victoria covering (Kenya, Uganda, Tanzania regionally);

ii Reducing Industrial POPs runoff into River Tana and Athi;

iii Reducing Industrial POPs run off into Lake Naivasha and Nakuru;

iv Support for Implementation of the Stockholm Convention on PoPs Regionally with follow-up nationally; and

v Undertaking a survey of Chlorinated Dioxins, Furans and PCBs in major water bodies in Kenya (L. Victoria, L. Naivasha, R. Tana, R. Athi, R. Nzoia, R. Yala).

3.4.3.7. Strategies for Action.

i) Harmonization of Methodologies for generating information and analyticalresults;

ii) adoption of guidelines and building capacity for regulatory officials and institution response for managing Risk situations;

iii) Establishment of Improved capacity in and scientific risk assessment institution through raising level of competence of experts involved and provide technical assistance for training;

iv) Development and evaluation of alternative industrial cleaner technologies for the reduction of POPs emissions; and

v) Development of Appropriate Technologies for handling and disposal of wastes, obsolete stocks and site remediation of POPs contaminated areas.

3.4.3.6. Monitoring Capacity

There is a need to build monitoring capacity for POPs in at least four institutions in Kenya for the following purposes:

i) The remediation and rehabilitation of contaminated sites;

ii) Assessment of environmental impacts at contaminated and rehabilitated sites;

iii) Assessment of human health impacts related to all POPS at key sites;

iv) Resourcing of poison centers;

v) Assessment and verification of data; and

vi) The development of standards by the Kenya Bureau of Standards.

3.5. TIMETABLE FOR PLAN OF IMPLEMENTATION AND MEASURES OF SUCCESS

The NIP will encompass diverse elements and its implementation will involve all groups impacted by POPs. Stakeholders will be interested with specific responsibilities, actions and programs all of which will be harnessed by the NIP.

The NIP will be implemented as a *programme* in close collaboration with other on-going initiatives under relevant conventions (*e.g.,* the Bamako and Basel Conventions). Linkages with other donor-funded and on-going programmes/projects will be developed. Whilst these linkages will develop as a "*day by day*" activity, the process will be formalized through representation of these other programmes and projects on the NIP Steering Committee. There will be a NIP Coordinator who will be the Secretary to the National Steering Committee. The Committee will comprise key stakeholders with differing and complementary interests as detailed in the programme implementation arrangements.

3.5.1. Execution Modality

Implementation of the NIP necessitates the coordination of all concerned parties from inside and outside of government. In order to obtain commitment and ensure appropriate implementation of any policy, the interests of all stakeholders should be taken into account in the decision-making process. At the same time, the government has always been in the center of the decision-making process and experience has shown that a formalized mechanism for coordinating all members of the government is indispensable for a successful chemicals management scheme. The NIP will work integrally with other government agencies, the private sector, NGOs, civil society and development partners.

3.5.2. Implementation and Co-ordination Arrangements

In line with the Kenya's international commitment and national desire to phase out and eventually eliminate POPs, it is proposing the implementation of a five-year NIP at a projected cost of US$35 million. Implementation of the NIP will take advantage of the various strategic plans so far developed by MENR and NEMA. In particular, NEMA has made various initiatives towards the creation of awareness among the population regarding human and environmental hazards associated with chemicals and hazardous wastes in general and POPs in particular. Establishment of the Coordination Office and the various workshops held under the auspices of the ministry are some of the important experiences the country needs to be built upon. In addition, a number of Kenyans and Kenyan institutions have participated in various international conferences related to POPs management and technology transfers. Kenya will therefore build on these experiences in implementing the NIP. The NIP will also tap into the experience of development partners such as UNEP, UNDP, UNIDO, WHO, World Bank etc.

3.5.3. Implementation Phases of the NIP

The implementation of the NIP will take the form of three broad and overlapping phases:

Phase I: Creating an Enabling Environment

The aim of this phase is to institute the mechanisms and processes necessary to

ensure all the stakeholders are mobilized and involved in the implementation of the NIP. Effective implementation of this phase will ensure success in the involvement of all stakeholders in the adoption of the respective NIP strategic plans. This will build on the facilities and capacity created during the NIP preparatory phase. It will also include consultations with donors to seek support for implementation. The MENR will provide the policy and coordination arrangements necessary for a successful NIP.

Phase II: Formulation and Elaboration of the NIP

This phase covers the design and elaboration of national, local and community activities, projects and programmes. It will endeavour to ensure that recommendations arising from these activities are incorporated into any national strategic plans prepared during the five year period.

Phase III: Implementation, Follow-Up and Evaluation

This phase will represent the concluding phase of implementation of national and local area action programmes, which, like those of individual institutions/ firms, should be fairly flexible and iterative to allow for the accommodation of lessons learned and experience gained.

3.5.4. Institutional Framework

The NIP will be implemented in the framework of MENR /NEMA strategic plans and will include linkages with lead institutions in the context of EMCA.

3.5.5. Formation of a National Programme Steering Committee

A National Programme Steering Committee will be formed. It will comprise representatives from government agencies i.e Permanent Secretaries or their representatives from the Ministry of Environment & Natural Resources, the Ministries of Planning and National Development, the Ministry of Finance, the Ministry of Health, the Ministry of Agriculture, the Ministry of Trade Industry and the Ministry of water and irrigation). The committee will have powers to co-opt additional members as necessary. The committee will meet at least four times yearly. Extraordinary meetings may be convened as needed. The Terms of Reference for the National Programme Steering Committee are set out as an Annex 3 to this document.

3.5.6. Programme Management

The Plan will be managed by a NIP Programme Management Unit (PMU) that will be headed by a full-time National Programme Coordinator (paid through the plan) who will be responsible for plan management and coordination with implementing institutions and donor agencies. The PMU will be supported by a NIP Assistant and a Driver/Messenger. The PMU will promote the NIP and provide logistical and administrative support to the Programme Coordinator and staff implementing the NIP at all levels.

Among other responsibilities, the NIP Coordinator will promote the programme among other government institutions, non-governmental institutions and donor

agencies. MENR will provide logistical and administrative support for NIP activities, such as meetings. The government and donor(s) will ensure that sufficient time and resources are allocated to the NIP Coordinator to carry out the various functions effectively. The NIP Coordinator will be accountable to the Permanent Secretary, Ministry of Environment and Natural Resources.

3.5.7. Implementation

The following principles will apply to NIP implementation:

i) National execution and implementation incorporating institutional consultation and collaboration.

ii) The use of a relatively '*lean*' NIP Management Unit

iii) Considerable day-to-day implementation autonomy, within approved work-plans and budgets, to be provided to the NIP Management Unit under the supervision of the Executing Agency and the NIP Steering Committee.

iv) Detailed terms of reference to be written for each post in the PMU.

v) All stakeholders, including private sector and community groups, to be involved in the programme.

vi) Local ownership (district and community, NGOs, CBOs) to be given opportunity at decision-making processes especially those that affect them.

vii) NIP activities to be built, as much as possible, on existing structures at district and community levels.

viii) Modalities for rapid commitment and disbursement of funds to be created subject to adequate fiscal control and monitoring.

ix) Flexibility in programme design and management are recognised as important for dealing with changing administrative structures.

x) Feedback, through adequate monitoring and evaluation using well-chosen indicators, will be ensured. The NIP Steering Committee and task forces assigned to evaluate technical progress should have a key role in this respect.

xi) Contracts are to be awarded on the basis of technical capability. Proven track record of effective and timely delivery, fiscal responsibility and, where appropriate, sustainability of activities at district and community levels, are to be used as yardsticks for the selection of contractors.

xii) Indicative programme costs shown in the annexes are based on general pricing of monthly expertise, travel costs, reporting and field operational costs, and reflect the needs and priorities of activities in the programme.

3.5.7.1. Programme Monitoring

The processes of NIP monitoring are shown in Table 3.3 below.

Table 3.3: Processes of Programme Monitoring

Process	Purpose
Project Management	To monitor whether responsibilities are clearly understood
Work flow	To verify if the project is implementation unit maintaining its planned work load (key role in this case is played by quarterly reports and constant contacts.
Co-financing	To ensure that disbursement are happening in time with ease
Implementation	Verify if work plan is progressing according to schedule.
Budget	To confirm that the work plan is progressing according to budget plans
Fund Management	To ensure that funds are wisely spent and correctly and transparently accounted for according to UNEP and NEMA
Reporting	To guidelines monitor that work progress is reported comprehensively and on time. Reports contain critical analysis.
Stakeholder involvement	To ensure that a multi-stakeholder process is in place and active touching on all sectors.
Communication	To guarantee that communication between management team and NEMA lead agencies.
Leadership	To ensure that project has an active and committed management team
Short term/long Term balance	To guarantee that project meets short term need without compromising on long term outlook
Political Influence	To verify project is making politically motivated decisions.

3. 6. Resource Requirements

NIP-related activities require resources – both technical, human and financial. The degree to which resources are allocated for chemicals-related activities is often a reflection of their priority in the broader policy. Unless NIP-related issues are recognized at the policy-making level as part of the national development planning agenda, developing an effective programme, however basic, through national planning processes may be a considerable challenge. National resources are invariably limited, while at the same time the problems associated with development – many of which are not immediately recognized as being related to chemicals issues – are numerous and serious.

The NIP development process showed that:

i) Low priority given to POPS issues on the national agenda POPs;
ii) Combined with POPs issues receiving low priority, internal (within the ministry/department) competition for resources was a reality;
iii) Absence of a clear national chemicals management policy (and, as a consequence, serious predictability in the allocation of funds for concrete activities and projects)
iv) Revenues from chemical safety-related legal procedures (e.g. fees, taxes, fines) flowing into national treasury or ministries without adequate "recycling" of funds for strengthening the national chemicals management infrastructure;

v) Absence of a planning strategy for the improvement of chemicals management at the national level and lack of knowledge or insight regarding how to design such a strategy;

vi) Lack of a central co-ordinating body that can facilitate exchange of information concerning the financial aspects of chemicals management;

vii) Little experience, if any, with instruments that provide incentives for industry and trade to contribute financially to an adequate national chemicals safety/management infrastructure; and

viii) Little knowledge on procedures to explore and obtain external financial assistance

The NIP process development made efforts to address these constraints and barriers.

3.6.1 Key Components of a Financial Resource Mobilization Strategy (FRMS)

In order to achieve financing for POPs activities, it is important to address the barriers and progressively address those goals and objectives to:

i) Raise awareness regarding chemicals issues among decision-makers and the public by publicizing the NIP with development partners;

ii) Put chemicals-related issues higher on a country's internal priority list;

iii) Ensure that those responsible for chemicals issues understand the Kenya's internal decision-making processes for allocation of governmental resources; and

iv) Improve knowledge of external funding opportunities and details of the process of obtaining such funding among those responsible for issues of chemical management in Kenya.

Suggested Steps

As mentioned above, developing a successful FRMS involves actions to strengthen the links between protecting the environment and human health and fostering sustainable economic and social development. Progress towards building or strengthening a FRMS can rely on a number of steps:

Step 1: Forming a FRMS Task Force with representation from government ministries/agencies and stakeholders (preferably reporting directly to the Project Committee) and developing Terms of Reference for the work of the Task Force for developing a FRMS that reflects the goal and objectives outlined above;

Step 2: Conducting a situation analysis that comprises, inter alia, an in-depth analysis of how the decision-making process works for financial resource allocation, and what external funding opportunities exist (both bilateral and multilateral);

Step 3: Identifying which opportunities for resource mobilization have a reasonable chance of success;

Step 4: Coordinating chemicals-related requests for resources in a coherent and systematic way;

Step 5: Understanding the process of "selling" the strategy to decision-makers; and

Step 6: Continuous maintenance of the strategy to ensure that it remains useful and relevant.

Quantification of Resource Needs

From the analysis of the specific activities, the NIP will require about US$ 35 million for the first three years shared in the broad categories shown in the annex. Over 70% of these resources will be used in the development of management plans and their implementation. Capacity building will be emphasized as most of the institutions, including those in the private sector, are not adequately aware of the Stockholm Convention and its provisions.

The GEF is the largest dedicated source of funding for environmental initiatives. It is also the financing mechanism for the convention. The Funding for the implementation of the Kenyan NIP on POPs may therefore be considered under GEF guidelines Full-sized Projects ($1 million and up);

The proposed funding of Kenya's National Implementation Plan under the Stockholm Convention is US$35 million over three years. GEF funding is primarily based on the costs associated with achieving incremental environmental benefits. It will therefore be important to document and verify any relevant on-going national funding and funding from other sources and to make a convincing assessment of incremental costs of any proposed GEF projects.

For projects proposed by government institutions, it will be important for the government contribution to be reflected in the Printed Estimates.

3.6.2. Resource Requirements as Financing Strategy for the NIP

3.6.2.1. Mobilization of Domestic Resources

Government of Kenya, the private sector and Kenyan civil society have traditionally supported socio-economic development initiatives in the country. High levels of education and awareness of the impact of POPs on human beings and wildlife are important ingredients in resource mobilization for national implementation of the provisions of the Stockholm Convention.Kenya recognizes the importance of economic instruments for environmental conservation. This has been specifically identified and provisions have been included in the EMCA, 1999. In addition, regulations on the use and application of economic instruments have been drafted and consultations are ongoing with the Treasury on appropriate implementation prior to approval.It is also expected that key manufacturers, suppliers and users should play a key role in resource mobilization for chemicals management particularly POPs management. Indeed, they should take a lead in providing the co-financing that is necessary for successful implementation of the NIP.As a member of the global family of nations, Kenya has received support from various national, regional and international organizations for implementation of the Convention, through building global, regional and national partnerships.

3.6.2.2. Technical assistance

The NIP envisages assistance from the following potential sources:

i) The Convention Secretariat;

ii) Intergovernmental Organizations;

iii) Bilateral Development Agencies; and

iv) Non Governmental Organizations and the civil Society.

The NIP implementation potentially falls within GEF Operational Program 14 within the POPs focal area. Many of the NIP implementation activities match GEF funding priorities as they include, for example:

i) Capacity-building;

ii) Policy and regulatory reforms; and

iii) Demonstrations of innovative technologies and practices (*e.g.,* development and application of DDT alternatives).

Kenya, like most of the other developing countries, requires urgent financial and technical support for the implementation of the Stockholm Convention. GEF funding criteria suggest that GEF support for capacity building, the development and transfer of technology and policy and regulatory reforms could be sought for activities that can be demonstrated as yielding incremental benefits.

3.6.2.3. The Africa Stockpiles Programme (ASP)

Kenya has ratified the Stockholm Convention and therefore qualifies to benefit from the Africa Stockpiles Programme (ASP). The ASP complements the Stockholm Convention in addressing chemical and hazardous materials management.

The objective of the ASP is to clean up and safely dispose of all obsolete pesticides in Africa and establish preventive measures to avoid their future accumulation. The programme aims to dispose of all obsolete pesticides and associated wastes that have accumulated over long time periods. The ASP also catalyses the development of preventive measures and provides capacity-building and institutional strengthening on important issues relating to chemicals.

3.6.2.4. Other Agencies

Kenya requires awareness-raising at the grassroots, district and national levels. This is because of the low level of awareness coupled with limited information dissemination regarding POPs. There are a number of multilateral and bilateral agencies and regional NGOs that are involved in various education and awareness activities and may be able to assist in this context. However, there is need to increase the use of targeted electronic and print media, especially in the primary local languages, if such awareness-raising activities are to be effective.

NGOs play a key role in the realization of the goals of the Stockholm Convention and other chemical safety agreements. In order to ensure success in the implementation of these Conventions the role that NGOs play is vital especially with regard to advocacy and introduction.

Presently the United Nations Environment Programme(UNEP) with its head quarters in Nairobi, Kenya plays an active role in chemical management. UNEP has under its wing most of the chemical and waste management programmesand Kenya should take the advantage of this proximity.

Other important organizations are the Food and Agriculture Organization (FAO). This is the principle agent covering pesticide use particularly with regard to the agricultural industry, which is its primary focus.

The International Labour Organization (ILO) steps in where issues of human health and in particular employee safety in work environments where POPs and other potentially harmful chemicals are exposed to the employees. The World Health Organization participates also in the protection of human health and will carry out research into eliminating health risks resulting from chemicals. In Kenya WHO is involved in finding alternatives to POPs that are detrimental to human health such as DDT.

Working with these organizations is important as it benefits the country by easing access to information, human resources and financial resources. Involvement in programs and projects organized by these organizations also encourages cooperation with other countries, which is effective in the realization of the objectives of the Convention

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ANNEXES

Annex 1 Action Plans
1.0 PESTICIDES

Short Term Activities

	Objectives	Activities	Responsibility	Time Frame	Budget Estimate US$ (10^3)
1.	Capacity building to communities to dispose exiting stocks	-Conduct stakeholders workshops, investment projects, consultative meeting for target communities and training	NEMA, PCPB, KARI, Ministry of Agriculture, AAK, KEPHIS, KIRDI, KETRI and Consultants KNCPC,MUNICIPALITIES	1 Year	200
2.	Building inspection capability for POPs to ensure compliance	- Verify DDT sites - Remediate DDT contaminated sites. - Quantify and Mark known sites - Mark Hot spots - Document Status - Clean-up 100%of sites - Promote adoption of BAT/BEP in disposal and transportation methods	MOD, NEMA, PCPB, KARI, Ministry KEPHIS, KIRDI, KETRI and Consultants, KEBS	1 year	200
3.	Strengthen existing analytical laboratories to assess low POPs content	- Provide equipment – Train staff and lead agencies -Develop common monitoring - Access to GMP	KARI, KEPHIS, KIRDI, KETRI and Consultants GC, KEBS GOVERNMENT CHEMIST,UNVERSITIES.	1 year	2 00
4.	Support to private analytical laboratories to undertake the same	-Provide support to University and referral laboratories Registered in line with EMCA	• NEMA, PCPB, KARI, Ministry of Agriculture, AAK, KEPHIS, KIRDI, KETRI and Consultants, KEBS AND KIRDI	2 years	200
Long Term Activities/Information					
5	Policy and Regulatory Framework	-Disseminate relevant statutory controls of the existing institutions - Conduct three consultative forums -Sensitize political leaders -Review and harmonize National policies and legislation. -Establish	MENR, MOTI, MOA,MOH PCPB, AAK	2 year	20

		framework for implementing the Stockholm convention			
6	Formulation of subsidiary regulations	-Enact regulations/by-laws	MENR, NEMA, PCPB, KARI, Ministry of Agriculture, AAK, KEPHIS, KIRDI, KETRI and Consultants, MOH	2 years	20
7	**Development of Strategies for Management Of pesticide POPs**	-Carry out surveillance of POPs imports at the borders through customs -Establish data centres. -Operationalise Information exchange networks -Effect networking. -Facilitate accessibility of information by all stakeholders and interested parties	NEMA, PCPB, Customs, KEBS and KEPHIS, MOTI	2 years	50
8	Monitoring Program	-Carry out surveillance of contamination of Lake Victoria	Fisheries Department KEFRI, NEMA/GCD/UON?KMFR		3 00
9	Research and socio economic issues	-Set standards and benchmarks for POPs pesticides e.g. labeling -Strengthen relevant research institutions –Carry out social-economic analysis of the effects of POPs - Document Lessons learnt - Built partnerships -Secure funding for this action plan -Enhance capacities at grassroots -Sensitize policy makers and funds allocated - Strengthen National institutions	NEMA, PCPB, KEBS, KEMRI, KIRDI KARI,KEPHIS/GCD	2 year	200
10	**Information Exchange and Public Information**	Provide relevant information on POPs for use by	NEMA, PCPB, AAK PH/MOH, Ministry of Education	1 year	30

		stakeholders			
11	Database	Establish database in all districts	NEMA, PCPB, AAK MOH	3 years	30
12	**Research, Development And Monitoring**	Identify research activities on POP	NEMA, PCPB, AAK KARI, KEPHIS	3 years	60
13	**Mobilization of Financial Resources**	Project formulation -identify of counterpart funds	MENR, Treasury, NEMA, Private sector, Universities Development Partners	1 year	30
	TOTAL	US$			1540

Table 3.5

DDT

	Objectives	Activities	Responsibility	Time Frame	Budget Estimate US$
1.	Management of already identified DDTs, wastes and obsolete stockpiles	- Verify DDT sites - Remediate DDT contaminated sites. - Quantify and Mark known sites - Mark Hot spots - Document Status - Clean-up 100%of sites - Promote adoption of BAT/BEP in disposal and transportation methods	1. NEMA team 2.MOH 3.PCPB 4.Private Sector 5. AAK 6.Ministry of Agriculture 7.GCD	2 years	100
2.	Detailed inventory of other suspect water contaminated by DDT	- Enumerate all the sites to be rehabilitated - Update the existing inventory of DDT contaminated sites - Accurate DDT inventory	1. National NIP Unit 2.Universities 3. Local Authorities 4.GCD	1 year	300
3.	Attainment of sustainable DDT management of alternatives	- Re-orientate the exposed staff - Provide infrastructure - Create awareness to the affected public - Training and sensitization of the national leaders -Strengthen National malaria surveillance - Provide Equipment - To train Staff in lead agencies - Develop common vision	1.MOH 2.NEMA 3.PCPB 4. ICIPE 5. PSR 6. GCD	2 years	20
4.	DDT register management	• Legislation • National Register • Trials	MOH, WHO, MCD KEMRI, NEMA		50
5.	Alternatives to DDT projects	Policy Projects Pyrethrum alternatives Combinations	PBK ,PCPB, MOH, WHO, NEMA,		1050
	Long -term action				
1.	Policy and regulatory framework	- Review and harmonize the existing regulations and legislation - Hold a stakeholders consultative forum for alternatives to DDT	MENR, NEMA MOH, WHO, UNEP, MOTI, MOA	2 Years	300 .
2.	Development of strategies for management of DDT and/or alternatives to DDT	- Carry out institutional needs assessment - Carry out stakeholders analysis to determine financing requirements - Identify alternatives to	1.MOH 2.NEMA 3.WHO UNEP 1. ICIPE 2. MOA	2 Yeara	250

		DDT - Carry out promotional activities and awareness on the alternatives to DDT. - Carry out Institutional assessment - Stakeholders analysis carried out - Alternatives to DDT identified - Promotional and awareness activities carried out			
3.	Information Exchange and creation of public awareness	- Identify existing data sources and bibliographies - Creation of a register/ databank for DDT - Carry out institutional data needs - Update of existing database - Develop modalities for information exchange programs.	- NEMA - MOH - MOA - Universities - Research institutions - Private Sector	Continuous	20
4.	Strengthen research development and monitoring activities	- Carry Social-economic analysis of the effects of DDT - Carry out Health effects and impacts of DDT -Establish efficacy of alternatives to DDT - Carry out Long-term training on assessment, monitoring and management of DDT and its alternatives.	1. 1.MOH 2. 2.NEMA 3. 3.PSR Kenya 4. USIU 5. KEMRI 6. MCD 7. WHO 8. PBK	2 Years	200
5.	Attainment of sustainability of programs	- Build partnerships - Identify funding sources - Enhance capacities at grassroots levels for sustainability - Sensitize policy makers on the need for allocation of resources for DDT management - Strengthen national institutions to ensure compliance to the principles of the convention - Develop monitoring benchmarks and plan.	NEMA, MENR WHO Treasury MPND	3	300
	Total	**US$**			**2590**

Table 3.6

Intentional POPs (PCBs)

Short Term Action on PCBs

	Objective (short term)	**Activity**	**Responsibility**	**Time Scale**	**Cost US$ 10 [6]**
1.	Management of already identified POPs	- Labeling of all PCB. Containing equipment in use or decommissioned. - Inform the users on the 2025 deadline Monitor any leakages - Inform users of PCB containing equipment in production and processing of food to discontinue their use immediately. - Containerization of decommissioned leaking equipment. - Transport to a central point for final disposal. -Clean-up contaminated sites - Package the equipment and contaminated soils, transportation and disposal	Owners, KPLC, PPM UNIDO, UNDP , World Bank	1year	20
2.	Detailed inventory of other sources	- Country wide inventory of other sources of PCBs - Labeling -Documentation availed in a centralized location -Manage the additional identified POPs as in objective 1 above	NEMA/Stakeholders	2years	50
3.	Capacity building programs for sustainable PCBs management	-Create awareness among stakeholders -Training -Identify/facilitate existing analytical/testing facilities to handle PCBs -Sensitize the general public on negative aspects of PCBs	MENR/NEMA UNEP,UNIDO,UNDP and bilateral programs	1year	500

Table 3.7

Long-Term Action For PCBs.

	Objective(Long-term)	Activity	Action	Schedule	Cost US$ 10^3
1.	Policy and regulatory framework	-Formulate policy on PCBs -Develop/adopt laws, regulations, standards -Sensitize stakeholders on policy and laws -Enforcement of the laws	NEMA/GOK, stakeholders, Attorney General's Chambers KEBS Private Sector		20
2.	Development of strategies for management of PCBs	-Identify areas requiring technical inputs -Develop effective monitoring and evaluation strategies, both technical and managerial -Phasing in non - PCBs and phasing out PCBs -Educate the user on alternatives -Develop disposal policy on PCBs	NEMA KPLC Private Sector GCD KEMRI	2 years	30
3.	Information exchange and public information	-Establish central data bank on users of PCB, products used and alternatives to PCBs -Regular publications on technologies -Disseminate information through print and electronic media. -Networking of stakeholders -Incorporate environment issues in post curriculum	NEMA/Stakeholders NEMA /Min. of Education GCD KEMRI	2 years	30
4.	Research development and monitoring	-Establish global links on PCBs disposal technologies. -Continuous research on BAT and BEP on PCB disposal methods. -Encourage local research on new methods of PCB disposal -Monitor the effect of any alternatives to ---	NEMA NEMA/stakeholders KEMRI NEMA, Universities NEMA, KIRDI/ Universities NEMA, KIRDI/ Universities NEMA, KIRDI/ Universities	10 years	100

	Objective(Long-term)	Activity	Action	Schedule	Cost US$ 10^3
		-PCB on health and environment -Research on sources of Industrial POPs and their releases into the environment -Research on presence, levels and trends in humans and the environment -Research on environmental transport, fate and transformation -Research on effects on human health and the environment -Research on socio-economic and cultural impacts o-f industrial POPs -Research release reduction and/or elimination of releases -Undertake research work geared toward alleviating the effects of Persistent Organic pollutants on reproductive health	NEMA, KIRDI/ Universities NEMA, KIRDI/ Universities NEMA, KIRDI/ Universities		
5.	Mobilization Financial Resources	a) Develop of project proposals from above activities	NEMA/stakeholders	2years	200
	Component Total	**US$**			**950**

Table3.8. Unintentionally Produced POPs: Short term

	Objective (short term)	Activity	Responsibility	Time Scale	Cost US$ 10^3
1	Management of already identified sources of UPOPs	-Quantify UPOPs wastes with residue by actual analysis	NEMA, Academia, MOH, GC, Local Government, KIRDI, Ministry of Industry	1 year	200
		-Carry out Environmental Audits of the above sites Major Municipalities (7)	NEMA, Academia, MOH, GCD, Local Government, KIRDI, Ministry of Industry, municipalities	2 years	300
		- Draft a Project Proposal for remedial measures. The proposal should contain -Containerization, Recovery, Clean up activities, Packaging, transportation and Disposal	MOH, GC, Local Government, KIRDI, Ministry of Trade and Industry, KAM, private.	1 year	70
2	Detailed Inventory of other sources not quantified	-Carry out a nation-wide waste inventory on generation, survey and quantification.	KIRDI – Private Industries, local authorities and service providers KNCPC	2years	150
		-Assessment of corrective and preventive measures to minimize UPOPs waste generation	Cement, Textile, Leather industries and local authorities.	2years	400
		-Development of Action Plan for residential combustion sources	Civil Society, ITDG, MOE, NEMA	1year	700
3	Capacity Building for POPs emission minimization	-Carry out technology needs assessment -Carry out in-house training for industries, regulators, civil society and stakeholders who are introducing BAT and BEP	NEMA, Universities, KIRDI, (KNCPC). D.I.T., FKE, MOH, KAM, KEBS	1year	600
		-Organise overseas Trainings and study tours on applicability of guidelines ON BAT/BEP	NEMA, Universities, KIRDI (KNCPC). D.I.T., FKE, MOH, KAM, KEBS		3000
		- Identify BAT and BEP for priority categories (incineration/open-burning	NEMA, UNEP Chemicals, Universities, KIRDI (KNCPC). D.I.T., FKE, MOH, KAM, KEBS, MOE		1000
4	Adoption of BAT and BEP	-Technology transfer start up activities and identifying synergies	*NEMA,* Universities, KIRDI (KNCPC). D.I.T., FKE, MOH, KAM, KEBS,		2000

	Objective (short term)	Activity	Responsibility	Time Scale	Cost US$ 10^3
			MOTI, MOE, PSR,KEMRI		
		-Identify those equipment, processes and materials, which will reduce emissions of UPOPs	NEMA, Universities, KIRDI (KNCPC). D.I.T., FKE, MOH, KAM, KEBS, MOTI		200
		-Removal of barriers on introduction of technology that minimize UPOPs through introduction of management principles	NEMA/UNEP Chemicals , *UNIDO*, KIRDI (NCPC). D.I.T., FKE, MOH, KAM, KEBS,Treasury, MOTI		200
		-Introduce cleaner production to both secondary copper and aluminum, Leather and Textiles industries	NEMA, Universities, KIRDI (NCPC). D.I.T., FKE, MOH, KAM, KEBS		2000
		-.Assessment of Environmental and Health Impact taking into consideration possible BAT and BEP.	KIRDI – Private Industries, local authorities UNEP, UNIDO, UNDP, MOTI	2years	500
	Long-term Considerations				
	2. Policy And Regulatory Framework	(i) Domestication and implementation of Stockholm Convention.	MENR, NEMA, UNEP POPs, Local Authorities, KAM, FKE and CBOs, ,MOTI		30
1	International networking	(ii) Develop International Partnerships on waste streams.	NEMA, Local Authorities, KAM, FKE and CBOs		20
2	Synergies among waste MEAs	(iii) Develop synergies on Multilateral Environmental Agreements and Improve National Coordination.	MENR, NEMA, Local Authorities, KAM, FKE and CBOs		20
3	Incorporating POPs Issues in national Strategic plan and development Plans	(iv) Develop National Policy on POPs and Incorporate into the National Development Plan.	NEMA, Local Authorities, KAM, FKE and CBOs Private sector		20
4	Support to due process of the law	(v) Enforce the relevant sectors of EMCA provisions. (vi) Sensitizing magistrates (vii) Publishing pamphlets	NEMA, Local Authorities, KAM, FKE and CBOs AGs/Judiciary		200

	Objective (short term)	Activity	Responsibility	Time Scale	Cost US$ 10^3
5	Development of Standards and guidelines	(viii) Develop Emission Standards on UPOPs to all media (Land, Water and Air).	NEMA, Local Authorities, KAM, FKE and CBOs, KEBS, MOTI		100
	Development of strategies for management of UPOPs.	(i) Promote adoption of clean technologies (ii) Promote use of non-hazardous raw material inputs to reduce production of UPOPs. (iii) Establish a POPs electronic information network.	KNPC, MoTI, KAM, Private sector	3 years	20
		(iv) Promote adoption and application of cleaner production concept	All stakeholders	3 years	1,000
		(v) Promote use of alternative POPs.	Industries Informal sector	3 years	200
		(vi) Good housekeeping and preventive maintenance programmes and promotion of best environmental practices	All stakeholders	3 years	200
		(vii) Promote environmentally sound management of wastes systems (reduce re-use, recycle, segregate).	Local authorities, NEMA and Private sector	3 years	300
		(viii) Minimization of chemical contaminants that lead to generation of POPs in products e.g chlorine, metals etc.	Industries	3 years	300
		(ix) Avoiding elemental chlorine or chemicals generating elemental chlorine for bleaching.	Pan Paper Mills Webuye	3 years	16,000
	Information Exchange and Public Information.	(i) Development of waste management information network through electronic and other networks.(website LAN for waste streams)	NEMA, Universities Civil Society, key Gvt. Departments, Private sector.		30

	Objective (short term)	Activity	Responsibility	Time Scale	Cost US$ 10^3
		(ii) Carry out public awareness campaigns for source categories as set out in Part III of the and especially open burning, smouldering of cables, crematoria.	NEMA, Universities, key Govt. Depts., MOH, MOTI, Private sector Civil Society		200
	6. Research, Development and Monitoring.	(i) Carry out periodic surveys to determine the presence/reduction of UPOPs wastes.	NEMA, Universities, KEBS, KIRDI, Government Chemist		400
	8. Monitoring	(i) Develop a monitoring programme to mitigate impacts of POPs especially on health.	JKUT, Other Universities, KEBS, KIRDI, Government Chemist	3 years	400
	Total	(ii)			30,810

ANNEX 2.FIELD VISITS FOR INVENTORIES AND NIP

TableA2.1: Persistent Organic Pollutants Pesticides Sites P Interviews

Area	Sites visited
1. Nairobi & Environs	15
2. Central & parts of Eastern	40
3. Coast & parts of Eastern	15
4. Rift Valley & parts Western	40
5. North Eastern	3
Total	113

Table A2.2.: Site Visits and Number Visited with POPs Pesticides

Area	NO. Visited	NO. With Positive sites	Percentage (%)
Nairobi & Environs	10	6	60%
Central and Parts of Eastern	28	5	18%
Coast and Parts of Eastern	16	1	6.3%
Rift Valley, Parts of Western	24	6	25%
North Eastern	3)	2	60%
Total	81	20	

Nairobi had 5 positive areas but since Kitengela is contaminated

Table A2.3: Distribution of Visited Sites with POP Pesticides in Nairobi.

Site Name	Type of POP	State	NO. of Containers	Quantity (Kg)	Quantity (Litres)
1.KFA-Nairobi	Dicofol	Liquid	10	-	250
" "	Gamma BHC	Powder	1	25	-
" "	Gamma BHC	Powder	12	300	-
" "	Gamma BHC	Powder	138	55.2	-
" "	Gamma BHC	Liquid	60	-	24
" "	Gamma BHC	Liquid	780	-	312
" "	Lindane	Powder	20	8	-
" "	Lindane	Liquid	4	-	80
" "	Lindane	Liquid	9	-	1.8
" "	Captafol	Powder	1	25	-
" "	(Difalaton)				
2. Twiga Chemicals	Dicofol	Liquid	6	-	4.89
Total			1040	413.2	672.69

Table A2.4: Distribution of Visited Sites with POP Pesticides in Central and Eastern Region

Site Name	Type of POP	State	No. of Containers	Quantity (Kg)	Quantity (Litres)
1. KFA-Embu	Lindane	Solution	757	-	757
2.Thuti Factory	Lindane	Liquid	109	-	109
3. Kiruga Factory	Lindane	Liquid	198	-	198
4.KFA-Nanyuki	Lindane	Liquid	40,000	-	40,000
		Total	41064		41064

TableA2.5: Distribution of Visited Sites with POP Pesticides in Rift Valley and Parts of Kisii

Site Name	Type of POP	State	Number of Containers	Quantity (Kg)	Quantity (Litres)
1. Egerton University	2.5% Aldrin	Powder	1 Plastic	NI	10
2. Egerton University	Aldrin (Pestkiller)	Liquid	NI	-	NI
3.Chege General Store, Nakuru	20%Lindane (ant killer)	NI Liquid	NI	NI	NI
4.Chege General Store, Nakuru	Lindane	NI	NI	-	20
5. Faida Seed Co, Nakuru	Lindane	Liquid	NI	NI	NI
6. Farmers World, Nakuru	Dicofol		NI	NI	36
7. Mea, Nakuru	Dicofol/Kelthane	NI	Bottle		
8. Egerton University	(Related to DDT)	Liquid		400gms	NI
	0.65% BHC	/powder	NI		
			1 plastic		-
Total				400	66

i) Information not available

ii) NO. 5, A sample of 20% Lindane was collected for lab analysis.

iii) NO.2 &3, There was intention to collect samples at the site/store but was not allowed authority/clearance from the head of the department was required.

iv) NI – Not Identified

A.7) DDT

The areas shown below are areas visited by DDT/ Pesticide POPs inventory team

1.0 NAIROBI AREA

KFA, MOH, Twiga Chemicals, KMS, Nairobi City Council- Dept of Public health

Murphy Chemicals, Baraka Agro vet, Huplan Kenya Ltd, Nairobi Vet Centre, desert locust store at Wilson Airport, HCDA, Kitengela store/Kenya institute of waste management Kitengela, KARI, KETRI, E.A. Seed Co., *Osho Chemicals, *Elgon Chemicals, *Rhino Chemicals (* to be visited).

Coast Province

Wundanyi;- District Agricultural Office (DAO), KFA, Wema Agro-Vet and General store Wundanyi, Lomastar Agro-Vet supplies.

Mombasa : Kenya Ports Authority, KFA, Badfar Agro-Supplies Mtwapa, ASK Show Ground Msa, Provincial Director of Agriculture, Mombasa Farmers Centre,

Mpeketoni- Lamu.

Kilifi – KEMRI

Malindi: Municipal Council, bindahman Agro-Vet, Casuarina pest control Services Ltd.

3.0 Central Province

Thika: Thika Municipality, Cirio Del Monte, Kakuzi, SOCFINAF Coffee Estates

Murang'a; Mugama Farmer's Coop. Union and societies, Maragua Coop.Union,

Kirinyaga: Inoi Farmers Cooperative society, Mwea New Down Town, National irrigation Board Mwea, KARI, Mwirua FCs, Mutira FCS, Mwea Ginneries, Thabiti Agro-Vet, Fair price Waguru

Embu: KFA, KARI, DAO, ATDC stores, Karuga factory, Thuti, Gakunda FCs, Njeriria Factory,

BAT-ENA, Mastermind tobacco(Muconoke), Kirin AgroBio Embu.

Nyeri; Mathira Farmers cooperative union , Nyeri Municipality, Mukurwe-iniFCs, KFA.

4.0 Eastern Province

Meru: Meru Central: Gaiti Cotton Ginnery, DAO stores, District Vet stores, MoA, Kaguru, Meru Central Farmers Union, Kiagaari and Nthima FCS

Meru North:Ruri FCs, Tigiji Factory, Kanjaru FCs, Murichia, kamachia FCS,

Meru South: Meru Farmers Cooperative, Mitheru FCS, Kanji Keru FCS, Bwee FCS, Kirubia

Tharaka; Tharaka cotton ginnery

5.0 North Eastern

Mandera and Wajir

6.0 Rift Valley

Nakuru: DAO,Faida seed co., Farmers World, Cooper Kenya, Farmers Partner, KFA, Kenya seed company, Meya Ltd., Mea, Chege general store,Technology farm-Njoro, National plant Breeding, research Centre- KARI Njoro, Egerton University.

Kericho; KFA, Kipsigis farmers, ponasliu Agro-Vet, DAO,

Naivasha: KFA, Oserian, Homegrown and Sher Flower farms

7.0 Western/Nyanza

KEMRI

Kisii: DAO, Jumbo Agro-Vet, KPCU,Kisii farmers Coop. Union.

Areas that need to be visited.

Western region

Part of rift valley not covered

Nyanza.

Parts of Central province not covered.

North Easten – Turkana

Table A.8 Areas visited and Number of stores with DDT stock.

Region	Number of sites Visited	Number of stores with DDT stock
Nairobi	12	1
Rift valley	24	3
Coast Province	15	0
Central; Province/ Eastern	30	1
*Northern Eastern/	2	0
*Northern Province	1	0
Western	1	0
Total	85	5

Tale 2A.9 Quality of DDT identified from Nairobi, Central/ Eastern Rift valley Provinces

Area	Site Store	Commercial Name	Quantity (Kg)	Suppiles
Nairobi	KFA Nairobi Ltd	5% Dust Didimac	125	Murphy
	KFA Nairobi Ltd	25% EC Didimac	151	Twiga
	KFA Nairobi Ltd	5% Dust Didimac	740	ExMurphy
	KFA Nairobi Ltd	5% Dust Didimac	30	
Central/ Eastern	NIB Mwea	Dust Didimac	10	Murphy
Rift Valley	Njoro, Egerton	Dust Didimac	80	
Rift Valley	Faida seed Company –Nakuru	Killpest	401	
Rift Valley	*Mea, Nakuru	Kelthane	361	
TOTAL			**1100 kg**	

INDUSTRIAL POPS

TableA2.10. Sites visited during the preliminary Industrial POPs inventory.

Region	Sites Visited
Nairobi	Nation printers, Colour Print, Madhu Paper, Associated Battery Manufacturers, Crown Berger, Kenya Breweries, **KPLC Nairobi South Depot, Colgate Palmolive, ****Unilever, KIRDI, KEBS, Sara Lee, Raiplywood, Coates and Brother
Rift Valley	KPLC Eldoret, Olkaria Geothermal, **Nakuru Blankets, Eveready Batteries, *Brooke Bond, James Finlay, Raiplywood Eldoret, Magadi Soda Company ,Gilgil Telecom, KPLC Naivasha, KPLC Nakuru
Nyanza/Western	Homalime, *Muhoroni Sugar Company, Fish processor 2000, Telecoms Kisumu, KPLC Kisumu, Chemilil Sugar company, ***Webuye PanPaper, Mumias Sugar company, Swan Millers, *Swan Industries
Central/Eastern	***Premier Bags and Cordage industries, Kenya tanning extract, KPLC Thika, KPLC Nyeri, KenGen Power plants (Mesco , Sagana, Kamburu, Tana, Kindaruma, and Wanjii power stations), *KBC station at Komarock
Coast	Kenya Oil refineries, Kaluworks, Kenya Ports Authority.

- *Sites with PCB equipment
- ** Site with suspect PCB.
- *** Site with PBC and PCB waste
- ****Site with PCB waste

TableA10.11. Location and approximate quantity of PCB identified in the inventory.

Region	Company Name	Type f Equipment	Pieces of Equipment	Approx quantity of PCB. (Kg)
Eastern	KBC	Transformer	1	1350
Nairobi	Unilever (K) Ltd.	Capacitors	Containerised in a box	
	KPLC	Transformer	1 labelled PCB	
Central	Premier bags and Cordage Industries	Capacitors	6	60
Rift valley	Brooke bond (Chagaik tea Factory and Kimari Tea factory).	Capacitors	7	84
Western/Nyanza	PanAfrican paper Mills	Transformers	20	39075
	Swan Industries	Capacitors	6	60
	Muhoroni Sugar company	Capacitors	6	45
Total				40675

ANNEX 3.

RECORD OF CONSULTATION AND INVOLVMENT OF STAKEHOLDERS

1.0 Summary

- Kenya is a global stakeholder in POPs management. Her interests in POPs include Pesticides, PCBs, Unintentional POPs and DDT as well as wastes and stockpiles.
- Kenya signed the Convention on 23.5.2001at the diplomatic conference expected before November, 2003
- The Process of Ratification has been completed
- The Goals for a National Implementation Plan (NIP) are defined for priority POPs for the sectors in research and epidemiology.
- The National Legal Framework in Place awaiting NIP to enforce measures in form of EMCA.
- The process to develop a national POPS inventory completed
- Finances to develop a national implementation plan availed by GEF through UNEP.

2.0 Highlights of the NIP Process

The process of developing the NIP has seen the coordinating project participate in many related activities and contributed to national coordination of the chemicals and hazardous waste agenda in Kenya. The output are therefore varied but important landmarks are highlighted below:

- Draft waste Regulations to be gazetted by NEMA
- POPS issue part of the NEMA Strategic Plan
- National Chemicals Profile
- National POPS Inventory
- National Inventory of Hazardous waste
- National Coordination of Resolving the Issue on alleged Hazardous Waste in North Eastern Kenya
- Cooperation with ICIPE as the Regional Centre for Technical Delivery on DDT alternatives presented to the First Conference of Parties May 2005.
- 10-Point Action Plan on Waste Plastics now a regional Project
- A key member of the National Committee on Epidemiology Research in Cooperation with KEMRI.
- A key member of the KAM/ GEF/ Environmental Award Scheme
- A key member of the Kenya National Cleaner Production Centre
- Participation in the expert Group on BAT/BEP
- Participation in the Implementation of the Basel Convention and the Rotterdam Convention
- Coordination of the national process of the Strategic Approach top international Chemicals Management(National Position Paper).
- Project Concept on Capacity building for chemicals management
- Project concepts on DDT alternatives
- Project Concepts on Minimisation of UPOPS emissions for the Pan African Paper Mills
- Project Concept on Delivery of cleaner Production to Annex C Source Categories
- Project Concept on Open Burning
- *Collaboration with Envilead in awareness*

3.0 Important Hall Marks for NIP Development.

- Recognition by the Kenya Government that the Convention is relevant to Kenya, and its implementation beneficial to the national development plan of 2003 -2008 and ministry's strategic plan 2006-2010
- A formation POPs Coordinating Office to oversee POPs Management, established in April, 2002 in the Ministry of Environment and Natural Resources.
- Kenya National Coordinating committee formed in June, 2002
- Priority POPs identified through stakeholders consultations
- Prioritization of POPs required to define an Environmental Action Plan for POPs through Inventories completed;
- Awareness creation on POPs issues has to an ongoing process.
- Policy Paper on DDT developed
- Policy paper on Plastics waste management

- Participation in a regional project on POPs.

4.0 Inventories of POPs and Chemical Capacity Assessment

- Need analysis made and is in place through Enforcement activities of EMCA, 1999
- Legal/policy framework recognized under environment law and public regulator.
- Assessment of the problem of obsolete stocks identified with FAO assistance
- The process of POPs inventory has began by Agro chemicals
- Advertisement by Ministry of Environment for a tender to carry out POP profile
- University of Nairobi Enterprises Limited recruited to carry out inventory.
- Priority setting workshop by technical experts held in June 2004 in Naivasha

5.0 Involvement of Stakeholders

Stakeholders were selected on the basis of clusters of POPs i.e. Pesticides, PCB, DDT, Unintentional POPs, Legal/Policy/Social, Economics and Expert/thematic groups formed

- **Industries/services**
- **Civil society**
- **Public**

6.0 Pesticides

Members who drive this sector group include;

- National Environment Management Authority
- Pest Control Products Board;
- Kenya Plant Health Inspectorate Services (KEPHIS);
- Kenya Agricultural Research Institute;
- Agrochemical Association of Kenya;
- Twiga Chemicals ltd.;
- Ministry of Agriculture: - Kenya Agricultural Research Institute.
- Kenya Bureau of Standards

6.2 PCB

The members of this sector group are:

National Environment Management Authority
Kenya Power and Lighting Co. Ltd.(KPLC)
Kenya Electricity Generating Company (KenGen)
Kenya Industrial Research Development Institute (KIRDI)
Kenya National Cleaner Production Center (KNCPC)
Ministry of Trade and Industry (MT & I)
Government Chemist Dept. (GC)

6.3 Wastes/Unintentional POPs

The members who drive this sector group are:

- Kenya Medical Research Institute
- Nairobi City Council
- Government Chemist Department
- Agrochemical Association of Kenya
- Ministry of Health/ Kenya Medical Training Centre.
- Pest Control Products Board
- Kenya National Cleaner Production Center
- Nairobi City Council.
- Ministry of Trade and Industry (MT & I)

6.4 Legal/Policy/Social Economic

The members who drive this sector group are;

- The Attorney General Chambers
- The Ministry of Environment, Natural Resources Headquarters
- The National Environment Management Authority
- The Treasury, Ministry of Finance
- Physicians for Social Responsibility (PSR)
- Ministry of Trade and Industry (MT & I)

7.0 Impact of members of POPs – NCC

- Agents of change/Ambassadors of phase-out of POPs
- They Played the Role of St. John, i.e. Clear the way for Management and eventual phase-out.
- Built Confidence in data/information in participation of inventories
- Potential lead agencies for the appropriate sector of POPs
- Custodian of specialized administrative/regulatory instruments for the specific POPs

8.0 Involvement in Social Society

At NCC Level, civil society represented;

- At Expert group level technical specialists are invited to participate;
- Individual especially those who have done research on specific pesticides;
- News media;
- Through Kenya Association of Manufacturers.
- The informal sector "Jua Kali"
- Envilead on open burning
- PSR on Medical Issues
- CEAG

9.0 Main Sectors of Involvement of Non-governmental Organisation.

- DDT debate. There are moves to reintroduce it in Kenya
- Wastes – Waste disposal especially open burning at Kitengela, Athi River.
- Advocacy awareness creation on alternatives and risk reduction
- Education especially universities and colleges at the United States University
- Planning to introduce appropriate education materials e.g. Msc, PhD
- Socio Economics with regard to introduction of economic instruments in POPs management for plastics
- Recycling and re-use initiatives especially at small scale level for plastics.

10.0 Specific tasks of the Kenya Government

Regulation (Pesticides/DDT)

Banning/Restricting (Pesticides) through PCPB
Formulation to the Enforcement of Sector laws
Capacity building at Ports of Entry, NEMA, Ministry
Formulation of investment projects for the pesticide, PCB and waste sectors

11.0 Regional Co-operation

- Data Exchange among the regional states
- Regional Projects (Dioxins. furans) for Lake Victoria Ecosystem
- Cross border transport of POPs and POPs waste
- Implementation of Basel Convention, Montreal Protocol/Rotterdam to cross boarder trades
- Trans-boundary movement of POPs wastes

Joint measures to ratification and implementation through the East African Community, COMESA, IGAD etc.
Regional Harmonization of Customs Tariff
Legal/Institutional/Administrative harmonization

15.0 Tasking

e.g. Kenya Plant Health Inspectorate Services (KEPHIS)

- Pest Control Products Act (Regulation) of pesticides
- National Agricultural Laboratories (Research)
- Government Chemist (analysis) for contamination of products e.g. cow milk, grains, animal feeds (keep the standards on POPs)
- Kenya National Cleaner Production on unintentional POPs (Cleaner Production methods)
- Kenya Flower Council on complying with trade restrictions especially maximum residue levels.

16.0 Healthy Debate in Media: related to POPs by:

- Top researchers
- Members of Parliament
- Research bodies such as
- International Centers for Insect physiology and Ecology (ICIPE)
- World Health Organization
- Kenya Trypanosomiasis Research Institute
- Kenya Plant Health Inspectorate Services
- Kenya Agricultural Research Institute
- Strong participation by the Minister for Environment Hon Kamotho, Kilundu Kalonzo Musyoka.
- Strong \participation by Prof Khamalla, Chair NEMA Board, Director General NEMA

17.0 Awareness Raising Materials

- Printing of T-shirts
- Printing of Pamphlets
- Regular Experts meetings and field visits
- Work Program of NEMA contains POPs activities such as:
- TV slots – professional view
- Educational materials
- Slides and CD ROMs
- Workshops
- Exhibits in COP12
- Participation in SAICM.

- 12.0 Roundtables Training

April 2003 - Obsolete Pesticides 25 people trained

Nov. 2002 - National Chemicals profile with UNITAR – 23 people trained

- Review of Dioxin Toolkit

Jan. 2004- National POPs Inventory – Dec 2004

13.0 Workshops

The office has organized participation by Kenya's in the following POPs related regional workshops

June, 2002 - Stakeholders Workshop (55 People participated)

April, 2003 - High Level Roundtable on DDT

Involvement of members of

Parliament/Academic/NGO's

40 people involved on health debate on DDT

14.0 June, 2003 - Expert meeting on multilateral environmental agreements on chemicals.

July, 2004 - Priority Setting Workshop

October, 2004 -

ANNEX 4

LIST OF PRESENT AND PAST NATIONAL COORDINATION COMMITTEE MEMBERS AND ADVISERS ON NIP

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20. Prof. Shem Wandiga
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Senior Ecologist
Department of Resource Survey and
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ANNE5
INVENTORY TEAM COORDINATED BY UNIVERSITY OF NAIROBI ENTERPRISE SERVICES

Sector	Name	Institution
1. Pesticide POPs –Task Team	Professor M. A. Mwanthi	(Consultant- UNES) Universal Of Nairobi School of Public Health
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	Mr. H. Aden	Ministry of Health
	Mrs. Rosemary Nganga	(KEPHIS) Kenya Plant Health Inspectors
	Mrs. Margaret Maumba	(PCPB) Pest Control Products Board
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