REPORT

INSTITUTIONAL NEEDS ANALYSIS FOR CHEMICALS AND WASTE MANAGEMENT IN KENYA

For the project

Sound Chemicals Management Mainstreaming and UPOPs reduction in Kenya, Ministry of Environment and Natural Resources

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EXECUTIVE SUMMARY

According to the Strategic Approach to International Chemicals Management (SAICM), by the year 2020, production and use of chemicals should be in ways that lead to minimization of significant adverse effects on human health and the environment. To realize this, Kenya developed a national chemicals profile and draft Terms of Reference for inter-ministerial coordination mechanism. The country also carried out her SAICM implementation capacity assessment. Both the national chemicals profile and the capacity assessment indicate that the country faces risks posed by chemicals and hazardous waste. Thus, interventions in chemicals production, import, export, transport, use and disposal are a priority in Kenya's SAICM Implementation Plan (SIP).

Similarly, the Stockholm Convention requires Parties to adopt and introduce measures to reduce or eliminate releases of persistent organic pollutants (POPs). The Convention currently focuses on reducing and eliminating releases of 28 POPs which include the initial 12 POPs and 16 additional new POPs. The additional POPS necessitated Kenya to update her POPs National Implementation Plan (NIP) that outlines the priority activities and strategies to address management of POPs in her environment. This includes; capacity building activities and funding needs to contribute to compliance measures and develop risk reduction measures under the Convention. Further, it spells out institutional capacity strengthening required to address new POPs.

The two plans of SAICM Implementation Plan (SIP) and the updated NIP for POPs by Kenya, recognize that even though there are regulatory and research institutions in Kenya that deal with chemicals management, they lack adequate capacity, coordination arrangements and synergy in execution of their mandates and activities. Further, a comprehensive approach to the management of chemicals is hampered by inefficient resource mobilization and optimization. Although specialised training on chemicals of global concern and related technical infrastructure is lacking, there is some specialized human risk assessment capacities and technical infrastructure in some institutions including technical training in various aspects of chemicals risk and hazard management

The above scenario prompted Kenya to develop a five year, 2016-2021, post NIP project on "*Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya*" funded by GEF and UNDP to address priorities identified in this NIP. The project is implemented by the Ministry of Environment and Natural Resources (MoENR) and its partners at national and county levels and seeks to implement the two plans envisaged by both the Stockholm National Implementation Plan (NIP) and the SAICM Implementation Plan (SIP). This would lead to mainstreaming sound chemicals management and reduction of unintentionally produced persistent organic pollutants into national and county development activities through capacity building of key institutions.
Time has lapsed between the project proposal development and its execution. Thus, before this project is implemented, the MoENR commissioned consultancies to provide baseline information on the current national priorities that can be addressed and upon which success can be evaluated. One of them is this one titled "*Institutional Needs Analysis for Chemicals and Waste Management in Kenya*". Its objective is to analyse the institutional barriers to effective sound chemical and waste management and the implementation of SAICM in Kenya.

Specific objectives include:

i. Identify the capacity of key institutions addressing drivers and barriers for chemical lifecycle as defined by SAICM and waste management issues as addressed by Annex c of the Stockholm Convention
ii. Define and evaluate specific strategies to strengthen institutional framework for SAICM adoption planning in reference to the institutional barriers
iii. Make recommendations on institutional capacity building for effective chemical and waste management
iv. Review the terms of reference for the proposed Kenya National Chemical Management Coordination Committee established at the Ministry of Environment and develop operational guidance note for its outputs

The consultancy was undertaken through document review, interviews and meetings with respondents in key institutions implementing various aspects of chemicals and waste management. These include: Government: Ministry of Environment and Natural Resources (MENR), Ministry of Health (MOH), County Government of Nairobi; Regulatory: National Environment Management Authority (NEMA), Pest Control Products Board (PCPB), Directorate of Occupational Health and Safety Services (DOHSS), Kenya Plant Health Inspectorate Services (KEPHIS); Research: Kenya Agricultural and Livestock Research Organisation (KALRO), International Center of Insect Physiology and Ecology (ICIPE) and Kenya Industrial Research and Development Institute (KIRDI); Services: Kenya Bureau of Standards (KEBS), Kenya Revenue Authority (KRA), Kenya National Cleaner Production Centre; Academia: University of Nairobi (UoN) and Technical University of Kenya (TUK) and NGOs: Centre for Environmental Justice and Development (CEJD), Green Belt Movement (GBM).

The study found the following gaps:

Training and awareness: In most of the institutions, the levels of awareness of POPs including the new ones was found to be low. The subject of chemicals management is regarded as a NEMA or Ministry of Environment issue simply because most of the activities undertaken have been led by these two institutions. Also the number of staff and their skills on chemicals management was reported to be low for various groups of people including: technical institutions supporting industry, staff at ports of entry, regulatory authorities

Information, Documentation and knowledge management: The sharing of information across the different stakeholders was found to be low by the majority of respondents. Institutions were found to practice a "silo" mentality in their activities. Apparently institutions do not store data. Most Institutions store their data in computers, files and flash disks and CDs as a backup in a computerized system. The data is not often analysed and synthesized. Sometimes information is shared in meetings, seminars and in trainings. Where there was overlapping of mandates such in the case of NEMA and WRA on issuance of effluent discharge licenses, the real issue of contention was found to be the fee that industries pay for the discharge licenses.

Research laboratory analysis, monitoring, and the ability to support health and environmental surveillance (e.g. for pesticide or workplace exposures, for chemicals in the environment, or for chemical contamination in air, water, soil etc) helps support programmes and policies for chemicals management. The research institutions were found to be incapable of detailed monitoring of POPs in environmental matrixes. Only This was attributed to inadequate human skills and laboratory infrastructure in all the key institutions targeted for the study. In some there is no equipment of high resolution

while in others, the staff lacks the methodology for analyzing the POPs and uPOPs. Only the laboratories in KEPHIS, ICIPE and KARLO can analyse uPOPs. The Univerity of Nairobi has management to develop a methodology for uPOPs analysis. The only laboratories whose results are used for forensic purposes are in Government Chemist Laboratories in Nairobi and Mombasa

Monitoring: There is no national program monitoring POPs in the environment. The projects such as the Global Monitoring Plan for POPs under Stockholm Convention sponsored by UNEP/GEF with reported data in air and mother's milk is an indication of levels of pesticide POPs in the environment. This may reflect the effectiveness of measures taken by Kenya to implement the Convention but the changes in levels can only be evaluated after a number of monitoring studies has been conducted within certain time intervals. Lack of monitoring protocol, limited funds and appropriate capacity to conduct the required analyses has affected the monitoring studies.

Regulations: There is no specific regulation governing the sector; currently, there is heavy dependence on EMCA (amendment), 2015 for chemicals and waste management. This law has provisions for technologies like open burning that is not in synch with the Stockholm Convention. The Chemical Regulations as well as those on Economic Instruments are in draft form and therefore not available to govern the chemicals sector and bring coherence amongst the players in the industry.

Voluntary initiatives: A number of pilot projects have been voluntarily implemented, demonstrating their effectiveness for POP reduction as well as alternatives. These initiatives are still small-scale, episodic as they are normally dependent on donor funds and have the risk of remaining at enterprise level if they are not up-scaled and mainstreamed.

Coordination: There is lack of coordination amongst the institutions involved in chemicals and waste management. Additionally, there are no databases, shared or otherwise as information is often stored in its source documents that are not analysed.

***Mainstreaming*:** Chemicals issue and particularly uPOPs have not been effectively mainstreamed in policies, plans, programs and institutions. This was evidenced by lack of its inclusion in the Environment Sector Report that is going to form part of the MTPIII.

To reduce chemical risks during production, use and disposal of chemicals, the study recommends the following:

Training: and awareness

Awareness raising and training on sound chemicals and waste management are required at several levels: for the general public; to various institutions on innovative concepts of sound chemicals and waste management that aim to prevent their use through cleaner alternatives, minimising use of chemicals and preventing pollution; for personnel testing chemicals in laboratories, handling hazardous goods at the ports of entry and along the supply chain including transporters and MSMEs. This will include enhancing inspection skills to customs officers, imparting knowledge and handling skills to first responders such as police and continuous awareness to nearby communities; training on hazardous effect of chemicals and disposal techniques for regulatory authorities and industry; and training on risk assessment, monitoring and evaluation of chemicals hazards by DOSHS staff.

Documentation and knowledge management
To effectively raise awareness and change behavior on chemicals management: the method that institutions have in place for collecting and analysing data and performance indicators and targets on chemicals management need to be reviewed; and chemicals management concepts piloted successfully need to be documented and shared widely.

Monitoring and Research
To avoid proliferation of poorly equipped laboratories, setting up of a POPs reference laboratory is recommended. Further consideration can be given to whether we should have up to three reference laboratories including for food safety surveillance, public health surveillance and for general analytical purposes in other environmental matrices.
To strengthen human capacity, training of staff should be provided on chemicals sampling protocol in core matrices, sample preparation, analysis and interpretation by monitoring and research institutions. Capacity built at the University of Nairobi can be used.

Coordination
A national coordination mechanism based at the Ministry of Environment and Natural Resources needs to be operationalised to bring coherence in chemicals management.

Policy and regulations

Complete the development of **Chemical Management Regulations** to regulate a sector where currently there are no effective controls. Further, infuse **voluntarism** in the current EMCA (Amendment), 2015, to give it legal recognition and give institutions and businesses latitude to explore innovative approaches for sound chemicals and waste management.

Integrate hard and soft compliance and enforcement approaches ot encourage innovations in sound chemicals and waste management. The full implementation of EMCA, in particular, the economic instruments and Chemicals Regulations should be fast tracked to support this approach.

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ABBREVIATIONS

ICIPE	International Centre for Insect Physiology and Ecology
EMCA	Environmental Management and Coordination Act
GEF	Global Environment Facility
GoK	Government of Kenya
KALRO	Kenya Agricultural and Livestock Research Organisation
KEBS	Kenya Bureau of Standards
KEMRI	Kenya Medical Research Institute
KMD	Kenya Meteorological Department
KNCPC	Kenya National Cleaner Production Centre
MEAs	Multilateral Environmental Agreements
MoENR	Minsitry of Environment and Natural Resources
MOH	Ministry of Health
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NIPs	National Implementation Plans
PCPB	Pest Control Products Board
SAICM	Strategic Approach to International Chemicals Management
SIP	SAICM Implementation Plan
TUK	Technical University of Nairobi
SOE	State of Environment Report
UNEP	United Nations Environment Programme
UoN	University of Nairobi
WHO	World Health Organization

SYNOPSIS

This draft report (Deliverable 2) is submitted in the framework of the assignment "*Institutional Needs Analysis for Chemicals and Waste Management in Kenya (Individual Contract No. IC/067/2017)*" financed by UNDP Kenya as detailed below.

Project title	Institutional Needs Analysis for Chemicals & Waste Management in Kenya
Individual Contract	No. IC/067/2017
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Ministry Counterpart	The Director of Multilateral Environmental Agreements **Ministry of Environment and Natural Resources**
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1 INTRODUCTION

1.1 Background

The Strategic Approach to International Chemicals Management (SAICM) of the Johannesburg World Summit on Sustainable Development provides an important framework for chemicals management by countries. According to SAICM, by the year 2020, production and use of chemicals should be in ways that lead to minimization of significant adverse effects on human health and the environment. Towards this, Kenya developed a national chemicals profile and draft Terms of Reference for inter-ministerial coordination mechanism. The country also carried out her SAICM implementation capacity assessment. Both the national chemicals profile and the capacity assessment indicate that the country faces risks posed by chemicals and hazardous waste. Thus, interventions in chemicals production, import, export, transport, use and disposal are a priority in Kenya's implementation plan for SAICM.

On the other hand, the Stockholm Convention which is a globally binding treaty to protect human health and the environment from persistent organic pollutants (POPs), requires Parties to adopt and introduce measures to reduce or eliminate releases of POPs. The Stockholm Convention currently focuses on reducing and eliminating releases of 22 POPs which include the initial 12 POPs and 10 additional new POPs. This necessitated Kenya to update her POPs National Implementation Plan (NIP) that outlines the priority activities and strategies to address management of POPs in her environment. This includes; capacity building activities and funding needs to contribute to compliance measures and to develop risk reduction measures under the Convention. Further, it spells out institutional capacity strengthening required to address new POPs.

The approval of SAICM Implementation Plan (SIP) and updating of the NIP for POPs by Kenya is testament to the country's commitment to establishing a strong foundation for the sound management of chemicals. These two plans recognize that even though there are regulatory and research institutions in Kenya that deal with chemicals management, they lack adequate capacity, coordination arrangements and synergy in execution of their mandates and activities. There are ad-hoc inter-ministerial coordination mechanisms for chemicals but generally the country lacks a well-organized inter-ministerial coordination mechanism for chemicals management. The presence of such a body would enhance collaboration among ministries and agencies in implementing their respective mandates and competencies and facilitate information sharing.

Further, it has been established that there is inability to foster a comprehensive approach to the management of chemicals due to inefficient resource mobilization and optimization. On the brighter side, there are some institutions at the national level that have specialized human risk assessment capacities and technical infrastructure. Additionally, basic technical training in various aspects of chemicals risk and hazard management is also available locally at universities and specialised training institutions. Unfortunately, there is a deficiency in specialised training on chemicals of global concern and related technical infrastructure which require support from many stakeholders including; government, private sector, civil society and development partners. Although there are institutional and administrative structures in the ministries and agencies to address chemicals risk management, weaknesses in human and financial resources for chemicals management at all levels of the chemicals life cycle are manifest.

Consequent to the above, Kenya has developed a five year, 2016-2021, post NIP project on "Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya" funded by GEF and UNDP to address priorities identified in this NIP. The project is implemented by the Ministry of Environment and Natural Resources (MoENR) and its partners at national and county levels and seeks to implement the two plans envisaged by both the Stockholm National Implementation Plan (NIP) and the SAICM

Implementation Plan (SIP). This would lead to mainstreaming sound chemicals management and reduction of unintentionally produced persistent organic pollutants into national and county development activities through capacity building of key institutions.

The project intends to protect human health and the environment by managing the risks posed by production, use, import and export of chemicals and reducing /preventing the release of U-POPs and toxic compounds originating from the unsafe management of waste in two key sectors: Health Care Waste and Municipal Waste. These sectors are among the highest priorities identified in the reviewed and updated National Implementation Plan. To realize this, this consultancy addresses barriers and needs that responsible institutions face so as to foster sound chemicals management and reduction of unintentionally generated POPs.

1.2 Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya Project

Kenya has participated in a number of regional projects on chemicals management. Two UNEP/GEF projects coordinated by the department of Chemistry, University of Nairobi, the; (i) Global Monitoring Plan (GMP) in Eastern and Southern Africa Sub-Region and, (ii) MONET Africa Initiative that is monitoring POPs in ambient air, are the relevant ones to the activities of this project. This project "Sound chemicals management mainstreaming and uPOPs reduction in Kenya' is Kenya's first post-NIP project supported by GEF and UNDP that runs from January 2016 to January 2022. Its main objective is the reduction of the release of uPOPs and other substances of concern and the related health risks, through the implementation of environmentally sound management of municipal and healthcare wastes and of an integrated institutional and regulatory framework covering management of and reporting on POPs. To achieve this, the project intends to: improve the regulatory system whilst enhancing its enforcement, raise awareness on POPs, establish the capacity for safe handling, transport and improved disposal of POPs-containing or POPs-generating waste. The expected project impact is a reduction of risks for the human health and the environment since the release of POPs in the environment shall be reduced as well as people's exposure to them.

The project has five five components including:

Component 1. Mainstreaming sound management of chemicals and waste into national and county development activities through capacity building of Ministry of Environment and Natural Resources (MoENR), Ministry of Health (MOH), county governments of Nairobi, Kisumu, Nakuru and Mombasa and the NGOs.

Component 2. Introducing environmentally sound management of health care waste in selected healthcare facilities entailing policy and strategic plans to prepare them to adopt Best Available Technologies (BATs) and Best Available Practices (BEPs).

Component 3. Demonstration of sound healthcare waste disposal technologies in a selected number of healthcare facilities in each county.

Component 4. Minimizing releases of unintentionally produced POPs from open burning of waste.

Component 5. Monitoring, learning, adaptive feedback, outreach and evaluation.

This project is underpinned by two key instruments: the SAICM and SAICM Implementation Plan (SIP) that address sound chemicals management; Kenya's National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants.

1.3 SAICM and SAICM Implementation Plan

The Strategic Approach to International Chemicals Management (SAICM) is a policy framework adopted by the International Conference on Chemicals Management (ICCM) at its first session in Dubai, United Arab Emirates, on 6th February 2006 to promote chemical safety around the world. It comprises the Dubai Declaration that expresses high level political commitment to SAICM and an Overarching Policy Strategy (OPS) which sets out its scope, needs, objectives, financial considerations, underlying principles and approaches, and implementation and review arrangements. The OPS was developed in the context of the Rio Declaration, Agenda 21 and the Johannesburg Plan of Implementation. The SAICM takes into account existing initiatives including: the Basel, Bamako, Stockholm and Rotterdam Conventions. In addition to adopting SAICM, Kenya is active in building its capacity in chemicals management and implementation of national and regional chemical and wastes initiatives such as the Libreville Declaration of 2008 linking health and environment.

The Strategic Approach to International Chemicals Management (SAICM) of the Johannesburg World Summit on Sustainable Development provides an important framework for chemicals management by countries. According to SAICM, by the year 2020, production and use of chemicals should be in ways that lead to minimization of significant adverse effects on human health and the environment. Towards this, Kenya developed a national chemicals profile and draft Terms of Reference for inter-ministerial coordination mechanism. The country also carried out her SAICM implementation capacity assessment.

Both the national chemicals profile and the capacity assessment indicate that the country faces risks posed by chemicals and hazardous waste. Thus, interventions in chemicals production, import, export, transport, use and disposal are a priority in Kenya's implementation plan for SAICM. The SAICM Implementation Plan for Kenya is anchored on recommendations contained in the Kenya National Chemicals Profile and The Capacity Assessment that were developed in 2011. All this is within the general framework of the Overarching Policy Strategy, the Global Plan of Action, and the Dubai Declaration, while taking into account the country's priorities and funding opportunities to implement actions.

The goal of SAICM Implementation Plan for Kenya (SIP) (2011-2014) is to reduce risks to human health and the environment arising from exposure to chemicals. The SIP focuses on priority risks and hazardous activities that have been identified at country level. The Plan offers a framework that contains actions that need to be addressed to reduce risks posed by chemicals and hazardous waste. Ways of strengthening national processes, policies, legislations, education programmes, and information network among others are suggested. This is expected to facilitate the implementation of chemicals risk reduction and management activities at the national, county and enterprise levels.

The SIP contains both short- (2011-2015) and long-term components (2011-2019). Among the key actions contained in its implementation framework are: capacity building through mainstreaming chemicals in key institutions, national policies, strategies and development plans; and partnering with bilateral and multilateral initiatives in Kenya. In addition to providing a pathway to meeting Kenya's main chemicals management needs, the SIP shall enable monitoring impacts of SAICM implementation in accordance with the country's international obligations.

1.4 The Updated Kenya National Implementation Plan

The updated Kenya National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants establishes a number of priority areas touching on sound management of chemicals:

- Promoting technology transfer, cleaner production, industry and civil society participation in POPs management

- Enhancing laboratory services, research for monitoring of POPs pollutants and assessment of alternatives to toxic POPs
- Promoting safer POPs alternatives, mostly concerning the use of non-POPs or non chemical pesticides, alternatives to PBDE flame retardants and alternatives to these processes which are generating POPs.

It is noted in the NIP that there are still difficulties in the completion of related activities in particular, the development and enforcement of an integrated chemicals and waste regulation which among others, takes into account: guidance on waste classification based on their chemical composition; standards on substances recovered from waste; and sound management of chemical waste. Further, the implementation of the globally harmonized systems (GHS) for classification, labelling and packaging of hazardous chemicals has not been implemented.

1.5 Other Conventions and Instruments

1.5.1 The Stockholm Convention

Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).In Annex A, B and C, the Convention spells out how three (3) types of chemicals must be managed by Parties.

Annex A (Elimination)
In Annex A, a total of 28 (up to October 2016) chemicals are targeted for elimination, most of which are pesticides. Parties must take measures to eliminate the production and use of these chemicals (Table 1). Specific exemptions for use or production are listed in the Annex and apply only to Parties that register for them.

Table 1: POPs for elimination

Aldrin	Decabromodiphenyl ether (commercial mixture, c-decaBDE	Hexabromodiphenyl ether and heptabromodiphenyl ether
Decabromodiphenyl ether (commercial mixture, c-decaBDE)	Hexabromobiphenyl	Alpha hexachlorocyclohexane
Hexabromobiphenyl	Hexachlorobenzene (HCB)	Mirex
Hexachlorobenzene (HCB)	Beta hexachlorocyclohexane	Polychlorinated biphenyls (PCB)
Beta hexachlorocyclohexane	Pentachlorobenzene	Technical endosulfan and its related isomers
Pentachlorobenzene	Polychlorinated naphthalenes	Chlordecone
Polychlorinated naphthalenes	Endrin	Heptachlor

Annex B (Restriction)

Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex (Table 2).

Table 2: Restricted chemicals

DDT	Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride

Annex C (Unintentional production)

Parties must take measures to reduce the unintentional releases of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination (Table 3).

Table 3: Unintentionally produced POPs

Hexachlorobenzene (HCB)	Hexachlorobutadiene (HCBD)	Polychlorinated dibenzofurans (PCDF)
Polychlorinated dibenzo-*p*-dioxins (PCDD)	Pentachlorobenzene	Polychlorinated biphenyls (PCB)

1.5.2 Rotterdam Convention

The Rotterdam Convention (formally, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade) is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals in international trade.

The objectives of the Convention are:

- to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm
- to contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties.

The Convention was adopted on 10 September 1998 in Rotterdam, the Netherlands and entered into force on 24 February 2004. More than 150 countries have ratified the convention.

Annex III contains chemicals subject to Prior Informed Consent (PIC) Procedure. The chemicals listed include pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by two or more Parties. A total of 51 chemicals are listed in Annex III, 36 are pesticides (including 5 severely hazardous pesticide formulations) and 15 industrial chemicals. A mixture containing these chemicals may also be regarded as listed in Annex III. Annex III is not a static list; more chemicals get recommended for listings in the Annex III from time to time.

Parties to the Convention have their own lists of hazardous chemicals banned or restricted from import and export. Such lists usually contain more chemicals than those listed in Annex III. For a hazardous chemical that is not listed on Annex III but is banned or restricted in exporting party, certain information must be exchanged between the exporting and importing party.

1.5.3 Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland, in

response to a public outcry following the discovery, in the 1980s, in Africa and other parts of the developing world of deposits of toxic wastes imported from abroad. Its thrust at the time of its adoption was to combat the "toxic trade", as it was termed. The Convention entered into force in 1992.

Objective

The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as "hazardous wastes" based on their origin and/or composition and their characteristics, as well as two types of wastes defined as "other wastes" - household waste and incinerator ash.

Aims and provisions

The provisions of the Convention centre around the following principal aims:

(i) the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal
(ii) the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and
(iii) a regulatory system applying to cases where transboundary movements are permissible

The first aim is addressed through a number of general provisions requiring States to observe the fundamental principles of environmentally sound waste management (article 4). A number of prohibitions are designed to attain the second aim: hazardous wastes may not be exported to Antarctica, to a State not party to the Basel Convention, or to a party having banned the import of hazardous wastes (article 4). Parties may, however, enter into bilateral or multilateral agreements on hazardous waste management with other parties or with non-parties, provided that such agreements are "no less environmentally sound" than the Basel Convention (article 11). In all cases where transboundary movement is not, in principle, prohibited, it may take place only if it represents an environmentally sound solution, if the principles of environmentally sound management and non-discrimination are observed and if it is carried out in accordance with the Convention's regulatory system.

The regulatory system is the cornerstone of the Basel Convention as originally adopted. Based on the concept of prior informed consent, it requires that, before an export may take place, the authorities of the State of export notify the authorities of the prospective States of import and transit, providing them with detailed information on the intended movement. The movement may only proceed if and when all States concerned have given their written consent (articles 6 and 7). The Basel Convention also provides for cooperation between parties, ranging from exchange of information on issues relevant to the implementation of the Convention to technical assistance, particularly to developing countries (articles 10 and 13).

1.5.4 The Bamako Convention

The Bamako Convention is a treaty of African nations prohibiting the import into Africa of any hazardous (including radioactive) waste. It was negotiated by 12 nations of the African Union at Bamako, Mali in January, 1991 and came into force in 1998. It has 29 Signatories and 25 Parties. This Convention is a response to Article 11 of the Basel convention which encourages parties to enter into bilateral, multilateral and regional agreements on hazardous waste to help achieve the objectives of the convention. The impetus for the Bamako convention arose also from the:

(i) the failure of the Basel Convention to prohibit trade of hazardous waste to less developed countries (LDCs)
(ii) the realization that many developed nations were exporting toxic wastes to Africa (Koko case in Nigeria, Probo Koala case in Ivory Coast).

The Bamako convention is much stronger in prohibiting all imports of hazardous waste and does not make exceptions on certain hazardous wastes (like those for radioactive materials) made by the Basel convention.

The purpose of the Convention is to:

(i) Prohibit the import of all hazardous and radioactive wastes into the African continent for any reason;
(ii) Minimize and control transboundary movements of hazardous wastes within the African continent.
(iii) Prohibit all ocean and inland water dumping or incineration of hazardous wastes.
(iv) Ensure that disposal of wastes is conducted in an "environmentally sound manner
(v) Promote cleaner production over the pursuit of a permissible emissions approach based on assimilative capacity assumptions
(vi) Establish the precautionary principle.

The Convention covers more wastes than covered by the Basel Convention as it not only includes radioactive wastes but also considers any waste with a listed hazardous characteristic or a listed constituent as a hazardous waste. The Convention also covers national definitions of hazardous waste. Finally, products that are banned, severely restricted or have been the subject of prohibitions are also covered under the Convention as wastes.

Generally countries are obligated to ban the import of hazardous and radioactive wastes as well as all forms of ocean disposal. For intra-African waste trade, parties must minimize the transboundary movement of wastes and only conduct it with consent of the importing and transit states among other controls. They should minimize the production of hazardous wastes and cooperate to ensure that wastes are treated and disposed of in an environmentally sound manner.

1.5.5 Minamata Convention

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. It was agreed at the fifth session of the Intergovernmental Negotiating Committee on mercury in Geneva, Switzerland at 7 a.m. on the morning of Saturday, 19 January 2013 and adopted later that year on 10 October 2013 at a Diplomatic Conference (Conference of Plenipotentiaries), held in Kumamoto, Japan.

The Convention draws attention to a global and ubiquitous metal that, while naturally occurring, has broad uses in everyday objects and is released to the atmosphere, soil and water from a variety of sources. Controlling the anthropogenic releases of mercury throughout its lifecycle has been a key factor in shaping the obligations under the Convention.

Major highlights of the Minamata Convention include a ban on new mercury mines, the phase-out of existing ones, the phase out and phase down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.

1.5.6 Other Conventions

The Vienna Convention on ozone layer and its Montreal Protocol on Ozone Depleting Substances; the Framework Convention on Climate Change; and the Chemical Weapons Convention. Each convention addresses a specific sectoral niche but have the common denominator minimizing the emission and risks.

1.5.7 The Libreville Declaration, 2008

The Libreville Declaration on Health and Environment was signed by 52 African countries at the first-ever inter-ministerial Conference for Health and Environment in Africa in Libreville, Gabon, in 2008 organised by the WHO and UNEP. The Libreville Declaration recognises that an integrated policy approach is the best way to address the inter-linked health and environment issues. The Declaration urges member states to implement priority inter-sectoral programmes at all levels in health and environment sectors. The conference adopted eleven action points as part of the Declaration:

1. Establishing a health-and-environment strategic alliance, as the basis for plans of joint action
2. Developing or updating national, sub-regional and regional frameworks to address environmental impacts on health and mainstreaming them
3. Ensuring integration of agreed objectives in health and environment in national strategies
4. Building national, sub-regional and regional capacities through the establishment or strengthening of health and environment institutions
5. Supporting knowledge acquisition and management in the area of health and environment
6. Establishing or strengthening systems for health and environment surveillance to measure interlinked health and environment impacts and to identify emerging risks
7. Effectively implementing mechanisms for enforcing compliance with international conventions and national regulations
8. Setting up national monitoring and evaluation mechanisms to assess performance in implementing priority programmes and peer review mechanisms
9. Instituting the practice of systematic assessment of health and environment risks
10. Developing partnerships for targeted and specific advocacy on health and environment issues
11. Achieving a balance in the allocation of national budgetary resources for intersectoral health-and-environment programmes

1.5.8 Marrakesh Ministerial Declaration on Health, Environment and Climate Change, 2016

Ministers of Health and Environment of more than 20 countries, in Morocco in November, 2016, signed the Marrakesh Ministerial Declaration on Health, Environment and Climate Change at the 22nd Conference Of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP 22).The Declaration aims to reduce the annual 12.6 million deaths caused by environmental pollution, including the estimated 6.5 million deaths a year attributable to air pollution, via a new global initiative to promote better management of environmental and climate risks to health.

The Libreville and Marrakesh Declarations accord Kenya a chance to catalyse change across multiple sectors, from energy, transport, environment, housing and agriculture to economic policy and planning in taking action about air pollution, climate and health impacts as well as promote climate solutions beneficial to health.

2 INSTITUTIONAL NEEDS ANALYSIS FOR SOUND CHEMICALS MANAGEMENT

2.1 The Study

This consultancy forms the baseline report on the needs of key institution that should be addressed in order for this project to realize its objectives.

Objective of the Study

The overall objective of this consultancy is to analyze the institutional needs to effective sound chemical and waste management and the implementation of SAICM in Kenya.

The specific objectives are to:

i. Identify the capacity and needs of key institutions addressing drivers and barriers for chemical lifecycle as defined by SAICM and waste management issues as addressed by Annex c of the Stockholm Convention

ii. Define and evaluate specific strategies to strengthen institutional framework for SAICM adoption planning in reference to the institutional barriers

iii. Make recommendations on institutional capacity building for effective chemical and waste management

2.1.1 Study Methodology

Study Design

Based on the consultant's understanding of the Terms of Reference, the scope of the institutional analysis was conceptualized and clustered under the three objectives (Figure 1).

This study was cognizant of the fact that a lot of studies have taken place in the context of SAICM and the Stockholm Convention. Consequently, the interest in this case was to select key institutions that are addressing barriers and drivers to sound chemical life-cycle and waste management in Kenya and delve deeper into the successes and failures. This would enable decipher the capacity needs of the institutions and the drivers to be addressed by the ProDoc so as to enhance potential for replication and up-scaling.

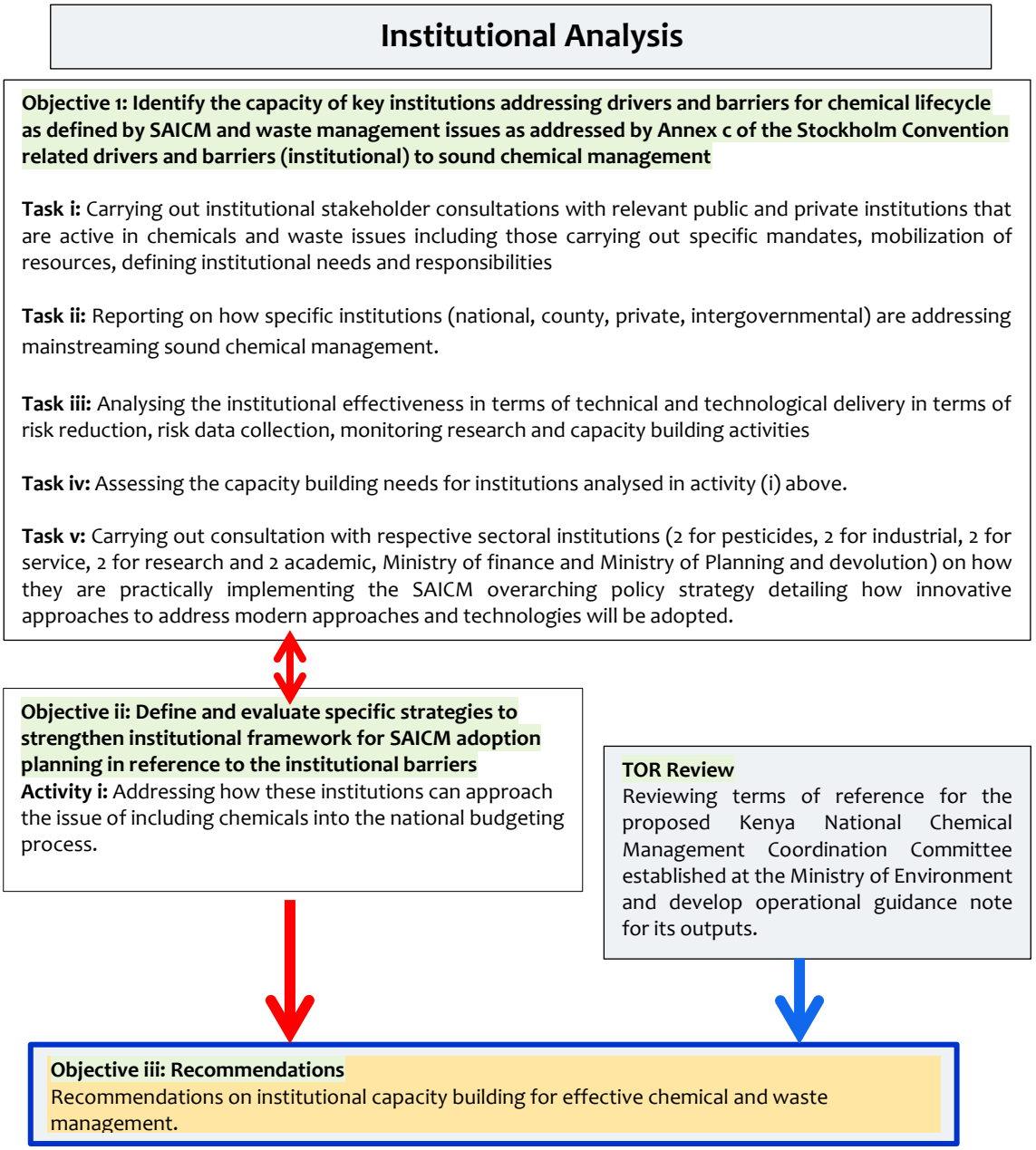

Figure 1: Conceptual Framework on Study Tasks

Among the key institutions targeted were:

Government: Ministry of Environment and Natural Resources (MENR), Ministry of Health (MOH), County government of Nairobi and Nakuru.

Regulatory: National Environment Management Authority (NEMA), Pest Control Products Board (PCPB), Directorate of Occupational Health and Safety Services (DOHSS), Kenya Plant Health Inspectorate Services (KEPHIS)

Research: Kenya Agricultural and Livestock Research Organisation (KALRO), International Center of Insect Physiology and Ecology (ICIPE)

Services: Kenya Bureau of Standards (KEBS), Kenya Revenue Authority (KRA), Kenya National Cleaner Production Centre

Academia: University of Nairobi (UoN) and Technical University of Kenya (TUK)

NGOs: Centre for Environmental Justice and Development (CEJD), Green Belt Movement (GBM)

Data Collection Methods

Both qualitative and quantitative information was sought covering the operational level at institutions in terms of chemicals and waste management needs and barriers through to policy and institutional domains. This was critical to discerning the extent to which these needs impact on effectiveness in service delivery.

The institutional analysis used both quantitative and qualitative approaches and employed three types of data collection methods: (i) semi-structured interviews of key informants in the selected institutions with knowledge of chemicals and waste management, (ii) drawing on evidence from desk review, (iii) laboratory and monitoring site visits.

Key Informant Interviews

The first dimension of data collection process was through in-depth interviews of key informants that have knowledge of either chemicals management and/or waste management in their institutions. Accordingly, an interview schedule was developed for the purpose of obtaining data during the face-to-face interview (Annex 1). The target respondents were Chief Executive Officers (CEOs) of Lead Agencies, heads of the chemicals and/or waste management departments of the institutions, representatives of non-state actor institutions, officers from policy development in Government, regulatory agencies and technical support institutions.

Literature review

Second, was an extensive literature review as documents and records are an invaluable social research sources. In this study, document analysis entailed review of grey literature relating to chemicals and waste management by institutions and their needs. Documents on SAICM, and the Conventions (Stockholm, Rotterdam, Basel, Minamata) were retrieved from online (www.pops.intl) resources, CDs, including hard copies of previous studies/publications on the subject of chemicals and waste management in Kenya. Other documents reviewed included; quarterly and annual reports for activities implemented by the institutions to determine program indicators at output and outcome levels.

Laboratory and monitoring site visits

In research, regulatory and universities, visits were made to the laboratories to verify equipment available. Additionally, a visit was made to the Chemistry Department of the University of Nairobi rooftop where active air sampling is taking place.

3 POLICY AND REGULATORY FRAMEWORK

3.1 Introduction

Kenya actively participates in various international treaties and conventions related to chemicals. In addition to this, the country has a number of institutions guided by specific policies and legislations to manage chemicals. The Ministry of Environment and Natural Resources (MENR) together with its regulatory institution, NEMA, plays a critical role in the conservation and protection of the environment that ensures decoupling of development from environmental degradation in every sector. The realization of the Sustainable Development Goals (SDGs), the aspirations of the Kenya Constitution 2010, Vision 2030 and Kenya's commitments in the Multi-lateral Environmental Agreements are dependent upon the effectiveness of the Ministry of Environment being cross-cutting in nature.

3.2 The Constitution of Kenya, 2010

The Constitution of Kenya, 2010, in Article 42 confers to every Kenyan citizen a right to a clean and healthy environment. This right comes with State obligations in Article 69 of protecting the environment whilst a duty is imposed on citizens in Article 70 to protect and conserve the environment.

This Constitution ushered a new devolved system of governance which created 47 counties. Each county is expected to design its own best practices of environmental governance in harmony with the Constitution, Kenyan laws and guidelines for resources management as stipulated by NEMA regulations. They are also required to make budgetary provisions for issues such as waste and chemicals management.

3.3 The National Environment Policy, 2014

The National Environment Policy, 2014 aims at providing a holistic framework to guide the management of the environment and natural resources in Kenya. Its aspiration is an integrated environmental management approach to issues including chemicals in all government policies in order to facilitate and realize sustainable development at all levels. It contains several guiding principles relevant to sound chemicals management and waste, some of which include: right to healthy and clean environment, right to development, sustainable resource use, public participation, subsidiarity, precautionary and polluter pay principle. These principles apply to the chemicals and waste management approaches that are deployed. On industry and environment, the environment policy calls for:

an environmentally- friendly industrial development strategy that integrates and promotes cohesion of development and environmental policies and enhances transfer of environmentally sound technologies.

Further to identifying that industrial development needs to be integrated with environment, the policy attempts to provide specific solutions by committing the Government to develop and implement an environmentally-friendly industrial policy, promoting environmental education and awareness among industries, supporting industry to adopt environmentally sound technologies through use of fiscal instruments. On eco-innovation in particular, the Government commits to:

Promote Resource Efficient and Cleaner Production (RECP) technologies including best available techniques and technologies.

On waste management, the policy recognizes that inefficient production processes, coupled with unsustainable consumption and production patterns lead to excessive waste generation. To this end, the policy provides for:

- *Development of an integrated national waste management strategy.*
- *Promotion of the use of economic incentives to manage waste.*
- *Promoting the establishment of facilities and incentives for cleaner production, waste recovery, recycling and re-use.*

The Environmental Policy recognizes the importance of chemicals in the national development process. In Section 57 it recognizes that management of chemicals does not have a guiding policy. In its absence, Kenya is vulnerable to risks and hazards associated with chemicals. Consequently, it commits that the Government will:

- *Integrate chemicals management programme into development plans*
- *Implement the international process of the Strategic Approach to International Chemicals Management (SAICM)*
- *Develop and implement a chemicals management policy*

Waste management is provided for in section 6.0. Here the Government commits to integrated national waste management strategy, economic incentives for managing waste and promotion of cleaner production, waste recovery, recycling and re-use. However, the policy does not specifically mention POPs and the aspect of open burning of waste.

3.4 Kenya Vision 2030

Kenya Vision 2030 is the country's development blueprint in the period 2008 to 2030. Its aim is to make the country a newly industrializing, "middle income country providing high quality life for all its citizens by the year 2030". The vision is anchored on three pillars of economic social political. Environment is subsumed in the social pillar. On environment, the country has set its sights on becoming a nation where her citizens live in a clean, secure and sustainable environment by 2030. The Vision has specific strategies that include: reducing pollution and waste generation through designing and enhancing the application of economic incentives; public-private partnerships (PPPs) for improved efficiency in water and sanitation delivery. This will promote environmental conservation thereby supporting the economic pillar in its flagship projects and in realizing the Millennium Development Goals (MDGs). Through the Vision, the country commits to enhance disaster preparedness and building resilience to climatic change.

3.5 The Environmental Management and Coordination (Amendment) Act, 2015

The Environmental Management and Coordination (EMCA) (amendment), Act 2015 is the framework law for environmental management in Kenya. The Act established the National Environment Management Authority (NEMA) as the principal instrument of Government for implementing policies on environment. This Act is aimed at harmonizing the effort of environmental governance in the country.

Under this Act NEMA provides leadership in environmental impact assessment for proposed projects. Chemical industries are scheduled activities that must adhere to this. NEMA also requires annual environmental audits to be done by existing facilities and it also prepares the State of the Environment Report for the country on an annual basis. Compliance and enforcement is undertaken by NEMA'S

Environment Inspectors and non-compliance leads to fines, sanctions and presentation of compliance action plans.

Management of chemicals is provided for in sections 91-93, including: development of standard criteria for classification of toxic and hazardous substances; development of guidelines and regulations for the management of each category of hazardous and toxic wastes; and control of imports, exports and transportation of toxic and hazardous chemicals and materials.

The Act further provides for development of regulations that should specify: labeling of chemicals, packaging, advertising, distribution, storage, transportation, and handling of chemicals and materials. The regulation should include: monitoring the effect of chemicals and their residue on human health and the environment; restriction and banning of toxic and hazardous substances and energy; disposal of expired and surplus chemicals and materials. Discharge of hazardous substances, chemicals and materials or oil into the environment and spiller's liability are provided for. It further provides for standards of pesticides and toxic substances. Chemicals covered under this Act include among others: industrial, fertilizers, consumer chemicals, petroleum products and chemical wastes.

To implement the EMCA (Amendment), 2015, are various regulations, viz., Waste Management Regulations (2006); Water Quality Regulations (2006), Air Quality Regulations (2012), Draft Chemicals Regulation (2017) among others. The Act and the Regulations do provide for incineration as a disposal method for waste. This is however, being discouraged in the new global development agenda including by the Stockholm Convention.

From the foregoing, what is now outstanding is the finalization of the development of Draft Chemical Regulations, 2017 covering the management, classification, labelling and handling of each category of hazardous chemicals and their wastes. These are briefly presented in the section that follows.

3.6 Draft Chemicals Regulations, 2017

The Regulations meant to regulate the chemicals sector are still in draft form. These Draft Regulations once they come into operation, provide for registration of hazardous chemicals by NEMA. They also require labeling to be done in line with the globally harmonized labeling and classification (GHS) of chemicals and materials. Additionally, they provide directions to importers, transporters, distributors on how they should be handled. They further specify disposal, impacts and offenses for violations.

These Regulations are expected to regulate primary emission sources from agricultural (for organochlorine pesticides (OCPs)], industrial (polychlorinated biphenyls (PCBs), poly- and perfluorinated compounds (PFCs), flame retardants (FRs)), health-related applications (dichlorodiphenyltrichloroethanes (DDTs) and lindane), or unintentional releases due to combustion (polychlorinated dibenzo-*p*-dioxins/furans (PCDD/Fs) and polycyclic aromatic hydrocarbons (PAHs)).

3.7 Occupational Health and Safety Act, 2007

This Act provides direction on how to manage the health, safety and welfare of workers and all persons that are lawfully present at workplaces. Additionally, provision is made for the establishment of the National Council for Occupational Safety and Health and for connected purposes. On chemical safety it provides as follows:

(i) establish safety and health requirements based on risk assessments, technical standards and medical opinion, for the safe handling and transportation of chemicals and other hazardous substances,
(ii) every manufacturer, importer, supplier or distributor of chemicals to make available to employers, material safety data sheets (MSDSs) for chemicals and other hazardous substances, containing detailed essential information regarding their identity, supplier, classification of hazards, safety precautions and emergency procedures
(iii) every supplier of hazardous substances, whether a manufacturer, importer or distributor of hazardous substances shall ensure that containers filled with hazardous substances, are appropriately labeled and marked,
(iv) every supplier of chemicals whether as a manufacturer, importer or distributor shall ensure that all chemicals are classified according to their characteristics, properties such as toxicity, chemical, physical, corrosive and irritant; allergenic, sensitizing, carcinogenic teratogenic and mutagenic, effects as well as their effect on the reproductive systems.
(v) facilities must set up Health and Safety Committees at their workplaces

3.8Pest Control Products Act, Cap 346

This Act regulates the importation, exportation, manufacture, distribution and use of products used for the control of pests and of the organic function of plants and animals and for connected purposes. This Act prohibits: (i) manufacturing, packaging, storing, displaying, distributing, using or advertising any pest control product except in accordance with conditions prescribed by regulations made under the Act, (ii) packaging, labeling or advertising any pest control product in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, quality, composition, merit or safety, (iii) importing into or selling in Kenya, any pest control product unless that product has been registered, packaged and labeled in accordance with regulations made under the Act and conforms to the standards specified in those regulations, (iv) export or re-export out of Kenya any pest control product unless (s)he has complied with the requirements specified in regulations made under the Act.

3.9The EAC Customs Management Act, 2004

The EAC Customs Management Act, 2004 (Revised 2009), the Second and Third Schedule, provides guidance on prohibited goods that are not allowed to enter the EAC region including Kenya. Prohibited goods include: (i) hazardous wastes and their disposal as provided for under the Basel Convention (ii) all soaps and cosmetic products containing mercury (iii) used tyres for light commercial vehicles and passenger cars.
Some agricultural and industrial chemicals are also prohibited. Agricultural chemicals prohibited include: 2.4 T Aldrin, Caplafol, Chlordirneform, Chlorobenxilate, DDT, Dieldrin, 1.2Dibroacethanel (EDB), Flouroacelamide, HCH, Hiplanchlor, Hoscachlorobenzene, Lindane, Mercury compounds, Monocrolophs (certain formulations), Methamidophos, Phospharrmion, Methyl –parathion.
Prohibited industrial chemicals are: Crocidolite, Polychlorominated biphenyls (PBB), Polyuchorinted Biphenyls (PCB), Polychlororinated Terphyenyls (PCT), Tris (2.3 dibromopropyl) phosphate, Methylbromide (to be phased out in accordance with the Montreal Protocol by 2007) and counterfeit goods of all kinds.

3.10 The Health Act, 2015

This Act establishes a unified health system, to coordinate the inter-relationship between the national government and county government health systems, to provide for regulation of health care service and health care service providers, health products and health technologies and for connected purposes.

Part VI on "promotion and advancement of public and environmental health" is particularly relevant to the subject of sound chemical and waste management. Section 38 (2b) calls for reduction of disease burden arising from the environmental hygiene, sanitation, occupational exposure and environmental pollution.

The Act also calls for private sector participation in the provision of health services. It also calls upon the Cabinet Secretary to develop legislation that provides for e-waste disposal. Further, in Part XIV-Inter-departmental collaboration, the Act recognizes that two or more arms of Government may need to collaborate to develop appropriate Regulations or implementation of this legislation. By providing for this partnership, the Act paves way for co-operation between Ministries such as Environment, Water, Agriculture, Energy among other to address matters of public health.

3.11 The Malaria Control Act (Cap 246 Laws of Kenya), 2013

This Act provides direction for the prevention of malaria. Although the subject of chemical management is not the focus of the Act, it is relevant to the extent that malaria control and prevention does make use of DDT that is a POPs substance, DDT falls under Annex B of the Stockholm Convention which requires restriction of its use only for purposes of disease-vector-control. However, it is a requirement of the Convention that registration Parties register prior to making use of it use.

Summary on Policy and Regulatory Framework for Chemicals and Waste Management

The policy and legal framework for sound life cycle chemicals and waste management is quite comprehensive but lacks specifics on the management of POPs. The Constitution 2010 confers every Kenyan citizen a right to a clean and healthy environment. Under this Constitution, solid waste management is devolved to the County Governments. The National Environment Policy, 2014 despite not providing for POPs, has good provisions on chemical and waste management prioritizing cleaner production, best available technologies and best available practices for prevention, re-use and recycling. In particular, it commits to implement SAICM and integrate chemicals management in development plans. It also commits to integrated waste management (IWM) strategy and promotes use of economic instruments. EMCA (amendment) 2015, on the other hand, comprehensively provides for chemicals management both hazardous and toxic. This should include developing a regulations and standard criteria for classification, labeling, packaging, transportation, management and controlling imports. The other legislations on pesticides, health, malaria control and occupational health and safety all have elements that are used to management chemicals and associated waste in the various sectors.

From the foregoing, there are two needs:

i. Reviewing of the legislations to align them to SAICM Implementation Plan (SIP) and National Implementation Plan (NIP) for Stockholm. This means that the issue POPs is mainstreamed and practices such as incineration as a disposal method for waste are replaced with non-burn technologies.
ii. The finalization of the development of the Draft Chemical Regulations, 2017. This shall bring coherence in the management of the chemicals including the POPs, both intended and unintended.

4 INFORMATION AND RISK REDUCTION

The reduction of risks of chemicals and waste is one of the objectives of SAICM. A review of the institutions' mandate reveals needs that should be addressed to ensure more awareness, better information flow and reduction of risks from chemicals and waste in the country.

4.1 Policy and Regulatory Institutions

4.1.1 Ministry of Environment and Natural Resources

Mandate

To protect, conserve and manage the environment and natural resources for socio-economic development in Kenya through formulation of policies and coordination.

The Ministry of Environment and Natural Resources (MENR) is the sector institution to drive the policy agenda in creating awareness and training in sound chemicals and waste management.

Institutional gaps

- *Coordination:* This study revealed that there is lack of a coordinated awareness and training mechanism at the national level on chemicals and associated risks including inadequate labelling. This makes it difficult for other ministries, County Government and institutions to effectively deliver in their mandates. Even then, whatever information that is shared is not specific to POPs less so uPOPs. Consequently, effective participation of organizations in their specific mandates is hampered.
- *Information and awareness*: there is no database on chemical information at the Ministry of Environment. Awareness raising is tied to specific projects such as SAICM Quick Start, development of the Kenya National Chemical Profile, development of and subsequent updating of the National Implementation Plan. However, there is no similar awareness programs for different stakeholders and the general public.
- *Training:* there is no regular training on chemicals and waste management. Normally, whatever training that is done is project-based and mainly involves key personnel drawn from different institutions who are playing a role in implementing these projects.
- *Chemicals Unit:* On the organization structure, chemicals is anchored under the Directorate of Multilateral Environmental Agreements as a Project Management Unit (PMU). The Unit is staffed with a Coordinator, and Project Assistants. This temporariness of the Unit whose existence is pegged on funded projects makes the issue of sustainability urgent

Proposed Actions by MoENR

- *Coordination:* there is need for a more institutionalised inter-ministerial coordination structure at the Ministry of Environment and Natural Resources for information sharing and training on the sound management of chemicals and waste. This should outlive any projects

- *Information and awareness:* development of database, proper messaging and communication on POPs to enable institutions effectively execute their institutional mandates. Awareness materials for various stakeholders need to be developed, viz. communities, policy makers, civil society, and implementing agencies are missing. This awareness and training should be regular and not dependent solely on projects
- *Training*: Regular training for different segments on chemical risks and sound management of chemicals and waste is needed. This should be preceded by training of trainers by the Ministry in partnership with other organisations.
- *Chemicals Management Unit:* The Chemicals Project Management Unit (PMU) should be a permanent feature, well-staffed and funded by the Ministry budget.

4.1.2 National Environment Management Authority

Mandate

This is the principal instrument of the Government of Kenya in the implementation of all policies relating to the environment exercising general supervision and coordination over all matters on environment.

Activities

The institution 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 and improvement of the quality of human life in Kenya. It renders advice to Government on national and international environmental legislative agenda, undertakes environmental education and public awareness, research and mobilizes financial and human resources for environmental management. It also oversees the conduct of environmental audit or environmental monitoring. Finally, it monitors and assesses activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities.

Chemicals management: The Authority has a Section dealing with Chemicals that falls under the sub-department of Compliance in the Directorate of Compliance and Enforcement. The Chemicals Section is therefore quite low in the organizational hierarchy implying that it is not of such high priority. However, the section is expected to become a department once the Draft Chemicals Regulations take effect. Currently, the functions of the Chemical section is limited to processing Prior Informed Consent (PIC) applications for industrial chemicals under the Rotterdam Convention, inspection of hazardous facilities, advising on disposal of contaminated and condemned goods, and designation of environmental laboratories for analysis of hazardous substances.

State of Environment: The EMCA (Amendment), 2015 requires NEMA to monitor the State of the Environment (SoE) and report on an annual basis and submit to Parliament. The SoE provides information on various aspects of the country's environment in order to ensure its sustainable use.

Institutional gaps

Staff: NEMA has no adequate human capacity to monitor uPOPs both from open burning and some processes in industry. The situation is made worse by the fact that waste management function has been devolved to County Governments that equally lack capacity.

Laboratory & field equipment: NEMA cannot provide data on chemicals in the environment including waste. This is due to the fact that monitoring is a problem because of lack of analytical capacity and relies on other institutions supplying it with information. This is not always forthcoming as there is no legal basis for other institutions to supply it with information.

Organisation structure: In terms of the organization structure, the Chemicals section falls far below in the management hierarchy implying that this issue has not been of priority in the institution. Also there does not seem to be synergies between the Chemicals Section and that on Waste Management.

Awareness and training: The Section still at infancy, has not provided leadership and guidance on training or awareness raising on sound chemical life-cycle and waste management due to human resources and financial constraints. The section has only one (1) staff member whose annual budget is about Kenya shillings 1.0 million. Moreover, there is no discernible synergy with the Waste Management Section of NEMA.

Pollutant Release and Transfer Register: A Pollutant Release and Transfer Register (PRTR) for chemicals does not exist. A PRTR has been proposed to be generated under Water Quality, Waste and Air Quality Regulations. Although NEMA already has the PRTR elements, it has not started working on it. Nonetheless, there is a view from the respondents that PRTR should ideally be embedded in EMCA (amendment), 2015 so as to it more legal clout.

Waste management: With respect to waste, NEMA is supposed to give information to the regulated community on technologies for sound disposal of obsolete chemicals and hazardous wastes. However, there is inadequate knowledge among the few staff, a situation that is exacerbated by inadequate infrastructure. There is also no known institution specialized in waste disposal technologies which it can partner with.

Proposed actions by NEMA

Organisation structure: Upgrading of the Chemicals Section to a fully-fledged department to enable effectively implement Sections 91-93 of Chemicals Management in EMCA. This includes among others, the development of Guidelines and Regulations on sound chemicals management

Awareness and training: Enhance the Chemical Section's capacity to enable it develop Guidelines and provide advisory services on awareness and training on sound chemical life-cycle management whilst enhancing synergy with the Waste Management Section of NEMA

Pollutant Release and Transfer Register: Review of EMCA, Water Quality, Waste and Air Quality Regulations to provide for the development of a PRTR. This register inform the State of the Environment Report that NEMA submits to Parliament

Technical knowhow: Enhance the staffing of the Chemicals Section upskill them on ESTs for sound disposal of obsolete chemicals and hazardous wastes. Further, allocate sufficient budget to development guidelines on sound chemicals and waste management including twinning it with Centres of excellence.

The summary on institutional gaps and proposed actions for the policy and regulatory institutions in Environment is provided in Table 4 below.

Table 4: Summary of institutional gaps and proposed actions, MoENR & NEMA

Ministry of Environment and Natural Resources (MENR)		
Aspect	**Institutional Gap**	**Proposed action**
Coordination	-Lack of a coordinated awareness and training system	-Establish a coordination mechanism at the MENR
Awareness & information	-Ad hoc information sharing -Lack of customized messages	-Information sharing platform -Customised messages and regular

	on chemicals and waste -Lack of a database on chemicals and waste	information sharing -Setting up of an information database -Expertise in information/knowledge management
Training	No regular training of various stakeholders on chemicals, wastes and their risks	Introduce regular training packages for stakeholders on chemical risks, EST of chemicals and waste
Chemicals PMU	The Chemicals PMU is temporary based on projects	A permanent, well-funded and staffed secretariat
National Environment Management Authority (NEMA)		
Aspect	**Gap**	**Remedial action**
Organisation structure	Low prioritisation and ranking of the Chemicals Section	Strengthen the Section and elevate it to lead in the implementation of Sections 91-93 of EMCA on chemicals management
Awareness & Training &	No guidance to institutions on awareness and training	The Chemicals Section should be strengthened to provide support and coordinate institutions on awareness raising and training
PRTR	There is no functional PRTR	A review of EMCA is needed to provide for PRTR under the Regulations on Water, Waste, Air and EIA/EA
Technical knowhow	NEMA does not have sufficient technical know how to advise on ESTs for disposal of obsolete chemicals and waste	Need for capacity building on various EST disposal methods

4.1.3 Pesticide Control Products Board

Mandate

The Pesticides Control Products Board (PCPB) is the Kenyan government pesticide and pesticide products regulatory agency. It provides regulatory service for importation, exportation, manufacture, distribution, transportation, sale, disposal and safe use of pest control products and mitigates potential harmful effects to the environment.

Activities

Among other activities, the Board ensures that before any pest control product is registered for use in Kenya, the Board considers the product's safety, efficacy, quality and economic value in line with the Pest Control Products Registration Regulations LN 46 and 109 of 1984. The Board also ensures that the technical information is summarized on the label in conformity to the Pest Control Products, Labeling, Advertising and Packaging Regulations. The Board maintains and updates a list of registered pesticides allowed to be used in Kenya, those banned as well as those restricted. The banned products of themselves cannot be used as pesticides or as ingredients in manufacturing or application of pesticides. Their use signals non-compliance to the requirements. According to the Board, none of the banned POPs pesticides imported into the country and it has not registered any specific exemptions for use and/or production.

The Board also inspects the licensed premises dealing with pesticides and together with other stakeholders impounds any illegal products, counterfeit products, unregistered, smuggled, improperly or unlabelled, expired and repacked products. Other key responsibilities include: processing and issuing import permits; creating public awareness on safety, storage, handling and use of pest control products; supervising the disposal of obsolete or undesired pest control products.

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) of the UN addresses the classification of chemicals by types of hazard and harmonizes hazard communication elements, including labels and safety data sheets. To accord with this, PCPB has developed a Draft GHS Manual for Classification and Labelling of Pest Control Products in Kenya.

Institutional capacity gaps

Analytical: the Board is unable to analyse pesticides for POPs and in particular, uPOPs

GHS system: Adoption of the Globally Harmonised Systems of classification and labelling is expected to be a challenge as it will require an awareness campaign

Finances: The financial allocation from the national government keeps on dwindling and the Board is faced with challenges of raising funds from other sources.

Proposed actions by PCPB

Analytical: the Board should be encouraged to procure equipment that can analyse POPs in pesticides and build staff capacity in the same

GHS system: The campaign for the adoption of the Globally Harmonised Systems of classification and labelling should be commenced

Finances: The Board should strengthen alternative funding sources including writing proposals and forging partnerships.

4.1.4 Ministry of Health

Mandate

The Ministry of Health has the mandate of providing policy direction and regulating matters of health in the country. It also manages referral health facilities, provides technical support to Counties and undertakes capacity building. The Division reports to the Director of Medical Services. Its functions are: (i) developing and reviewing policies to promote preventive and promotive health, environmental health inspectarorate, food safety and quality, OHS, sanitation and hygiene, pollution control and health care waste management among others (ii) implement the Kenya Country Action Plan for adaptation of public health to climate change (iii) providing technical support and building capacity of environmental health and sanitation at National and County levels (iv) promoting linkages between national and international environmental health laws (v) undertaking environmental health impact assessments.

Some specialized 12-day international training on POPs has been done for the Ministry staff as Master Trainers. A total of six (6) Public Health Officers were trained, drawn from of the Ministry headquarters (1), one (1) from each of the counties (Mombasa, Nakuru, Kisumu), two (2) from the private sector. Staff interviewed felt that five (5) instead of one (1) staff from the Ministry of Health headquarters should have been trained to have meaningful impact.

Incineration of waste forms the method employed by health care facilities to dispose of HCW. The incinerators used are literally open burners burning at low temperatures that favour the production of uPOPs. Besides improving the operations of these incinerators, the Ministry, in line with the Libreville Declaration, is promoting sustainable health care waste management through minimization, source segregation, BATs and BEPs. The BATs promoted are mainly non-burn technologies of autoclaving or microwaving waste that do not produce toxic substances like dioxins and furans. Standard autoclaving is one of the cheapest alternative waste treatment technologies that employ steam to disinfect medical wastes. Big autoclaves are planned for the County hospitals in Malindi, Mombasa, Karatina, Bungoma and National Public Health Laboratory.

For Kenyatta National hospital, a microwave is under construction. The Belgian Government is funding the Ksh. 900 million Clinical Microwave Project on 2016-2020 on a 50:50 basis. Treasury is supposed to top up administration and management but has not so far.

On climate change, the Ministry is working with UNICEF to develop training materials to train health care workers. The Ministry is also working with WHO to develop a Strategy on Household Fuel Combustion

Institutional Capacity Gaps

*Inadequate staffing levels: o*nly one permanent staff handles matters of health care waste and climate change at the Ministry. Two Public Health Officers handle Occupational Health and safety issues. They are also the same ones that handle chemicals.

Training: Training of health care workers on sound management of chemicals and uPOPs touching on waste minimization, non-burn technologies has been conducted for skeleton staff at national and county level. There is no special training for incinerator operators. Even as the shift to non-burn technologies happens, the incinerators will still be in use for the foreseeable future. These incinerators, mainly operated by casual workers at health care facilities

BATs/BEPs: Alternative technologies to incineration such as autoclaving and micro-waving, are poorly understood and appreciated

Policy: Several of the policies lack the element of chemicals management, BATs and BEPs. The current NEMA Waste Management Regulations leans heavily towards incineration technology for HCW management which is out of synch with new approaches.

The Public Health Act, County Legislations and Health Act are duplicative on HCW management. The Environmental Health and Sanitation Bill is still in draft stage whilst the the Guidelines on HCW Management of 2011 miss out on BATs/BEPs for chemicals management and climate change health issues. Also the Injection Safety and Safe Disposal of Medical Waste Communication Strategy lacks emphasis of life cycle approach in the management waste. Lastly, is are the Standard Operating Procedures (SOPs) on HCW Management needs review. A National Standard for specifications of medical waste equipment is still incomplete.

Financing: There is no direct allocation of funds to chemicals management at the Ministry of Health. Only

Proposed actions

Inadequate staffing levels: more Public Health Officers are needed to handle chemicals, waste and climate change at the Ministry.

Training: Develop training packages and mount training on sound management of chemicals and uPOPs touching on waste minimization, non-burn technologies, for health care workers at national and county level is required. There should also be special training sessions for incinerator operators. Even as the shift to non-burn technologies happens, the incinerators will still be in use for the foreseeable future. These incinerators, mainly operated by casual workers at health care facilities need to be run professionally by a permanent staff, preferable a Public Health Technician who has been trained.

Incineration: An incinerator audit needs to be carried out countrywide to determine which ones can be left to continue running and where more non-burn technology can be substituted in addition to current initiative of equipping County Hospitals. This should be followed by awareness raising on BATs/BEPs as these alternative technologies to incineration are poorly understood and appreciated.

Policy: harmonization and review of the health related policies and legislations, and completion of those still pending such as the Environmental Health and Sanitation Bill. On enforcement, there is a proposal to have 2-3 Public Health Officers employed by NEMA to liaise with the Ministry of Health and lead in undertaking health impacts. The current NEMA Waste Management Regulations need to be reviewed. As they stand, incineration technology is emphasized which is not in tandem with the recommended BATs/BEPs for HCW management. The Environmental Health and Sanitation Bill needs to be completed including building the capacity of the counties to enforce it once it comes into force. It contains a chapter on OHS.

The Guidelines on HCW Management of 2011 need to be reviewed to mainstream BATs/BEPs for chemicals management and climate change health issues.

The Injection Safety and Safe Disposal of Medical Waste Communication Strategy lacks emphasis of life cycle approach in the management waste and needs review. Further, the Standard Operating Procedures (SOPs) on HCW Management needs review. Lastly, the National Standard for specifications of medical waste equipment that has been deposited at the Kenya Bureau of Standards needs to be completed by Technical Committee. The SOP should include specifications for equipment transporting medical waste.

Financing: Upstream policy dialogue is needed at the MOH to trigger direct allocation of funds to chemicals management. Further, the initiative that the MOH has started on Private Public Partnerships makes it easy for the private sector to invest in waste management. Having been validated by stakeholders at a uPOPs workshop, the concept on PPP for waste management needs to be further developed.

Summary on policy and regulatory framework

Policies and regulations: the country has a National Environment Policy with good provisions on chemicals and waste but is deficient in the subject of POPs. The Chemicals Management Regulations to govern the sector are in Draft form and need completion. Thus, there is over-reliance on the framework law, the EMCA (amendment) 2015 which, although has given direction on chemicals management, still endorses technologies such as incineration which is being phased out by the Stockholm Convention. The Economic Instruments Guidelines being prepared under Section 57 of EMCA are still in draft forms and are therefore not able to incentivize good environmental practices.

Harmonization and review of the health related policies and legislations, and completion of those still pending such as the Environmental Health and Sanitation Bill is needed. Further, the current NEMA Waste Management Regulations need to be reviewed. Like the EMCA, they emphasize incineration technology as opposed to non-burn technologies. Several instruments need review such as the Guidelines on HCW Management of 2011 so as to mainstream BATs/BEPs for chemicals management and climate change in health issues.

Information and awareness: there is need to collect, analyse and develop databases at institutional level for ease of retrieval to facilitate awareness raising on chemical risks and their sound management. National databases should be established at the MoENR and NEMA.

***Staffing & training*:** in all the policy and regulatory institutions except KEPHIS, there is a shortage of technical staff in chemicals and waste management. NEMA needs the Chemicals Section to be upgraded and staffed, for the Ministry of Health, at least 5 Public Health Officers are needed to handle chemicals, waste and climate change. These as well as County Government staff shall need specialized training on chemical hazards and BATs/BEPs and cleaner production for risk reduction. Since incinerators will still be in use for the foreseeable future, there is need for them to be run professionally by a permanent staff, preferably a Public Health Technician who has been trained.

Coordination: there is need for a more institutionalised inter-ministerial coordination structure at the Ministry of Environment and Natural Resources for information sharing and training on the sound management of chemicals and waste.
Financing: Targeted upstream policy dialogue is needed to trigger direct allocation of funds by Ministries and institution's for chemicals management. More Private Public Partnerships are needed to unlock private sector funds for sound chemicals waste and investment. The MOH's concept on PPP for waste management needs to be further developed.

4.2 Non-Governmental Institutions

Non-governmental organisations (NGOs) play as social animator, attitude and behavioral change advocates towards sound chemicals and waste management. This is undertaken through awareness and advocacy. Although two NGOs were interviewed their institutional needs are similar:

4.2.1 Centre for Environmental Justice and Development

Mandate

The Centre for Environment Justice and Development (CEJD) is a not for profit Non-Governmental Organization promoting rural development and environmental justice in Kenya, through sound chemicals management and sustainable use of natural resources. It undertakes advocacy and lobbying for pro-sustainability policies and legal frameworks; educating and advising the public on available technologies and practices that improve human and environmental health; conducting and/or participating in research that generate knowledge for influencing sound policies and actions.

This NGO undertook a specific activity in July-September 2016 in an attempt to generate information on lead in paints. It analysed for lead metal content, through a third party, a sample of paint brands manufactured locally and intended for home use. Very high concentrations of lead, above 10,000ppm were found against Kenya Bureau of Standards requirement of not more than 90ppm. The labels on

paint were misleading on the composition. However, 31% of the paints contained total lead concentrations at or below 90 ppm, suggesting that the technology to produce paint without lead ingredients exists in Kenya.
The NGO also carries advocacy on elimination of mercury dental amalgam in line with the Minamata Convention

Institutional capacity gaps

Technical staff: the NGO lacks adequate staff that understands the subject of chemicals. With only one (1) Chemist, it is unable to mount serious activities and generate proposals for funding

Financial resources: The NGO indicated the need to have sufficient resources to undertake awareness raising programs on the need to phase out lead in paints

Policy: her activities are hampered for lack of a law to phase out mercury and lead from use in certain applications.

4.2.2 Green Belt Movement

Mandate

Green Belt Movement (GBM) is a non-governmental, environmental organization that empowers communities, particularly women, to conserve the environment and improve livelihoods.

It advocates for sound policies on green economy and against environmental pollution through the 3 R's – Reduce, Reuse and Recycle. GBM has strongly focused on avoidance or release dangerous chemicals to the environment and embrace alternatives as more sustainable ways towards the management of wastes.

Between 2010 and 2012, GBM in partnership with Stockholm Convention Secretariat undertook a pilot Study on how to Address Unintentional Releases of Persistent Organic Pollutants from Open Burning of Plastic Waste in Kenya. The purpose of the project was to provide to the secretariat and parties to the Stockholm convention with a better understanding of the options to reduce uPOPs from open burning and develop a proposal for a pilot project for UNDP/GEF funding.

Institutional capacity gaps

Human capacity: GBM's staff need additional training on chemicals rsisks and management technologies to be able to undertake effective advocacy work

Financial resources: often times there is insufficient financial resources to educate the grassroot communities on risks and management of chemicals and chemical wastes

Coordination: GBM lacks more central coordination between MoENR and the larger NGO community to enable them better understand the emerging chemical issues and how they can effectively align their programs to the national agenda.

Proposed actions for the NGOs

Human capacity: Both NGOs are in need of additional knowledgeable staff on sound chemicals and management. With only one (1) Chemist for example, the Centre for Environment Justice and Development (CEJD) is unable to mount serious activities and generate proposals for funding.

Financial resources: there are insufficient financial resources to educate the grassroot communities on risks and sound management of chemicals and related wastes.

Coordination: although both NGOs do get engaged in MoENR activities from time to time, this is not the same for most NGOs. More coordination between MoENR and the larger NGO community us needed to enable them better understand the emerging chemical issues and how they can effectively align their programs to the national agenda

4.3 Industry Associations

4.3.1 Agrochemicals Association of Kenya

Mandate

Agrochemicals Association of Kenya (AAK) is a membership organization for the agrochemical companies in Kenya such as manufacturers/formulators, importers, registrants, agents, transporters, distributors, stockists, farmers and users of pest control products (pesticides). The Association's main service is product stewardship and training on proper use of agrochemicals.

Activities

Safe use training: The Association undertakes training of its members and other stakeholders on safe and effective use of pesticides. The training is conducted for farmers, pastoralists, stockists, industry staff, health workers and extension agents. Over one million farmers, pastoralists, extension agents, distributors and stockists have been trained.

County level workshops: The Association holds county level workshops and expositions aimed at improving farmers' access to and effective use of agricultural inputs among other services. The initiative promotes dissemination of information on the latest products and technologies by intensifying and expanding on-going farmer support in Good Agricultural Practice (GAP). Also taught are issues of climate change, integrated pest management (IPM), biotechnology, nutrition (crop and livestock), laws and regulations in the industry, post-harvest handling, evolving pests and diseases.

Promotion of New Technologies: AAK supports new technologies in the field of agricultural production including biotechnology and integrated pest management. The Association supports the Bio safety principals as articulated in the Bio safety policy. Another new approach to Chemicals use reduction during spraying involves engaging specialized Spray Service Providers (SSPs). The SSP is a concept that is removing the spraying activities from farmers and giving it to specially trained professionals that will handle it responsibly and remove the challenges faced by farmers such as minimum residue levels (MRLs) and contamination.

Poison Information and Emergency Centre: AAK in collaboration with the PCPB, the Pharmacy and Poison Board, the Ministry of Health, the University of Nairobi and Kenyatta National Hospital initiated a poison information and management program. The program has developed a pesticide poisoning management chart, training of doctors and pharmacists on pesticide poisoning, establishment of a Poison Referral Centre at Kenyatta National Hospital, and the establishment of two toll-free numbers at the centre.

Regional Integration of Pesticide Industry: The Association supports regional integration of the pesticide industry through supporting the harmonization of the pesticide registration in the East and Southern Africa. The Association is the convenor for the ongoing integration process for the East African Industry Association.

Industry Sustainability: The Association has established a levy fund to enhance and sustain industry activities. It has also launched a program with sector ministries to strengthen the farmer / pastoralist field support services.

Institutional capacity gaps

The safe use campaign is only targeted at export market less so for produce ending up in the local market.

Proposed actions by AAK

There is need for increased government support and direction in sensitizing farmers on proper use of chemicals. This would involve more funds being allocated towards activities that help improve agricultural production.

4.3.2 Kenya Association of Manufacturers

Mandate

The Kenya Association of Manufacturers (KAM) is a membership organization mainly for manufacturers. KAM members are categorised into 14 sectors, 12 of which are in processing and value addition while the other two offer essential services to enhance formal industry. The Chemical and Allied sector comprises 9% of its membership. These are: Industrial Chemicals that manufacture basic industrial chemicals including fertilisers and pesticides; cosmetics who manufacture soap and cleaning preparations, perfumes, cosmetics and other toilet preparations, and paint and resins that manufacture paints, varnishes and lacquers.

Activities

Policy development: Its environmental sub-committee reviews environmental regulations and also participates in their formulation.

Training: The Association conducts seminars to enlighten members on new and upcoming regulations. Individual companies have their own awareness and capacity building programs for managing various aspects of significant environmental impacts including chemicals.

Responsible Care Initiative: KAM is hosting the Responsible Care (RC) Initiative that links its members to SAICM. The RC Program was started at KAM in the last two years but was adopted in the last one year through the mandate given by The International Council for Chemicals Association (ICCA). The program is yet to be launched. The RC Initiative focuses on 3 components of chemicals: (i) chemical safety (ii) responsible production (iii) safety of allied products.

Responsible Care (RC) is the chemical industry's unique global initiative that that forms the chemical industry's contribution to SAICM implementation on sound chemicals management. In addition to Global Responsible Care initiative is the need to enhance the management of chemical products worldwide (Product Stewardship). The Global Product Strategy (GPS) provides RC members with global product stewardship guidelines including: a system for implementation for sound chemical products management; defining risk-based assessment process; improving flow of information in the value chain; partnership with inter-governmental organizations and stakeholders; sharing relevant information between industry and with public; working to close data gaps and identifying emerging issues.

The KAM will soon start customizing Guidelines for life cycle chemicals management for Kenyan industries. KAM has 150 members who are chemical industries with 200 plastic industries that use a lot of chemicals. Capacity building of industries is the biggest component of RC. This will be done at two levels: (i) training industries in implementing RC (ii) giving them technical support in implementation.

Institutional capacity gaps
Awareness: Currently no awareness or training programs on chemicals are run by the Association.
Institutional framework for RC: The RC initiative lacks a substantive focal point Officer. The current staff managing the RC initiative is doing so on a volunteer basis. There is lack of a Government anchor institution to work in this Initiative. This could be NEMA or MENR. In Egypt, the RC is housed in the Ministry of Environment. Hosting it in KAM is good for self-policing but a referee is needed. In Belgium for example, all chemical reports from industry to ICCA Chapter in Brussels are also sent to the environment agency. The same is true for the UK where the Department of Environment receives reports from industry to verify that there is conformity to the legal regime.

The RC Initiative is good but lacks a capacity building institution for industry. The ICCA is still looking for this institution in Kenya and has approached KNCPC on this; KNCPC's three staff members have already been trained in RC jointly by ICCA, UNIDO and the International Union for Pure and Applied Chemistry (IUPAC).

Proposed Actions by KAM
Awareness: Establishing partnerships to raise awareness and train the KAM members on sound chemicals management and waste

Institutional restructuring Establishing the requisite institutional arrangement at KAM for the Responsible care (RC) Initiative including: a concrete secretariat with an RC Manager and Technical Officer. Also, establishing a partnership with the Ministry of Environment and Natural Resources.

GHS: Taking advantage of the RC to implement the Globally Harmonized System of classification (GHS) of labeling and classification amongst KAM members.

Summary needs for Industry Associations
Awareness: the industry associations are in need of partnerships to raise awareness and train their members on sound chemicals management and waste

Institutional restructuring: For KAM, there is need to create a Section of Chemicals and waste management for the RC Initiative including a concrete secretariat and forging partnership with the Ministry of Environment and Natural Resources and the Cleaner Production Centre.

Globally Harmonised System (GHS): Advantage should be taken of the RC to implement the Globally Harmonized System of classification (GHS) of labeling and classification amongst KAM members.

Government support: Government need to give financial support and direction in sensitizing various groups on proper use of chemicals.

4.4 Service Institutions

4.4.1 Kenya Bureau of Standards

Mandate

The Kenya Bureau of Standards (KEBS) was established by an Act of Parliament - the Standards Act, Chapter 496 of the Laws of Kenya. It started its operations in July 1974.

The aims and objectives of the Bureau include preparation of standards relating to products, measurements, materials, processes, and their promotion at national, regional and international levels; certification of industrial products; assistance in the production of quality goods; improvement of measurement accuracy and circulation of information relating to standards.

Activities

The role of KEBs in chemicals and uPOPs reduction is majorly on standards development and testing. Testing is done against national standards. The standards are expected to guarantee that goods and services locally produced or traded with any country are safe and fit for consumption whether locally or for export. For instance for importers, goods are checked before shipping and if containing banned chemicals, these are not allowed into the country. From September 2017, KEBs started testing drugs and herbal medicines on behalf of the National Control Laboratories.

The Bureau has also developed standards on Globally Harmonised System of classification and labeling of Chemicals (GHS).

Institutional capacity gaps

Awareness: Sensitisation and awareness on hazardous chemicals is not available in KEBSs. This is despite the fact that there is need to sensitize various stakeholders such as transporters, SMEs, resource persons on the relevant standards that it has developed.

Analytical capacity: The Bureau has not started testing dioxins and furans in products, air or water as there is no national standards for them. Moreover, request for analytical services for POPs as well as uPOPs are insufficient to warrant investment in this infrastructure. There are also no trained staff on analyzing uPOPs.

Proposed actions

Training: Need to design at least 2 days' workshops on standards sensitisation

Technical support: Additional equipment is needed as well as staff training in POPs on sampling, sample preparation and laboratory analysis.

Standards development: the Bureau needs to develop a National Standard on uPOPs levels in products

4.4.2 Kenya National Cleaner Production Centre

Mandate

The Kenya National Cleaner Production Centre (KNCPC) is a Not For Profit institution established under Kenya Country Co-operation Framework of UNDP of 1999-2003. It falls under the UNIDO-UNEP global program of Cleaner Production Centres. The Centre's mandate is to build national capacity for resource efficiency and cleaner production. The sound management of chemicals and waste prevention are the core of this mandate. It achieves its mandate through the following:

Awareness and training on the circular economy: This is training mounted for industries to develop skills of treating waste as a resource to be harnessed and for energy efficiency.

Resource Efficiency & Cleaner Production (RECP) audits: this program trains industry and professionals in RECP, followed by technical assistance to industry in utilizing resource inputs (chemicals, water, energy and other materials) efficiently, pollution prevention and greener alternative technologies.

Certified trainer and consultant in Environmental Impact Assessment and Audit: the Centre trains professionals seeking to be registered with NEMA

Policy advice and advocacy: the Centre provides policy advice and analysis on mainstreaming resource efficient and cleaner production as well as eco-innovation into l policies.

The Centre is staffed with Cleaner Production specialists with background in chemistry, engineering, environmental science and technology and policy. By the nature of its work of auditing production processes, the Centre is equipped with various data logged equipment including: energy and water flow meters, flue gas analyzers, ambient air quality meters among others.

Activities

Some of the projects undertake are covered below:

Resource Efficient and Cleaner Production audits: Over 500 enterprises have been assisted to implement cleaner technologies for water, energy and chemicals use efficiency including waste minimisation.

Responsible Production in industry: a Responsible Production (RP) project on chemical hazard management for SMEs supported by UNEP. It assisted selected SMEs to implement UNEP's Responsible Production in their operation as a framework for Chemical Hazard Management.

Safe Chemicals Management: "KNCPC-UNEP-ICCA Project on Promoting Chemical Safety Management in the African Region," was anchored on UNEP's Responsible Production for Chemical Hazard Management in SMEs and APELL approach, and on ICCA's Responsible Care and Global Product Strategy. The project aimed at achieving safety in transport of hazardous chemicals, and safe practices in warehousing and storage of chemicals at the ports of Mombasa and Tema.

Chemical Leasing: The Chemical Leasing (ChL) project implemented with UNIDO is an innovative business approach for sound and efficient chemicals management. It provided a more sustainable solution for industries, through which they only pay for the services rendered by the chemical suppliers (e.g. volume of water treated, number of parts painted, lengths of pipes cleaned, etc.) and not for the volume of chemicals consumed.

Industrial symbiosis Project: The Industrial Symbiosis project is promoting resource efficient and green businesses based on the circular economy (the repurposing of under-utilized resources and by-products). Instead of waste being directed to landfills, it is diverted to support industries, both new and emerging ones, thereby creating a demand pull on eco-innovation and an opportunity base for waste entrepreneurs to emerge. It falls under UNEP SWITCH Africa Green Project (SAG) of the Ministry of Environment supported by the European Union (EU).

Institutional capacity gaps

Institutional strengthening: currently the Centre is not funded by Government for its recurrent expenditure. It generates funds from the services it offers.

Proposed actions by KNCPC

For it to support SMEs in information and training, the Government needs to mainstream it into the exchequer

Summary of Needs by Service Institutions

Training: Need to design and mount training workshops on new life-cycle chemical standards by Kenya Bureau of Standards.

Technical support: Additional equipment is needed as well as staff training in POPs on sampling, sample preparation and laboratory analysis.

Standards development: the Bureau needs to develop a National Standard on uPOPs levels in products

Institutions like KNCPC that support SMEs in information and training on resource efficiency and cleaner production, needs to be mainstreamed in Government so as to start offering services to SMEs which currently they can't afford.

4.5 County Governments

4.5.1 The Nairobi City County

Mandate

This is one of the 47 County Governments created by the Constitution of Kenya 2010 and is the successor of the defunct City Council of Nairobi. It operates under the Cities and Urban Areas Act, the Devolved Governments Act among others. The Constitution has devolved a number of functions to the County Governments. The Nairobi City County's responsibility is the provision of services to residents within its area of jurisdiction including: physical planning, public health, social services and housing, primary education, infrastructure, inspectorate services, public works, environment management. Others are: agriculture, livestock development and fisheries, trade, industrialization, corporate development, tourism and wildlife, and public service management.

Chemicals and waste management related activities

Waste management: Waste management is a devolved function. The County Government has developed Solid Waste Management Act, 2015 that spells out the waste disposal methods, viz., controlled tipping, sanitary landfilling, recycling, composting and incineration. Currently, the main waste management functions undertaken by the County is waste collection, transportation, treatment and controlled tipping *at Dandora dumpsite that is characterized by open fires*. The County Government has privatised solid waste collection, transportation and disposal from various locations within its jurisdiction.

Institutional capacity gaps

Infrastructure: Nairobi lacks an integrated treatment/disposal facilities. *Waste disposal by controlled tipping is entrenched. Since there is no source segregation of waste, hazardous waste finds its way into the dumpsite.*

Staff capacity: the number of staff in the 17 sub-counties and their technical know-how to take lead in hazardous waste management and monitoring is inadequate. Consequently, there is lack of general understanding among all the stakeholders about the safe management of hazardous and toxic waste.

Policy gaps: The Nairobi County Solid Waste management Act, 2015, lacks in the provisions for management of waste using cleaner technologies and BATs and contains incineration as an option. Although it spells out source segregation, which is not done in practice, no articulation is made of

household harzardous waste that is never collected curbside. Clearly there is no evidence of domestication of the chemicals and waste MEAs in the Act. Further, no Regulations have been developed to implement this Act.

Information and training: The County Government does not run information and training programs on sound chemicals or waste management for the city populae. There is also no formal platform for information communication between lead agencies and the County Government. In addition, there is absence of reliable and accurate information on hazardous and toxic waste generation, sources and composition, slowing progress to sustainably manage POPs and prevent release of uPOPs.

Proposed actions by the Nairobi City County Government

Infrastructure: Nairobi needs infrastructure for integrated chemicals and waste management including source segregation of waste, transfer stations for resource recovery and finally, sanitary landfilling which will be a departure from the entrenched dipping practice.

Staff capacity: increase the number of staff in the 17 sub-counties as well as their technical know-how to take lead in hazardous waste management and

4.6 Research and Monitoring

There is still no nationally established research and monitoring programme for POPs in environmental media, food stuff or human samples. The available data on POPs has been produced through participation in international projects such as the Global Monitoring Plan (GMP) supported by UNEP/GEF and through in-country research activities. Besides this, some information is generated from laboratory analysis and testing of imports and export products such as industrial chemicals, agricultural chemicals, public health pesticides, articles and electronic products.

Environmental monitoring and research is the mandate of different Lead Agencies such as WRA, NEMA, Kenya Meteorological Department (KMD), some Research Institutions and Universities. Testing of imports, exports and locally manufactured products is mainly by Kenya Bureau of Standards (KEBs), KEPHIS, KRA, National Quality Control Laboratory and PCPB among others. The Government Chemist provides legal government testing and analytical services.

A number of Kenyan institutions nonetheless, have some equipment to measure and engage in research on the basic POPs such as POPs pesticides and PCBs (Table 5). The laboratory capacity for the selected institutions provides an indication on what is available today, 2017 in the selected institutions. The University of Nairobi's GC-MS and that of Technical University of Nairobi are of low resolution therefore cannot be able to measure uPOPs. It can be noted that KEPHIS seems to have added more superior equipment than the rest as they have the equipment (GCMSMS, LCMSMS) capable of analyzing uPOPs.

Table 5: Analytical research capacities for selected institutions, 2017

No	Institution	**Equipment**
1	Nairobi University	GC-ECD, HPLC, GC-MS GC-MS LC-MS, HPLC
3	ICIPE	VCS, GC, GC-ECD, HPLC, GC-MS, GC-MS, LC-MS, HPLC
4	KEPHIS	LCMSMS (2), GCMSMS (1), GCMS (1) GCMSMS, LCMSMS, GCECD
5	KRA	GC-MS, FTIR, CV-VIS, AAS, ZRF, HPLC

6	Technical University of Nairobi	HPLC-MS, GC-MS, ICPC-MS, AAS

It was also revealed that procurement of these equipment is closely tied to donor-funded projects such as EU and the African Development bank (AfDB).

4.7 Universities

Universities as institutions of higher learning, undertake training and research in a number of areas. Most of the universities in Kenya has departments of Chemistry where training and research on chemicals takes place.

4.7.1 University of Nairobi

As indicated above there is no national monitoring and research on dioxins and furans except as currently undertaken in the university of Nairobi Chemistry Department for ambient air. The research and/or monitoring being undertaken is mainly on the basic POPs, pesticides and PCBs. In Kenya, there is generally limited research on high level POPs such as dioxins/furans, organochlorine pesticides (OCPs), polybrominated diphenyl ethers (PBDEs) and neutral per- and polyfluoroalkyl substances (PFAS), PFOS and PFOSF and other industrial POPs.

In the period 2010-2012, two activities supported by the UNEP/GEF projects and coordinated by the Department of Chemistry of the University of Nairobi at regional level on POPs include: ((i) UNEP-GEF Project on Supporting the Implementation of the Global Monitoring Plan (GMP) in Eastern and Southern Africa Sub-Region and (ii) the MONET Africa Initiative that is monitoring POPs in ambient air.

The GMP project: This is a UNEP/GEF capacity enhancement project to support regional capacity building, training and monitoring activities of POPs covering six countries in the Eastern and Southern Africa sub-region namely, Egypt, Ethiopia, Kenya, Uganda, Mauritius and Zambia. The Department of Chemistry from 2008, coordinated this project of monitoring POPs under the Global Monitoring Plan (GMP) under the Stockholm Convention. The department collaborated with UNEP Stockholm Convention, and the RECETOX in Masaryk University Czech Republic. The GMP framework monitored POPs in mothers' milk as well as in ambient air.

The project essentially comprised of a number of learning-by-doing training workshops and coordinated sampling for Basic POPs (OCPs and PCBs) except Egypt which was also able to measure dioxins and furans. Backup laboratories were provided by IVM in the Netherland and Man Technology Environment (MTM) Institute of the Orebro University Sweden. The project strengthened the institution's capacity in ambient air sampling, sample extraction, cleanup, fractionation, analysis and interpretation of POPs data. An international inter-laboratory proficiency test was conducted to determine the performance of the laboratories to analyse POPs in core media and standard solutions. In the University of Nairobi research, new POPs data was generated for basic POPs in ambient air, soil, fish, sediments and human milk.

Monitoring Network for Africa (MONET Africa) on POPs in the Air: In 2013 the Department of Chemistry participated in the sampling of new POPs in ambient air under the UNEP/GEF project. The passive air samplers are installed at one of the ambient air monitoring sites at Kabete. The on-going ambient air POPs monitoring programme called Monitoring Network for Africa (MONET Africa) deploys passive air samplers to trap gas phase POPs chemicals using polyurethane foam filters.

The Department of Chemistry has recently acquired a Low Volume active air sampler for calibration of the passive air samplers used in the Region. A Low Volume active air sampler is mounted at the rooftop of the Department monitoring POPs in ambient air.

The Department also participated in MONET passive water sampling using the Supported Permeable Membrane Devices (SPMD) and XAD water sampling devices for POPs in water. However, this method has not been fully developed. It also participated in the development of passive water samplers for trapping POPs chemicals in water using Silicon Rubber and XAD polymer.

This project uses two main types of air sample collection techniques to sample POPs in the air: active sampling (involving pulling air through a trap with an electric pump, e.g. high- or low-volume air sampling) and passive air sampling (PAS) (mainly diffusion-based, trapping chemicals on sorbents without the use of electricity).

Concentrations of POPs in air derived from these two techniques are not always directly comparable; but they complement each other by providing different information. Active sampling provides quantitative concentrations of POPs in both gas and particle phases over short time intervals (several hours to 1 week) whereas PAS provides semi-quantitative data over longer periods (typically 1–3 months up to 1 year. Active sampling is more expensive to operate, more labor intensive and requires power, therefore it is well-suited for intensive monitoring at well-equipped stations. PAS is cheaper, easy to deploy and, thus, better-suited for remote monitoring sites or for developing a large network of sites.

Equatorial Africa Deposition Network: The Equatorial Deposition Network (EADN) is a GEF-supported project monitoring atmospheric deposition of nitrogen and phosphorus based substances into the Equatorial Africa great lakes and surface lands. It does not monitor POPs. The sampling sites located in Lake Victoria are three, at: Suba Island (Kenya), Bukasa Island (Uganda) and Kahunda- in Mwanza Tanzania. The study is useful for determining the watershed budgets of nitrogen and phosphorus. It could not be ascertained whether the project can be modified to measure POPs and particularly uPOPs.

4.7.2 Technical University of Nairobi

The Technical University of Kenya (TUK) has a fully-fledged Chemistry department. Besides training in Chemistry at BSc., MSc., and PhD level, the university offers course units in industrial safety and security. It is also planning to have a course unit on multilateral environmental agreements that includes the environmental fate of pesticides.

The university undertakes research on chemicals mainly through students at MSc. and PhD levels who are working towards their degrees.

Institutional capacity gaps in UoN and TUK

Analytical capacity: In the two universities, UoN and TUK, there is inability to measure uPOPs due to the low resolution nature of their equipment. However, in Nairobi, a methodology has been developed to analyse uPOPs. This can be used to build the capacity of the other universities.

Staff capacity: The universities have qualified staff with PhD, MSc, BSc, and diplomas in analytical, organic and inorganic chemistry. However, their ability to analyse POPs and in particular, uPOPs, is low.

Funding: The universities have financial needs to conduct research in POPs and there is also the desire to wean them off over-reliance on funded projects.

National monitoring: The research carried out at the University of Nairobi targeting only few sites; Kabete and Mt. Kenya is not representative of the whole country.

Research and policy: The good research finding from these institutions is not informing policy development or review.

Summary of Research Needs by Universities

Analytical capacity: The two universities have different needs in terms of analytical capacity: the University of Nairobi has developed analytical capacity for basic and uPOPs analysis but lacks a high resolution equipment to be able to analyse this category of POPs. The Technical University of Nairobi on the other hand, lacks both.

Monitoring: There is need for the universities to measure POPs trends in some selected environmental matrixes in at least five regions in Kenya so as to get a

Research and policy: The research findings from these institutions should be converted policy briefs so as to inform policy review and development.

4.8 Research Institutions

4.8.1 Kenya Medical Research Institute

Mandate

Kenya Medical Research Institute (KEMRI) is a State Corporation established as a National body responsible for carrying out health research in Kenya. It was established through the Science and Technology (Amendment) Act of 1979, which has since been amended to Science, Technology and Innovation Act 2013.

Activities

Among the research it undertakes is on Integrated Vector Management (IVM) towards achieving the targets of Roll Back Malaria initiative, the Abuja Declaration, and the Sustainable Development Goals. The IVM program is looking at alternatives to DDT for the control of malaria. Some of the IVM approaches include: the use of insecticide-treated nets (ITN), proper use of mosquito nets and environmental management for malaria vector control, including draining, filling and covering of mosquito larval habitats, use of bio-larvicides and mosquito proofing of houses. IVM strategies have been initiated in Kenya by various institutions including the Ministry of Health, research institutions and Universities and the Stockholm Regional Centre.

KEMRI Institutional gaps

Coordination: The major gap revealed is that the teams in various institutions working on alternatives to DDT are not working together. There are also no national consultation between ministries such as Ministry of Health, Agriculture and Ministry of Environment and Natural Resources.

Research and policy: The other gap that is similar to universities is lack of transition of research findings to policy

Proposed actions for KEMRI

Coordination: The Ministry of Health needs to initiate a forum for engaging the stakeholders in the medical research field.

Research and policy: Research findings should be followed by policy briefs to trigger a policy dialogue to initiate policy review or development. Additionally, public dissemination of research findings should be part and parcel of scientific researches.

In conclusion, Kenya has continued to indicate a strong commitment to developing alternatives to DDT. Several alternatives have been initiated, chief among them being the non-chemical alternatives, plant-based alternatives and Integrated Vector Management (IVM) practices.

4.8.2 International Centre for Insect Physiology and Ecology

Mandate

International Centre for Insect Physiology and Ecology (ICIPE), was established in 1970 to develop and transfer technology on alternatives to chemicals. It also trains postgraduate students in PhD and MSc. Its research centres on the development of environment-friendly methods for controlling disease vectors and crop pests, and for preservation and use of beneficial insects. With regard to POPs, its iconic achievement has been on the development of alternatives to POPs for human disease vector control, in particular, alternatives for DDT for malaria control.

Activities

The International Centre for Insect Physiology was in July 2010, selected as a regional centre for the Stockholm Convention on POPs. It works with a range of partners in capacity building and transfer of technology to Africa member states in alternatives to the use of persistent organic pollutants (POPs) in management of disease vectors and pests, and biodiversity and environmental conservation.

The Centre has also developed integrated pest management (IPM) options for pre- and post-harvest pests, and for parasitic weeds (such as Striga) in staple food crops (cereals and grain legumes); horticultural crops (vegetable and fruit) and commercial crops (coffee, cotton, cashew, sugarcane and cocoa). The IPM strategies and technologies include biological control, bio-pesticides and habitat management strategies. Dissemination of the ICIPE packages on IPM is done through national agricultural research organisations, training of trainers, farmer training programmes, and private sector partnerships.

The development of environmentally-sound alternatives to POPs for suppression and reduction of pests while enhancing the populations of beneficial insects including natural enemies of these pests is undertaken by the Department of Behavioural and Chemical Ecology. Thus, the department is engaged in identification, formulation and evaluation of chemicals substance such as kairomones, allomones pheromones, and other hormones that influence the behavior of insects including arthropod.

Equipment

The department is well equipped with various analytical chemistry instruments including volatile collection systems (VCS), gas chromatographs (GCs), coupled gas chromatography-electroantennographic detection (GC-EAD) system, GC-mass spectrometer (GC-MS), and a liquid chromatograph-mass spectrometer (LC-MS) to carry out its research objectives both in basic POPs and uPOPs. The department is also equipped with various instruments to study insect behaviour. Capacity building is an integral part of research activities in the department.

In addition to the above, the regional Centre undertakes several other activities that include: (i) regional workshops on IVM as alternative to DDT (ii) training activities for a range of stakeholders and in diverse topics. These training are on: communities on application of mosquito nets, children in the use of IVM, habitat management, eco-friendly bio-pesticides for controlling mosquitoes BTI, malaria prevalence reduction, control of cereal stem-borer pests and Striga weed, bio-pesticides, fruit-fly control using

fungus, diamondback moth biological control-on cabbages, odour-baited eco-friendly traps for control of tsetse flies, repellant collars for control of tsetse flies using repellants compounds identified from wild animals like water buck, and entomopathogenic fungi for control of ticks.

ICIPE Institutional needs

Funding: there is a constraint on funding to increase the national capacity for translating the Centre's international best practices (BEP and BATS) on disease vector control and implementing quality assurance systems in Kenya

IVM: implementation of IVM and screening of products for vector control is not yet at its optimum

Partnerships: there are no sufficient partnerships at the country levels to help transfer new and alternative technologies

Proposed actions by ICIPE

Combating malaria: the Ministry of Health should increase its national capacity for translating the Centre's international best practices (BEP and BATS) on disease vector control

Partnering with other organizations including; KEMRI Ministry of Health, UNEP and WHO seeking to help the country to work with IVM. It was noted that ICIPE has some of her consultants based at KEMRI. Also collaboration with PCPB to promote the use of bio-pesticides

4.8.3 Kenya Agricultural and Livestock Research Organisation

Mandate

The Kenya Agricultural and Livestock Research Organization (KALRO) is a corporate body established through the Kenya Agricultural and Livestock Research Act of 2013. Its mandate is to establish suitable legal and institutional framework for coordination of agricultural research in Kenya with the following goals:

- Promote, streamline, co-ordinate and regulate research in crops, livestock, genetic resources and biotechnology in Kenya.
- Expedite equitable access to research information, resources and technology and promote the application of research findings and technology in the field of agriculture.

Activities

With respects to chemicals and POPs, KALRO deals specifically with efficacy trials of agricultural pesticides for field and stored crops and fertilizers. In general, research activities in the country are targeted to specific needs of the society.

Institutional capacity gaps

Funds: there are limitations on funding project activities

Equipment: the equipment for analyzing uPOPs are mostly old and of low resolution to be able to measure uPOPs

Staff: there is inadequate human capacity particularly in the new POPs and uPOPs

Information: information flow between the institutions is non-existent.

Partnerships: networking/collaboration amongst above institutions is not available and not clearly defined.

4.8.4 Kenya Industrial Research and Development Institute

Mandate

The Kenya Industrial Research and Development Institute (KIRDI) is a national research institute established in 1979 under the Ministry of Industrialization and Enterprise Development. It undertakes multidisciplinary research and development in industrial and allied technologies through its Research Technology Innovation (RTI) department. The RTI comprises Engineering, Energy and Environment, ICT, Leather and Textiles, and Food Technology Divisions. The Institute hosts the Kenya National Cleaner Production Centre and was at the forefront in establishing it.

Research forms the core business of the Institute and contributes significantly to development in all industrial and allied technologies through innovation, adoption, adaptation and transfer of technologies to support the industrial development process. It also undertakes analytical and testing services.

Activities

The Institution has been working in the development and piloting of cleaner products for leather tanning in particular, vegetable tannins in its Leather Development Centre and is a Training Centre for MSMEs in the leather value chain.

The Institution's activities on POPs has been on awareness raising on the impacts of lead in paints. The aim is to highlight the negative impacts of the presence of lead in paints and the need for a national policy to prohibit use of lead in paint manufacturing

KIRDI Institutional gaps

Staff: There is shortage of staff particularly at the lower level for Laboratory Technologists and Technicians. The Research Scientists are adequate but do not have skills in POPs analysis
Equipment: The laboratory equipment is old as there has been no replenishment for over 8 years. Only the AAS is working. The institution is therefore not able to analyse for POPs.

Funding: Funding is an issue as the Institute relies wholly on Government Funds

Proposed actions for KIRDI
Staff: More staff, about 7, at the lower level for Laboratory Technologists and Technicians is needed. The Research Scientists can be up-skilled in chemicals and POPs analysis

Analytical equipment: The laboratory equipment should be graded in order to analyse for POPs.

Funding: The Institute should diversify its revenue options by partnering and preparing proposals for funding.

Summary of Needs by Research Institutions

Staff: in all the Research Institutions except ICIPE, there is need for more human capacity particularly in the new POPs and uPOPs

Coordination: Coordination a forum are needed for engaging the stakeholders in the medical research field such as between the Ministry of Health, KEMRI and ICIPE.

Research and policy: Research findings should be followed by policy briefs to trigger a policy dialogue to initiate policy review or development. Additionally, public dissemination of research findings should be part and parcel of scientific researches.

Alternatives to POPs: the research institutions need to enhance their capacities to conduct more research on the cleaner alternatives to POPs such as in public health, industrial POPs and agricultural POPs. l

Partnerships: developing partnerships with other organizations including those undertaking complementary activities. This will bring about effectiveness as information and knowledge would be shared across institutions.

4.9 Monitoring and Testing Institutions

4.9.1 Kenya Plant Health Inspectorate

Mandate

The Kenya Plant Health Inspectorate Service (KEPHIS) is a regulator in the agricultural sector operating under the KEPHIS Act No.54 of 2012. It provides quality assurance of agricultural inputs and produce. Amongst its mandate is to: administer and enforce phytosanitary measures; support the administration and enforcement of food safety measures; establish service laboratories to monitor the quality and levels of toxic residues in agro-inputs, irrigation water, plants, soils and agricultural produce.

Activities

Training: KEPHIS offers need-based training on safe use of chemicals to farmers, targeting people who spray like in the flower industry and exporters. In 2016 two training sessions were held and in 2017, two have been held so far. This is done in conjunction with PCPB.

Monitoring of MRLs: KEPHIS continually monitors agricultural produce for exports to determine Maximum Residue Levels (MRLs).

Quality inspections: KEPHIS is stationed at ports of entry to undertake quality inspections on agricultural produce on arrival. Quality inspections are done and an import permit given. This is supplement by the requirement for the importer to produce a certificate of analysis from origin.

Analytical and advisory services: KEPHIS has a multi-purpose facility that is able to analyze agrochemical formulations and residues in a wide range of agricultural produce, soil, water and animal tissues at a fee. As agriculture function has been devolved, County governments will need to work closely with KEPHIS to get vital documents for export such as phytosanitary certificates. KEPHIS has analytical capacity for the prohibited chemicals under the Stockholm Convention and much more. Pesticide residues, veterinary drug residues in foods, toxic elements like lead, arsenic and mercury, disease causing micro-organisms, harmful food additives and mycotoxins (such as aflatoxin) are tested. Analytical capacity in terms of equipment and human capacity for uPOPs (dioxins and furans) is also available (Table 6).

Table 6: Infrastructure and human capacity at KEPHIS

Chemical	Equipment	Method used	Staff
Pesticides residue (includes pesticides listed as POPs)	LCMSMS(2), GCMSMS(1), GCMS (1)	QueCHERS for multi-residue analysis	14
Heavy metals (≥ than 20 elements)	ICPMS (1), GFAS (1), AAS (1)	Single- and multi-element analysis	12
Dioxins and Furans	GCMSMS and LCMSMS	-	14 (need upskilling)
PCBS	GCMSMS and GCECD	QueCHERS for multi-residue analysis	14

Chemicals in soil, water and sediments analysis: KEPHIS also looks at contaminants in core media (soils, water and sediment) that include heavy metals and pesticides. The Institution has been actively testing 12 out of the 14 chemicals and PCB under the Stockholm Convention. The two that they don't test for, Mirex (termicide) and Toxaphene (insecticide) are not in line with their mandate. It is also able to test the remaining 12 that are the new additions but they should be pesticidal in nature. It does not test waste. However, it responds to requests from institutions such as KENGEN, KENYA Pipeline, Government Chemist. Their hazardous waste is taken to Environmental Combustion Consultants in Athi

Government allocation has declined over the years 2010 to 2017 while Appropriation In Aid (AIA) has been increasing due to increase in demand for her services mainly, food safety analysis, farm inspections and training (Table 7). Also development partners support the institution in terms of equipment and training.

Table 7: KEPHIS funding

Year	Government (KES)	AIA	Partners
2010	400 million	-	-
2017	270 million	600 million	250 million (equipment)

Institutional gaps

Method for uPOPs analysis: The institution does not have human skills and the methodology to analyse uPOPs in core environmental media despite having high resolution equipment. But even then, concerns were raised about the sustainability of investing in uPOPs analysis. For the last one year the Inspectorate has received only one request from KEMFRI for uPOPs analysis.

Training for local production: Although producers for the export market are trained in safe chemicals use, the same cannot be said for stakeholders producing agricultural products for the local market.

MRLs testing: Compliance to Maximum Residue levels for agriculture and fisheries products is actively enforced for export exports destined for the EU market but not for locally.

Organic fertilizer: Introduction of organic fertilizers is not prioritised

Proposed actions by KEPHIS

Awareness and training: extend the awareness and training program on MRLs to local producers on safe use of chemicals and management
Organic fertilizers: Develop programs on organic fertilizers as greener alternatives

Method for uPOPs analysis:

- Development of analytical method for methyl mercury and up-skilling of analysts
- Development of analytical method for dioxin and furans and staff up-skilling
- Develop analytical method for Mirex and Toxaphene and up-skilling of staff
- Support to procure reference standards, certified reference material and participation in proficiency testing in dioxin, furans and methyl mercury.
- Support in purchase of specialized sample preparation apparatus kits for dioxin which reduces health and safety implications of small particulate inhalation and exposure to acid and reagents to the analyst
- Coordination and information sharing by players in POPs research and monitoring space

Training for local production: Although producers for the export market are trained in safe chemicals use, the same cannot be said for stakeholders producing agricultural products for the local market.

MRLs testing: There is need for a national framework for MRLs to minimise the risks and hazards related to agricultural produce

Organic fertilizer: Introduction of organic fertilizers is not prioritised

Sustainability of uPOPs analysis: To enhance sustainability of uPOPs analysis in the country, it would be important that a reference laboratory for uPOPs is designated instead of duplicating across institutions. A chemicals regulation that is enforced can provide a push effect for uPOPs analysis.

4.9.2 Directorate of Occupational Safety and Health Services

Mandate

The Directorate of Occupational Safety and Health Services (DOSHS) is one of departments within the Ministry of East African Community, Labour and Social Protection, whose primary objective is to ensure safety, health and welfare of all workers in all workplaces. Its Field Services Division is represented in 29 Counties headed by County Occupational Safety and Health Officers. Each workplace is required to form a Safety Committee.

Activities

The organization oversees the conduct of safety audits in workplaces, undertakes occupational hygiene and health inspections, medical surveillance of the workers and medical inspections. Chemical safety in the work places is a running thread. It also undertakes training and information dissemination on safety and runs an Occupational Safety and Health Institute. In addition to that, the Directorate implements the Medical Examination Rules that require measurement of chemical exposure and body burden (bio-monitoring).

Institutional capacity gaps

Monitoring: With respect to monitoring chemical hazards in the work places, the institution is not able to measure persistent organic pollutants. This is because it lacks the infrastructure for doing so including; inability to sample POPs and uPOPs for analysis as there is no sampling protocol, no human resource, coupled with lack of analytical equipment.

There is also no capacity to analyse exposure levels of chemical hazard in the body for early intervention. Doctors only check on biological effects on the body such as organ failure.

Safety audits: through registered safety auditors, the Directorate undertakes safety audits in work places on an annual basis, focusing primarily on actions undertaken to prevent OSH problems. Although

submitted in hard and softy copy, information contained in these audit reports is not processed for ease of reference

MSDSs: Data on chemical hazards comes raw in the form of Material Safety Data Sheets (MSDSs) from workplaces. This does not tell how many people are injured or exposed to hazardous substances

Staffing: Aggregating information collected in the safety audit reports is difficult as there is only one Occupation Hygienist that serves the whole country. Moreover, he does not deal with data capture and analysis. This is attributed to lack of adequate data analysts occasioned by freeze on employment by the Government.

Training: DOSHS normally conducts training for first aiders and first responders in the workplaces. However, special training on chemical safety for micro-, small-, and medium enterprises (MSMEs) is missing. The training is not deep enough as to include persistent organic pollutants.

Proposed DSHS actions

Safety audits: It is important that DOSHS invests some resources to review safety audit protocols and data sheets to determine if they capture quantitative information on chemicals hazards, risks and waste with ease

Performance indicators: Key performance indicators on chemical risks particularly, exposure levels and chemicals accidents, need to be developed and embedded within the safety audit protocol. Also a mechanism needs to be developed to facilitate enforcement information management and dissemination in the MSDSs.

Staffing: There is need for additional human resource to capture, analyze data in safety audit reports and store in a manner easy to retrieve

Training: Customised training packages on chemical safety for MSMEs need to be developed and mounted. This should include specialized training on POPs, chemicals and waste for micro-, small-, and medium enterprises (MSMEs) including for first responders.

Laboratory: The institution is planning to set up an equipped reference laboratory for occupational health and adequate trained staff (technicians, technologists, and scientists) for analysing chemical exposure and body burden.

4.9.3 Kenya Meteorological Department

Mandate

The Kenya Meteorological Department (KMD) provides meteorological information and services as well as infusion of scientific knowledge to spur socio-economic growth and development. It falls under the Ministry of Environment and Natural Resources

The Department provides meteorological and climatological services to agriculture, forestry, water resources management, civil aviation and the private sector including industry, commerce and public utilities for the better exploitation and utilization of natural resources for national development among others. It also provides meteorological services to shipping in the western Indian Ocean including the issuing of cyclone warnings for the safety of merchant and other ships.

In addition to the above, the Department also co-ordinates research in meteorology and climatology including co-operation with other authorities in all aspects of applied meteorological research. It also develops suitable training programmes in all fields of meteorology and other related scientific subjects

which are relevant to the development of Kenya and other countries that participate in the Department's training activities.

Activities

The Department coordinates a World Meteorological Organisation (WMO) programme monitoring Ozone Depleting Substances (ODS). The monitoring station is on Mt. Kenya where it monitors ozone, carbon monoxide and aerosols. Again, no POPs are monitored. The station measures background ODSs which is far from the source of releases in cities and industrial areas.

It is possible to install passive air samplers to monitor basic POPs. For uPOS however, sampling protocol and human resource needs to be developed and analysis can be done at KEPHIS as they have the equipment. However, there is a caveat in that the equipment, GCMSMS and LCMSMS, are dedicated to a project and cannot therefore be deployed for monitoring purposes.

Institutional capacity gaps

Inability to measure POPs and uPOPs in their monitoring stations. This has not been prioritized in their measurement.

Proposed KMD action

Engagement with KMD on the priority POPs that can be measured by its weather stations

4.9.4 Government Chemist

Mandate

This is a Department under the Ministry of Health which involves biochemical analysis on toxic products that are taken into the human body and any abnormalities related or generated by the use of toxic chemicals. It is the legal referral laboratory that offers forensic and analytical laboratory services in the field of public and environmental health and in administration of justice.

Activities

The Government Chemist performs the function in collaboration with other arms of the nation's public health system to ensure the safety and well-being of the public. It also offers advisory services to the regulators in various industries and stakeholders who engage in carrying out of research.
It is equipped with various analytical equipment to perform physical, chemical analysis including for basic pesticides. It has a host of laboratory analysts performing. analytical functions

Institutional capacity gaps

Analytical equipment: It does not have equipment to analyse uPOPs. However, more emphasis is given to forensic samples.
Staff Capacity: the staff lacks skills on sampling, sample preparation and analysis of uPOPs and in particular, in human tissues

Proposed Government Chemist actions

Analytical equipment: The institution needs to invest in an equipment to analyse uPOPs.

Staff capacity building: the staff needs to be trained on sampling, sample preparation and analysis of uPOPs, in human tissues. They will also require initial technical assistance in conducting analysis.

4.10 Illegal Trade

The function of curbing illegal importation is undertaken by the KRA Customs Department, Kenya Bureau of Standards, KEPHIS, Kenya Veterinary Department, Pesticide Control Board, Pharmacies and Poisons Board and the Radiation Protection Board among others. They are the agencies that clear goods into the country.

4.10.1 Kenya Revenue Authority

Mandate

The Kenya Revenue Authority Customs Services Department, established by an Act of Parliament Cap 472 of 1978, has the mandate of customs and excise administration in Kenya. Apart from its fiscal responsibilities, the Customs Services Department is responsible for facilitation of legitimate trade and protection of society from illegal entry and exit of prohibited goods.

Activities

To minimise on illegal trade of prohibited chemicals, the Customs Department installed an Integrated Customs Management System (iCMS). The system is able to intercept possible diversion of transit goods into the local market or disappearance of containers. In addition, the iCMS solution has an auto-upload of cargo import data from shipping manifest to prevent import falsification.

The Investigative Team undertakes patrols and makes seizures of illegal imports that are then destroyed. For industrial waste, the importer, and more specifically, the shipping line is made to return with it. To minimize these incidences, KRA runs a 2 year training program for staff and clearing agents largely on customs procedures, prohibited goods, restricted goods, classifying goods.

The Authority has a laboratory at Times Tower in Nairobi equipped with GC-MS, FTIR, CV-VIS, AAS, ZRF and HPLC for testing goods. Goods under seal are given conditional release while awaiting test results from the laboratory. Data that is generated on imports and exports of ODS is not available to the public unless through the national authorities like NEMA and Government Chemist. The Authority also gives to the Organisation for the Prevention of Chemical Weapons (OPCW) in the Hague annual reports on scheduled chemicals in Schedule 3 of the Handbook of Chemicals such as triethanolamine.

Institutional Capacity Gaps

Disposal method for illegal goods: Destruction/disposal technologies for illegal chemicals and other goods is usually a challenge with NEMA not able to provide solutions many a times

Awareness of chemical hazards: Awareness levels of Customs Officials on chemical hazards is low. They also lack the requisite skills, expertise and experience in handling chemical products. This also goes for enforcement agencies, transporters and other stakeholders .

Falsification of import declaration forms: All importers are required to fill a declaration form as required by the Act. Some imported goods declared in the paperwork (PVoC) are different from the actual goods in the containers thus exposing the handlers to hazards. Often hazardous cargo is manifested but not all are declared. There is no master data base for hazardous cargo in the port except for explosives.

Labeling: Some importers use different labeling and classification other than the World Customs Union Harmonised System (HS) code such as chemical names and UN codes. KEBs uses the GHS. The prohibited and restricted imports are generally checked at the entry point. The challenge occasionally encountered is the identification of some chemicals especially with the use of trade and brand names instead of the chemical names.

Laboratory: KRA has a laboratory for testing goods. The laboratory is equipped with GC-MS, FTIR, CV-VIS, AAS, ZRF and HPLC. Data that is generated is not available to the public unless through the national authorities like NEMA and Government Chemist. Some POPs and uPOPs are complex chemicals and are therefore not analysed at KRA due to lack of sampling and analytical methodology.

Packaging & storage: Goods arrive at the port with all manner of packaging and some even on wagons. It therefore becomes difficult to tell what they are and how they should be stored.

Joint meetings: The Authority also decried the lack of joint meetings with KEBS except at the border points.

Proposed actions by KRA

Training and research: The unpredictability of samples goods imported requiring testing makes it necessary to have continuous research and training

Disposal method for illegal goods: A collaborative team should be established to offer technical support services on destruction/disposal technologies for illegal chemicals and other goods at the KRA.

Awareness of chemical hazards: regular awareness sessions on chemicals and their sound management for Customs Officials, transporters, and other SMEs is required.

Falsification of import declaration forms: **To reduce incidences of falsifying** Import declaration forms, the Trade facilitation institutions

Labeling: To address the disharmony in the labeling, the adoption of GHS of labeling and classification need to be rolled out. Completion of the Chemicals Regulations shall make enforcement of labeling effective.

Laboratory: The university of Nairobi Chemistry Department can rope the Customs Department in the UNEP/GEF calibration program. This will enable them to build staff capacity and develop a methodology for anlysing POPs in goods. A proposal to the MENR is to have a *reference laboratory* to handle chemicals regulated by the Stockholm Convention.

4.10.2 Kenya Bureau of Standards

Mandate

The Kenya Bureau of Standards (KEBS) is the national standards body responsible for the development of standards in the country. It implements Pre-export Verification of Conformity (PVoC) to standards. Goods destined for Kenya are expected to demonstrate compliance with Kenya standards or approved specification before shipment. This is in accordance with the Imports Order LN No 78 of 2005.

Activities

Pre-export Verification of Conformity (PVoC): The Pre-export Verification of Conformity (PVoC) to Standards programme is a conformity assessment and verification procedure that KEBS applies to

specific imported products at the respective countries of export, to ensure their compliance with the applicable Kenyan Technical Regulations and Mandatory Standards or approved equivalents.

Key elements undertaken in PVoC process are physical inspection prior to shipment, sampling, testing and analysis in accredited laboratories, audit of product manufacturing process and documentary checks of conformity with regulations and standards. KEBS has developed the product (regulated products) scope covered by the PVoC programme based on health and safety issues, security and environmental protection. The Certificate of Conformity is a mandatory Customs clearance document for Regulated Products. Under the PVoC programme, all imported goods that do not meet the requirements of Kenya Standards or approved specification will not be allowed entry into Kenya. Only goods found to comply with the said specifications or are accompanied by a Certificate of Conformity (CoC), will gain entry into the country.

As of 1st December 2015, the PVoC covered prohibited/regulated product list to include all products except those exempted. These are:

- goods already regulated by other government agencies such as the Pharmacy and Poisons Board (PPB), Kenya Plant Health Inspectorate (KEPHIS), Pest Control and Products Board (PCPB).

The PVoC is operated on the basis of standards so if there are no standards, there is no inspection. There are no standards developed by KEBs uPOPs.

Market Surveillance. Once illegal goods have found their way into the country, KEBS undertakes surveillance based on standards and covers manufactured products such as electricals, chemicals, cosmetics, paints, fertilizers and toys among others. Market surveillance is based on KEBS standards and regulations. The Bureau uses a system of risk assessment for heavy metals such as lead metal in toys and paints as well as prohibited substances such as hydroquinones in beauty products. For lead, particularly in paints, the standard limits lead to 90 ppm (dry wait of paint), the strictest legal limit enacted in the world today.

The issue of cosmetics with hydroquinones is challenging as they come in through many unauthorized channels at border points such as Malaba, Busia. These are not declared by business people. Consequently, the traceability becomes a problem as they do not get declared. There are no 100% inspections.

Institutional capacity gap

A major impediment is equipment and staff skills for analysis of uPOPs. There is also lack of effective consultations between KEBs and KRA

Proposed actions by KEBS

Investment shall need to be made in laboratory equipment and staff capacity building. Effective partnership needs to forged between KRA and KEBs.

4.11 Mainstreaming

This section sought to find out if national priorities related to chemicals management and SAICM implementation are reflected in national policies, development policy documents such as the Medium-Term Plan III, County Integrated Development Plans (CIDPs), institutions and if non-state actors are involved.

According to UNEP, mainstreaming sound management of chemicals and waste (SMCW) requires that it becomes mainstream practice in public and private sectors. The goal is mainstreaming SMCW through

public sector policies and private sector investments. Mainstreaming also means that SMCW has to be perceived by the public and private sector as a critical factor in the SDGs and a vital element that underpins a green economy and sustainable development.

It is such mainstreaming that will provide an enabling environment for the private sector to launch into innovations that make the sound management of chemicals and waste a common practice. The SMCW must continue to progress into the mainstream and become an environmental, public health and development priority.

4.11.1 Mainstreaming in Plans and Policies

Medium Term Plan, (MTP III), 2018-2022

The draft Medium term Expenditure Framework (MTPIII), 2018-2022 was not yet ready at the time of this study. It is only Draft Sector Reports that were available and yet to be consolidated. The Draft Sector Report on Environment and Natural Resources Sector does not have a provision for chemicals management as a priority. It has provision for waste management and pollution control, particularly, solid waste management. The provisional 5-year budget (2018-2022) for waste management is Ksh. 4,260 million. The Sector Report also provides for Strengthening of Environmental Governance by enacting/reviewing enabling policies, legislation and institutional arrangements at a budget of Ksh. 5821.45 million. The other is provision for Green Economy to help the country transition towards a circular economy with Green Growth. A total of Ksh. 8362.5 million has been provided for green growth initiatives (Table 8). Although Chemicals issue is not mentioned in the Draft Environment Sector MTP III, it can be packaged under Waste or Green Economy.

Table 8: Proposed MTPIII Implementation Matrix, Environment Department

Flagship program	Objective	Key indicator	Outcome/ Output	Agency	Budget (10^6)
Waste Management and pollution Control	To improve solid waste management in urban and rural areas	Improved solid waste management countrywide	Proportion of county dumpsites with ten minimum points	ME&NR/ NEMA	4,260
Strengthening Environmental Governance	To provide enabling policies, legislation and institutional arrangement.	Enhanced environmental and natural resources' governance	No of policies, legislation and regulations implemented No of environmental devolved institutions operational in the Counties. No of gazetted regulations enforced.	ME&NR/ NEMA	5,821.45
Green Economy	To help the country transition towards a circular economy with Green Growth	Improved environment and climate change management	Number of Green Growth initiatives	ME&NR/NEMA/ NETFUND	8,362.5
Modernization of meteorological services	To enhance provision of meteorological services	Enhanced provision of meteorological services (Modernized National Weather Network)	% level of citizen satisfaction	MENR/KMD	4,325.4

Advertent weather modification	To promote operational research and real time monitoring of weather parameters	Radar derived weather data	No of Components of weather derived data system in place	MENR/KMD	4,950.4
National Environment Support programme	To enhance institutional strengthening for effective implementation of MEAs	Improved coordination , harmonized domestication of MEAs	No of strategies and Action plans for implementation of MEAs	MENR and relevant stakeholders	1,700

Source: Draft MTP III, Environment Sector, 2017

Green Economy Strategy and Implementation Plan

The Green Economy Strategy and Implementation Plan (GESIP) provides an overarching policy framework for consolidating effort towards green growth. It is a tool for addressing intra-and inter-governmental policy coordination. This will build synergies thereby avoiding duplication. Although sound management of chemicals is not mentioned in GESIP, innovative and environmentally-sound management of chemicals and waste, do constitute an aspect of the green economy.

At the national level, the Draft Environment Sector Report for MTP III has mainstreamed the green economy paradigm. However, many County Governments have not undergone training on mainstreaming Green Growth into their development plans. Many opportunities for green economy exist at the county levels including sound chemicals and waste management, but effective coordination between the two levels of government is required to support implementation actions.

In Nakuru County, Training of Trainers workshop on Green Economy Planning was held in 2016 by the Ministry of Environment with financial support from UNEP. The training focused on four areas among them waste, water, agriculture and energy. Through the training, the County of Nakuru is expected to mainstream Green Economy initiatives into the 2018-2022 County Development Plans as a framework for achieving the Sustainable Development Goals (SDGs). Green Economy provides an avenue for functional interaction between the economy and the SDGs. The 17 SDG goals provide a framework in which green growth targets can reorient national economic development planning as well as guide the behavior of both the public and private sectors.

Needs and priorities for mainstreaming

- Training and awareness of Members of the County Assembly, Committees and the Executive on sound chemicals management and green economy
- Effective coordination between the national and county governments is required to support implementation actions.
- Relevant technical and financial assistance to chemicals management should come out in the County Integrated Development Plans (CIDPs)
- Upstream policy dialogue should be initiated with the Council of Governors (CoG) in order to commit them to allocate funds for apacity building and human resources training in the area of chemicals management

4.11.2 Institutional Mainstreaming

Institutions interviewed were found to be undertaking activities touching on either, the Stockholm, Rotterdam, Basel Conventions or Montreal Protocol and the SAICM. Activities are in the area of disposal of chemicals waste and obsolete chemicals, chemicals management policy, training and awareness, risk assessment, monitoring and evaluation.

Those who participated came to learn about these conventions through meetings, seminars, websites, newsletters, international fora, invitation letters, NGOs, environmental programmes. In institutions, not all staff participate in chemicals management; participation is tied to the department where one works.

National Environment Management Authority
The issue of chemicals has been mainstreamed in the organization structure of NEMA though at a very low level; the Section of Chemicals Management falls under the Department of Compliance in the Directorate of Compliance and Enforcement. The bulk of its work is in processing requests for imports of chemicals under the Prior Informed Consent (PIC) of the Rotterdam Convention. This will become a Department after the Chemical Regulations come into force. This section's allocated annual operational budget is no more than Ksh. 1 million against a request of Ksh. 10 million.

Some innovative efforts on the part of NEMA is required to make it stronger as an institution in chemicals management. These would be innovations that enhance its coordination role whilst implementation, and more importantly, self-regulation and circularity, is pushed to the businesses. This will free resources from compliance and enforcement and direct it towards building its institutional self-sufficiency for over-sight.

National Environmental Management and Coordination (amendment) Act, 2015
As discussed in chapter 3, chemicals management is already mainstreamed into EMCA (amendment), 2015 although POPs are not provided for. What is currently lacking is a specific subsidiary legislation, Chemicals Management Regulations, to implement the provisions in the Act. It is hoped that once developed, these regulations shall be sufficiently reflexive as to stimulate circular innovations for sound chemicals management.

Private Sector and Civil Society Participation in Chemicals Management
The private sector and civil society are major players in chemicals management in terms of capacity building. This includes: education, information sharing, awareness raising on impacts of chemicals to human health and the environment. Consequently, they are critical partners and major stakeholders in SAICM governance towards the realization of the 2020 goal. As partners and stakeholders they have been actively engaged from the onset on SAICM implementation that involved planning, implementation and monitoring. This has created a sense of ownership and engagement; essential ingredients for the success of its implementation.

The private sector, in particular industry, is an implementer and can be a net contributor of resources needed in capacity building. Civil society may also play a significant role in chemicals management, particularly in areas of capacity building activities, awareness raising, advocacy and information collection and dissemination especially to grass roots.

Already the private sector, in particular, the Association of Manufacturers (KAM) and the Agro-Chemical Association of Kenya (AAK) are active in sound chemicals management. As discussed, KAM already has a committee on chemicals in its structure. It has also recently agreed to adopt the Responsible Care Initiative that links the chemical industry with SAICM. The AAK on the other hand, has subscribed to initiatives that enable it to engage in the sound management of chemicals of concern. The private sector is also a credible partner in testing new knowledge and technologies in arising from research. What is required is a legislation or guidelines on what these voluntary initiatives should conform to in order to prevent "green washing".

4.11.3 Financial Resources for Chemicals Management

Among the institutions interviewed, financial resources was set aside in annual budgets for activities including capacity building on chemicals management. However, majority of the institutions indicated

that the allocations were inadequate whereby if the request was for instance Ksh. 10 million per year, only Ksh. 1 million was allocated. The paltry allocation of financial resources was attributed to low prioritization and lack of sufficient knowledge on the importance of sound chemicals management at the top management.

On the side of infrastructure, the study also found that every institution is rushing to set up state-of the art analytical laboratories often without considering if the investment makes business sense. It may be important to start engaging on whether we can have reference laboratories designated for various analytical tests instead of duplicating.

Sustainable financing of chemicals is hampered by the perception that this is an issue of the Ministry of Environment and development partners such as UNEP, UNDP, World Bank. This makes chemicals management be divorced from the realities of institutions making it difficult to provide funding for it.

On financing, there is the concern that revenue from chemical safety-related legal procedures (e.g. fees, taxes, fines) flowing into national treasury or ministries are not adequately "recycled" for strengthening the national chemicals management infrastructure.

Potential actions to enhance mainstreaming

- Developing synergistic relationship between institutions on resource sharing
- Training and awareness on safe chemicals handling and waste management within institutions
- Policy dialogue on the need to mainstream chemicals management into national plans, policies and institutions
- Strengthening knowledge management through information collection, analysis, storage, retrieval and dissemination
- Innovating enforcement system of exiting legislation and reviewing the provisions to make them more reflexive
- Documenting and disseminating good case studies on innovative chemicals management to enhance replication and up-scaling

5 STRATEGIES FOR IMPLEMENTING SAICM OVERARCHING POLICY STRATEGY

Strategies for implementing the SAICM Overarching Policy Strategy are two-pronged: first is removing the barriers and addressing the institutional needs identified in the preceding chapters and secondly, is up-scaling the best practices already undertaken in sound chemicals and waste management. This chapter provides some of the strategies that need to be followed touching on governance, technical support, financial resources and coordination. Finally, it proposes the projects that need to be up-scaled so as to provide impetus for eco-innovation in sound management of chemicals and waste.

5.1 Governance

Kenya can be said to have good chemicals management if this is embedded in her governance structures both at the national and county levels and non-state actors are effectively participating and investing in the sector. As earlier discussed, this includes: institutional capacity and coordination; sufficiency of monitoring, regulatory compliance and enforcement; market instruments, information, potential policy instruments for enhancing and stimulating beyond-compliance voluntary approaches.

However, we saw from section 4.11 that mainstreaming, although beginning to manifest is still a challenge. This lacuna will militate against meeting Kenya's international obligations in the chemicals and waste Multilateral Environmental Agreements (MEAs). New laws shall need to be developed, existing ones reviewed, compliance and enforcement strengthened, and institutions strengthened. These are covered in more details below.

5.1.1 Strengthening Regulatory Frameworks and Voluntarism

Regulatory Compliance

An enabling regulatory environment directly strengthens governance of chemicals and waste. The country's regulatory landscape is characterized by the command-and-control regulations where standards are set and the regulated community's duty is to comply. Although the National Environment Policy of 2014 contains proactive policy statements, these have not yet filtered down to the Acts and legislations.

Limited technical capacity, financial and laboratory facilities in the regulatory institutions in terms of laboratory analysts, Environmental Inspectors, and transportation make it difficult to enforce regulations. This is exacerbated by the complexity of monitoring some of the prescribed chemical substances. For example, NEMA and WRA have capacity constraints in terms of analytical laboratories, which for WRA number six country-wide and even when they are available, they are not able to analyse basic POPs and uPOPs. Moreover, analysis of POPS is not part of the quality parameters required by the current regulations. NEMA does not have a laboratory and therefore relies on laboratories it has accredited in various institutions which cannot analyse POPs. All these make prescriptive process ineffective expensive and ineffective.

Fragmentation of institutional responsibilities between WRA and NEMA, Ministry of Health and NEMA, National and County Governments, has to some extent, stifled evolution of ecological innovations. NEMA issues effluent discharge licenses at a fee of Ksh. 100,000 per facility. WRA on its part issues effluent discharge permits after a facility has developed effluent discharge control plans (EDCPs). This framework has precipitated specific problems including widespread coordination challenges in implementing pollution prevention plans and effective compliance and enforcement.

The Environmental Management and Coordination (amendment) Act, 2015 still places premium on disposal methods such as incineration. This is a disposal technology not recommened by the Stockholm

The Environmental Management and Coordination (amendment) Act, 2015, is fairly prescriptive, giving little room for proactivity as it contains no specific authorisation for the use of voluntary (self-regulatory) approaches in lieu of regulatory requirements. This makes it difficult to bring pollution prevention and performance-based regulation into mainstream environmental management. Further, the full implementation of EMCA has not been realized; economic instruments and other incentives provided for in Section 57 meant to stimulate environmental innovations are a good starting point but their development and implementation continues to be a distant future.

4.3.2 Voluntary Mechanisms

EMCA contains some ecologically innovative features such as requiring annual environmental audits, a performance evaluation tool which engenders self-reflection in industry by revealing types and quantities of inputs, wastes generated and performance weaknesses for correction. Unfortunately, there is no national program to build the capacity of industry to evolve methodologies for pollution reduction from one year to the other.

Amongst the institutions, there is also slow commitment to re-configuration of compliance and enforcement approaches to correspond to the pragmatics of ecological innovation and pollution prevention; issues of voluntary regulations as a means of driving ecological restructuring and practices in the chemical firms has not been tacitly expressed by the regulators. Although cleaner production is the preferred waste management approach in the Waste Management Regulations of 2006, this has not been emphasized in the approach of compliance and enforcement by Inspectors and Compliance Officers.

In order for sound management of chemicals and waste approaches to take root in Kenya, it is necessary that restructuring of EMCA and its subsidiary legislations be done to provide for a legislative remedy in the promotion of voluntary environmental programs (VEPs). This shall provide a broad framework which should guide the promotion of voluntary approaches such as Chemical Leasing, Responsible Production, new eco-innovative business models, eco-labelling and other certifications. In the same vein, Kenya's effluent discharge permits could do well to make pollution prevention a condition for renewal of license. The Environmental Impact Assessment and Audit Regulations (EIA/EA) of 2002 is an area that requires remedial measures to include incremental pollution reduction targets, monitoring and reporting.

The annual environmental audits can be used to identify environmental risks including those of chemicals, development of pollution reduction programs and cost benefits. Currently, the audit reports are submitted to NEMA and are used in case a control audit is called for or when a complaint is raised against the company. Reforming the conduct and performance of the environmental audit tool to provide for demonstration of incremental pollution reduction as a condition for renewal of license, effective monitoring and reporting are critical. This restructuring should be coupled with a capacity building program for industry to enable them evolve a methodology for continual pollution reduction including chemicals. Some respondents expressed the view that the government should put in place a system of industry self-reporting and this should be made public as part of information disclosure to put pressure on industries to reduce pollution.

Some important revelations were also made that uniform effluent discharge standards for all industry categories do not just work. For example, the current effluent discharge standards in NEMA's Water Quality Regulations of 2006 are the same for fairly less polluting entities such as bottling water and that

of molasses distillery. A different program needs to be put in place for the distilleries that elicits the emergence of voluntary ecologically innovative initiatives.

Draft Chemical Management Regulations

Unless they are coupled with strong analytical infrastructure, requirement for chemical pollution targets, incentives and an indication of the business value in them, they may just suffer the same fate as the other regulations. They should provide room for institutional reflexivity and propensity for exploration of how alternative and innovative approaches can be made to favourably bear on sound chemicals and waste management.

The Environmental Management and Coordination (amendment) Act, 2015

The EMCA needs to be amended to provide a legal remedy for the voluntary environmental management initiatives that are emerging in the private sector. This remedy should provide guidance on what qualifies to be a voluntary environmental program (VEP) so that there is coherence and avoidance of "greenwashing". Already the Agro-chemical Association of Kenya (AAK) and KAM are ahead in their voluntary chemicals management initiatives such as the Sprayer Service Provider (SSP) Program and Responsible Care (RC) respectively. Included is the Kenya National Cleaner Production Centre initiatives of Resource Efficient and Cleaner Production (RECP), Responsible Production (RP), Industrial Symbiosis (IS), and Chemical Leasing (ChL). The SSP and ChL concepts all borrow from the same philosophy of contracting the service and not the chemical.

Reporting format of annual environmental audits

The current reporting format of the annual environmental audits is riddled with "filler" materials that fail to bring quantitative data on process inputs (e.g. chemicals) and pollution intensities. Without this, it is difficult to design activities that can continually bring down the consumption of chemicals and pollution generation.

Reforming Compliance and Enforcement

Instead of focusing on sanctions, fines and imprisonment, compliance and enforcement should also exhibit value addition by referring industry to pollution prevention technical support institutions. It will also require that Environment Inspectors are equipped with additional skills on voluntary tools of compliance such as cleaner production, chemical leasing, eco-innovation, industrial symbiosis among others. In this way they are to also advice industry on eco-innovative opportunities

Development of Chemicals Management Regulations

The immediate need in the chemical sector is completing the development of Chemical Regulations to govern the sector. They cover the Stockholm and Rotterdam Conventions and e-waste. They will also cover the Minamata Convention. The Draft Regulations include POPs although this will require that KEBs develops standards for uPOPs

The regulations should be sufficiently reflexive by providing both a "carrot" and "stick' so as to spur eco-innovation. In their absence, governance and coordination amongst the national and county government becomes a big challenge, with participation of non-state actors becoming ad hoc.

The Regulations should be in harmony with the standards and guidelines that the Kenya Bureau of Standards has developed. The regulations should be able to provide answers to questions such as: "When does waste contain uPOPs? On remediation of contaminated sites, what are the limits?"

It is important to note that e-waste Regulations were declined at the Ministry of Environment and Natural Resources with the view that NEMA should have mega Waste Management Regulations comprising all categories of waste. The Bill was submitted by Government Chemist and is proposing an institution for capacity building.

Development of Regulations on Incentives and Disincentives

Development of regulations that incentivise innovative environmental performance and disincentivise bad environmental performance shall facilitate the sound management of chemicals and waste. Development of these regulations will require operationalizing Section 57 of EMCA. Add Economic incentives (Obadiah).

5.1.2 Strengthening Institutions

Institutions need to be strengthened in terms of their human and infrastructural capacities in order for them to engage effectively in chemical risk reduction. This strengthening is needed by both public and private sector including civil society. Respondents cited numerous barriers for inadequate participation of institutions in the management of chemicals and waste including: lack of knowledge, skills and experience in chemicals management, chemicals management was not considered a priority, and low level of commitment within the private sector. Further at the County level, there is lack of planning capacity in mainstreaming chemicals into the County Integrated Development Plans (CIDPs).

Consequently, the implementation of the Project on "mainstreaming sound chemicals management and uPOPS reduction" need to have a strong capacity building component for institutions. Various programs can be undertaken:

Raising public awareness on POPs: workshops for the general public on basic knowledge and risks of chemicals to Government, private sector and civil society. This will empower them to engage in activities that provide concrete and immediate contributions to Kenya's efforts in preparing for the implementation of SAICM

Strengthening laboratories: strengthen public laboratories regarding technical and human resources in order to be able monitor and analyze the banned chemicals. For staff, this should include: sampling, sample preparation and analysis of POPs in various environmental matrices including air, water and sediment. This should be done through learning-by-doing workshops. The training workshops should be extended to those institutions that own gas chromatography (GC) equipment and are involved in monitoring and testing pesticides and PCBs in environmental (air, sediment, soil, water) as well as biological matrices (human milk, food products etc.). A reference laboratory should be designated for POPs to avoid proliferation.

Knowledge management on data generated: Training is needed on interpreting and packaging data generated in ways that can be understood by various stakeholder groups. This will spur them to identify niche areas in the realm of chemicals and waste management where they engage in. This should also include development of policy briefs to information policy making and review.

Up-scaling successful BEPs/BATs projects: There are concepts that have been piloted on sound chemicals management by various institutions. These should be packaged and disseminated to drive up replication and up-scaling.

County situation reports: training on preparing reports on county situations and hotspots

Research and Policy: research findings that have been generated by research institutions should be packaged into policy briefs and used to kickstart policy dialogue sessions so as to inform policy review and development.

Strengthening cooperation among institutions and stakeholders: strengthen cooperation and close collaboration among governmental institutions, the general public, private sector and other stakeholders towards sound management of chemicals used in household products. Issues such as banned chemicals, hazards, impacts and sound management should be freely shared among them.

5.2 Coordination

Successful implementation of sound chemicals management and waste in line with SAICM and Annex C of the Stockholm Convention will require the active engagement of all stakeholder groups. There is little collaborative analysis of data and no shared database of quantitative and qualitative monitoring result exist between institutions. There are ad-hoc inter-ministerial coordination mechanisms for chemicals but generally the country lacks a well-organized inter-ministerial coordination mechanism for chemicals management. The presence of such a body would enhance collaboration among ministries and agencies in implementing their respective mandates and competencies and facilitate information sharing.

There is an already existing institutional base with capacity to manage POPs in the Ministry of Environment and Natural Resources. This institution, the Project Management Unit (PMU) is project based with no sustainability structures. It consists of the National Project Coordinator, Project Technical Specialist and Assistants. It is the PMU that ensures that the Project is successfully executed. To realize this, the main responsibilities of the PMU is to draft the project work plan including assigning responsibilities amongst government and other stakeholders, management of project execution, initiation, final planning and budget. The PMU also monitors technical aspects of the project, organizes the workshops, establishes and contracts the working groups and consults stakeholders throughout the project life.

Of critical importance for the ProDoc, will be the establishment of a sustainable entity to continue coordinating the operations of SAICM and the Stockholm NIP in the Ministry of Environment and Natural Resources. The Project Document proposes that a SAICM Coordination Office be established which will serve the SAICM Implementation Committee (SIC). SIC will lead in decision-making on chemical safety and strengthen cooperative action on policy issues including emerging ones such as nanotechnology, biotechnology, including emerging categories of waste such as e-waste. The coordination should also lead to expanded space for inter-actor exchange of experiences as a strong determinant for success of sound lifecycle chemicals and waste management.

5.3 Suggested Programs to Enhance Risk Reduction

The study suggests the following activities /projects for chemical risk reduction:

5.3.1 Technical Support in Research

The implementation of the ProDoc needs to have a strong training and research component for institutions. Training should entail the development of advanced GC techniques, methodology techniques- validation as required under UNEP (Chemicals) analytical conditions for POPs analysis. New columns, internal standards, and reference materials should also be supplied.

The UoN laboratory has been developed under UNEP assistance, as one of the six regional developing country laboratories in the world for the analysis of POPs. Laboratory analysis has been done for air sample and milk. Samples for uPOP analysis were analysed out of the country as the Department has a low resolution equipment. On the other hand, KEPHIS has a state of the art equipment that can analyse uPOPs but lacks the methodology. The Inspectorate is involved in monitoring pesticides and PCBs in environmental (air, sediment, soil, water) as well as biological matrices (human milk, food products).

Thus, there may not be a need to send uPOPs samples out of the country for analysis as KEPHIS has that capability. The call is for collaborative research initiatives between the UoN and KEPHIS for training. This will significantly contribute to an increased capacity in relation to analyzing and generating reliable basic POPs and uPOPS data through better quality control, quality assurance and collaborative inter-laboratory research. It will also help in generating baseline data for Kenya on (POPs) like dioxin, furans, polybrominated biphenyl ethers (PBDE) polyaromatic hydrocarbons (PAHs) and other dioxin-like PCBs. The methods developed at UoN will be adopted by the KEPHIS laboratory, therefore, contributing towards an expansion in institutions' capacity to screen for a variety of Persistent Organic Pollutants (POPs) compounds.

5.3.2 Scaling up Innovative Concepts

Innovative concepts to address sound chemicals management and waste reduction have been demonstrated. These include: Responsible Care, Responsible Production, Chemical Leasing, Resource Efficient and Cleaner Production, Integrated Vector Management and Integrated Pest Management. To scale up the application of these concepts requires proper documentation of the case studies for awareness raising, dissemination and policy mainstreaming.

Resource Efficient and Cleaner Production

The Resource Efficient and Cleaner Production (RECP) aims to improve resource efficiency and environmental performance of businesses and other organisations by continuously applying preventive environmental strategies to processes, products and services. This increases efficiency and reduces risks to humans and the environment. RP supports the application of RECP approaches, through minimisation of toxic chemical releases as well as reduction of the amount of toxic materials on site, spillage, and hazardous wastes, RP can be a key contributor to increased resource efficiency and cleaner production.

Chemical Leasing (ChL) that focuses on hiring a service and not buying chemicals will be an innovation to be up-scaled in the chemicals industry. It contributes towards efficient consumption of chemicals.

This study found that except when there is a donor-funded project such as LVEMPII, no nationally-funded technological support is provided to industries for compliance or even over-compliance with standards. The ProDoc through KNCPC can provide technical support to industry training, half-day site assessments, provide access to cost effective technology evaluation, and management publications, national and county seminars. Knowledge and Information sharing between the National and County Level governments.

Responsible Care Initiative

Although still new in KAM, this Initiative shall need to be supported by MENR as it will bind the members of the Association to management chemicals and related waste sustainably.

5.3.3 Promote regulatory and voluntary actions to phase out lead in paints

Kenya still lacks a regulation on phasing out lead from paints. A proposed strategy would be to promote regulatory and voluntary action by NEMA to phase out lead in paint. The project should drive the need

for national regulatory development while also engaging the private sector on cleaner production technology options for substituting lead in paints. The envisaged interventions should include:

Standards: Kenya Bureau of Standards (KEBS) to fast track the gazettement of the two Standards on the determination of total lead content in paints, varnishes and related products.

NEMA: to develop a legislation on both regulatory and voluntary compliance to put the KEBS standards into effect. This will require policy advocacy and public awareness campaigns to generate support for lead phase-out. The regulations should demand full disclosure of a paint product's content by manufacturers.

Industry: to be supported to stop the use of lead-based pigments, driers, and substances in paint formulations, and shift to non-hazardous alternatives. This should be through pilot demonstration projects in selected manufacturing industry whereby industries are encouraged to invest in cleaner technologies for the phase-out of lead containing paint.

Consumers: Raise consumer awareness on the dangers of lead in paints and encourage them to purchase and use paints with no added lead in places frequently used by children such as homes, schools, day care centers, parks and playgrounds.

Partnerships: establish public and private partnerships, raising awareness and training on alternative cleaner technologies. National stakeholder collaborations (National Working Groups) should be set up to lead this action.

5.3.4 Alternative Pest Management Options Training

Aggressively, combining work on POPs elimination and integrated pest management (IPM) will be a promising strategy for developing a broad based approach for improving pest management and pesticide health and safety issues in Kenya. This strategy should build on IPM and bio-control programs of ICIPE that have already been discussed. These programs shall provide valuable contribution to the agricultural sector and facilitate significant reduction in pesticide use.

5.3.5 Food Safety Program at County Level

Proposals have been made by KEPHIS for each County to set aside Ksh. 2 million per year for monitoring pesticides in commonly-consumed foods. KEPHIS will sample staple foods from County markets and analyse them for minimum residual levels (MRLs). This will help build national and county systems including traceability and eco-labeling of produce from Counties. In fact, a ranking system should be developed to recognize Counties that do better than the other. This strategy should incorporate capacity building of agricultural officers at county level in order to enhance food safety.

5.3.6 Reduction of uPOPs

In Kenya, the POPs inventories showed that majority of dioxin emissions come from open burning processes in agriculture, forestry or waste. However, the typical incinerators for safe waste disposal are not available so the waste is dumped and burned. The burning of waste in the open without any technical equipment is often considered as the largest source of dioxins and furans – larger than from all other industrial sources. The health care facilities will be a good candidate to start from. This should entail popularizing the application of non-burn technologies i.e. the autoclaving and micro-waving of health care waste.

Of priority is to develop a strategy for reducing uPOPs emission from open burning that has the following elements:

- awareness on the impacts of open burning of certain categories of waste having potential of generating POPs at low temperatures
- start an incinerator training program on best practice management of incinerators
- giving timelines to owners and operators of incinerators to upgrade their incinerators to best levels to act as demonstrations for the rest
- Pushing up the migration to non-burn technologies for health care waste management
- the NEMA Waste Management Regulations can be reviewed to go a step further and pronounce that "*recyclable waste should not be incinerated, no incineration of waste in the open and where incinerators are used energy should be recovered*".

In Kenya, we currently neither have measured data to estimate the release of these chemicals nor the composition of waste burned. In the implementation of the ProDoc, detailed information should be sought on the composition of waste that is burned in the open and on the conditions under which the waste is burned.

Second priority would be industrial uPOPs.

These include: industrial and other processes such as manufacturing, product application and use, recycling, and waste as sources of uPOPs. These include: production of chlorine and chlorinated organic chemicals, oil refining, and pulp and paper production, cement kilns; scrap metal processing; mineral processing; incineration of waste; operating vehicle combustion engines, especially diesel engines; copper smelting; oil, coal, plastic container, or electrical waste burning.

Product applications and uses including: pesticide and herbicide application; textile, wood, and leather dyeing and finishing; industrial bleaching; use of paints containing PCBs; transformer and electrical equipment use; and solvent use and applications.

Reduction of industrial uPOPs within the ProDoc shall require:

- development of detailed sector guidelines on adoption of BATs/BEPs by NEMA in line with voluntary environmental agreement

- scaling up the application of cleaner production program by KNCPC and having a multi-stakeholder engagement in particular, NEMA, Ministry of Industrialization and Industry Associations.

Third is the circular economy for plastics management and waste

Although the flat bags have been banned, there will always be other plastic waste categories in the environment. A program on circular economy management of plastic is necessary so as to reduce uPOPs emission from burning. This should involve implementation of industrial symbiosis concept as well as a return scheme to divert waste from landfills into the plastics economy. In general, the circular economy concept should buttress all categories of waste as it will espouse landfill diversion practices and contribute to the recycling targets set out in the National Solid Waste Management Strategy.

5.3.7 Mainstreaming of Chemicals

To enhance mainstreaming of POPs in policy and institutions shall require a coordinated effort among different government actors, industry, academia and other sectors of society. Development of policy briefs on the need for sound management of chemicals and waste should be followed by policy dialogue and engagement with policy makers. This should be handled as a project consisting of three major activities, starting with a priority-setting workshop. The stakeholder should then discuss the NIP and SIP to give participants information on the record of chemical substances in the country and available information in Kenya on production, import, export, use and waste-generation of chemical substances

and their impacts. Lastly, is discussion on the National Capacity report and other studies that have taken place afterwards. Planned activities for mainstreaming can be discussed so that stakeholders can contribute what they expect to be their roles.

5.3.8 Partnership Projects

Adoption of partnership engenders a participatory approach where individual constituents can take advantage of the core competences of their colleagues to reach their goals in spite of the challenges they confront. Partnerships should be sought between regulatory agencies, the non-state actors and institutions working on public health POPS, pesticide POPs, industrial POPs, uPOPs, and heavy metals. In the current dispensation of regulatory enforcement, partnerships that exist are mainly ad hoc.

Several partnerships need to be forged. These include:

Research institutions: The main national research institutions that address chemical issues include Kenya Medical Research Institute (KEMRI), Kenya Agricultural Research Institute (KARI), and Kenya Industrial Research Development Institute (KIRDI). These can perform research on alternative technologies for the replacement of POPs. They can also undertake research to support NEMA and county Governments on appropriate disposal technologies.

Also, a number of national and international research and higher education research institutions conduct research in various areas of POPs. Research on chemicals can also be done on methods of sampling and analyzing POPs.

Non-governmental Organizations: There are a number of public interest organizations which promote sound management of chemicals in Kenya. These include the non-governmental organizations and other consumer labour organizations and can help educate communities and put companies under check.

Technical service providers: organisations like the Cleaner Production provide technical advisory services to industry on cleaner technologies and techniques. These can partner with industry to assist them in compliance and mobilizing private sector resources.

Regulators: these can formulate legislations that enable the private sector to innovate chemicals management beyond compliance.

5.3.9 Emergency Preparedness and Response Plan at County Level

To address worker and public safety in Counties, the strategy will be strengthening the implementation of systems for the prevention of chemical and industrial accidents and for emergency preparedness and response.

National Disaster Management Unit (NDMU): provides overall leadership, coordination, command and control before, during and after Emergencies and Disasters in the Country while working with stakeholders. NDMU is an Inter-Agency with the National Police Service (NPS) being the lead agency. Unfortunately, DOSHS is not a member of this Committee. Partnership between the County Governments and this agency is crucial.

The County Government of Nairobi, like other Counties, runs a fire station but this is not equipped with proper equipment for fighting chemical fires. The project should work with every County Government to ensure that they can handle chemicals related emergencies.

For first responders who run to the scene of accident, the strategy should be awareness at county level on chemical risks, handling and responding to emergencies such as chemical fires. First responders such

as police should be targeted for the awareness. They often do not have PPEs (respirators, masks, gas supply respirators), therefore this should form an integral part of the training.

5.3.10 Increase Training, Awareness and Information Dissemination

Information disclosure and public engagement should be encouraged. Unfortunately, a wider introduction of a disclosure policy has been restricted because of the embedded secretive attitudes and cultures among management institutions.

Suggested methods to enhance information collection and dissemination among stakeholders include: engagement through information exchange platform such as national website for chemical management and regular meetings by the key stakeholders.

To improve this state of affairs shall need sustained awareness and training of industry from Government and support institutions that provide leadership in legitimizing ecological innovations in sound chemicals management.

A strategy to enhance public reporting is by NEMA putting up a system of reporting in which industries are required to publish regularly the amount of chemicals they use and wastes that they generate and how they manage it as part of the larger schema to enhance chemical risk reduction. Development of a web-based chemical database shall facilitate easy access to information

Another area is to improve packaging and labeling to provide sufficient chemical information to users. NEMA Packaging Regulations need to be linked to KEBs standards on transportation of hazardous substances. The Standard has a gap on transportation and this need to be reviewed and filled. NEMA Chemicals Management need to recognize the KEBS Standards particularly on hazardous goods on transit and packaging.

The awareness activity should also include implementation of the Global Harmonized System (GHS) in Kenya. This shall facilitate trade as well as avoid entry of illegal goods.

5.3.11 Resource Mobilization

It was found out that institutions do not set aside adequate budgets for activities related to chemicals. Most of the training/research they participate in is through sponsored projects such as GEF/UNEP, that the Ministry of Environment provides through the Directorate of MEAs. In its Draft Sector Report to MPTIII, the Ministry has set aside funds for waste management and the green economy. The devil will be on the detailed workplan to operationalize the report. The strategy to get other institutions making budgetary provisions for chemicals management should first commence with this Ministry.

Financing strategies

A number of funding options exist. The most sustainable one is through national and county budgetary provisions. Others include the Trust Funds, Grants and mobilization from the private sector. The bottom line however, is that proposals must be written o attract these funds. Some of the available funding mechanism are outlined below.

Budgetary provisions: The most sustainable approach for funding chemicals is to make budgetary provisions in National, County and Institutional planning. For this to happen, it must be preceded with advocacy, awareness sessions at national and county levels.

Deposit bond: A bond system for chemicals management particularly Chemical Transportation and Chemical Pollution, can be considered during the development of Regulations on Incentives to

operationalise Section 57 of EMCA. This is because in the Polluter Pays Principal, money is channeled to other activities

The Global Environment Facility (GEF): GEF is a source of funds for implementation of activities in chemicals under the various Conventions. However, staff has to be trained on the procedures to explore and obtain these external financial assistance.

Partnerships with International partners such as UNEP, NGOs, ILO, UNDP, World Bank helps. But a gain, the ability for staff to write bankable proposals will be key.

Multilateral Funds: Such as the Multilateral Fund for the Implementation of the Montreal Protocol provides funds to help developing countries comply with their obligations under the Protocol to phase out the use of ozone-depleting substances (ODS) at an agreed schedule.

The Basel Convention Technical Cooperation Trust Fund (BD): This is a Technical Cooperation Trust Fund (BD) that assists developing countries and other countries in need of technical assistance in the implementation of the Basel Convention

Private Funding: Mobilising funds from the private sector organisations such as *the* International Council of Chemical Associations (ICCA) through partnership projects is an option

Trust Fund for the Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade

Special Voluntary Trust Fund for the Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade

Small Grants Program (SGP) as a corporate program of GEF implemented by UNDP

5.3.12 Regulatory Frameworks

(a) Regulatory Compliance

The regulatory framework governing chemicals management and waste has been extensively covered in Chapter 3. Although most Multilateral Environmental Agreements (MEAs) covered in chapter 2, have now been domesticated in Kenya, the environment management is still driven by the framework law, the Environment Management and Coordination (amendment) Act, 2015 and sector specific legislations. EMCA (amendment) 2015 is largely command-and control. Thus, the statement it makes is that "you can produce pollution so long as you can treat it to the acceptable levels". This is reactive with some of the treatment and disposal methods being incineration that essentially transfers pollution from one environmental medium to another. The Stockholm Convention and the Librevillle Declaration are advocating for non-burn technologies for waste particularly, health care waste. Limited existing capacity such as inadequate laboratory analysts, Environmental Inspectors, and transport renders this prescriptive process ineffective and expensive. In practical terms, NEMA and WRA have capacity constraints in terms of analytical laboratories which for WRA number six country-wide and even when they are available, they are not able to analyse POPs.

The country's regulatory framework needs strengthening in order to support sound management of chemicals and waste to accord with the SIP and NIP. For example, the review of EMCA should align it to BATs/BEPs such as non-burn technologies in line with the multilateral Stockholm Convention. The

National Environment Policy of 2014 contains proactive policy statements that have not yet filtered down to the Acts and legislations. Also the Regulation on Economic Instruments to provide incentives and disincentives for sound environmental management are still work in progress. This does not spur emergence of voluntary environmental programs by the regulated community. Voluntary approaches help support the efforts of national authorities by improving private sector compliance with legislative and permit requirements.

The following is proposed as a strategy for the regulatory framework to enhance chemical risk reduction:

Chemicals Management regulations: The Chemicals Management Regulations that would bring coherence to the sector are still in draft form. Their completion should be coupled with strong analytical infrastructure, requirement for chemical pollution targets, incentives and disincentives. They should provide room for institutional reflexivity and propensity for exploration of how alternative and innovative approaches can be made to favourably bear on sound chemicals and waste management.

(b) Voluntary compliance

The revision of EMCA (amendment), 2015, to give a legal remedy for voluntarism as an alternative tool for environmental compliance should be another strategy. Slow commitment to re-configuring systems to correspond to the pragmatics of sound chemicals and waste management is partly attributable to lack of this legal recognition of voluntary environmental programs (VEPs). Prevention of chemical hazards through BATs/BEPs should be recognized as the bedrock for the whole control strategy for toxic pollutants by adoption of approaches such as cleaner production, responsible care, integrated pest management, industrial symbiosis, chemical leasing among others. The role of NEMA should be to provide guidance on the design features of such voluntary programs while playing an oversight role.

This voluntarism can complement the objectives of legally binding provisions in the MEAs, policies and programmes for risk reduction and accident prevention. They must also take into account elements of Kenya's legal frameworks, including those that deal with major accident prevention and preparedness, occupational health and safety, and classification and labelling of chemicals.

(c) **Economic incentives**

The completion of the Draft Guidelines on Economic Instruments should be prioritized as a strategy to incentivize good environmental practices. Among the incentives should be an extended permit terms with lower monitoring for good performing entities. Similarly, NEMA could consider an enforcement leniency period or waiver on permit fees if companies go beyond-compliance environmental requirements through voluntary initiatives.

6 CONCLUSIONS AND RECOMMENDATIONS

The study concluded that there are several institutional needs for chemicals and waste management in Kenya, touching on monitoring, Information sharing and coordination, regulations, voluntary initiatives, mainstreaming and financing.

6.1 Conclusions

The study found out that there is poor coordination of private sector/civil society, weak enforcement of existing legislation, lack of specific policy on chemicals management, absence of specific mechanism to promote partnership between private sector and civil society, and low awareness and information flow coupled with inadequate system for information exchange on chemicals hazard and risk along the supply chain of chemicals management. Consequently, institutions need to be strengthened in terms of their human and infrastructural capacities for their effective engagement in chemical risk reduction. This strengthening is needed by both public and private sector including civil society as follows:

- ***Training and awareness:*** There is the notion that chemicals management is a NEMA or Ministry of Environment issue and knowledge of sound chemicals management is low. Also the number of staff and their skills on chemicals management was reported to be low for various groups of people including: technical institutions supporting industry, staff at ports of entry, regulatory authorities

- ***Documentation and knowledge management:*** Record keeping and data analysis was largely found to be poor in institutions. Therefor it was impossible to extract effectiveness data. For instance this study could not answer questions such as (i) since the advent of statutory environmental audits in 2006 by businesses as required by EMCA, what has been its impact with respect to reduction of waste generation, reduction of pollution and therefore improvement of environmental quality indicators? (ii) with respect to water quality, what is the impact of implementation of the Water Rules on the quality of effluent discharged? (iii) with facilities undertaking health and safety audits annually, what is the demonstrable impact on number of chemical accidents or exposure to hazardous chemicals?

- ***Monitoring & Research*** The regulatory institutions were found to be incapable of detailed monitoring of POPs in environmental matrixes. This was attributed to inadequate human skills and laboratory infrastructure in all the key institutions targeted for the study. In some there is no equipment of high resolution while in others, the staff lacks the methodology for analyzing the POPs and uPOPs.

- ***Coordination:*** There is lack of coordination amongst the institutions involved in chemicals and waste management. Additionally, there are no databases, shared or otherwise as information is often stored in its source documents that are not analysed.

- ***Regulations:*** There is no specific regulation governing the sector; currently, there is heavy dependence on EMCA (amendment), 2015 for chemicals and waste management. This is a framework law that requires regulations to implement its provisions. Moreover, this law has provisions for technologies like open burning that is not in synch with the Stockholm Convention. The Chemical

Regulations as well as those on Economic Instruments are in draft form and therefore not available to govern the chemicals sector and bring coherence amongst the players in the industry.

- ***Voluntary initiatives***: A number of pilot projects have been voluntarily implemented, demonstrating their effectiveness for POP reduction as well as alternatives. These initiatives are still small-scale, episodic as they are normally dependent on donor funds and have the risk of remaining at enterprise level if they are not up-scaled and mainstreamed.

- ***Mainstreaming*:** Chemicals issue and particularly uPOPs have not been effectively mainstreamed in policies, plans, programs and institutions. This was evidenced by lack of its inclusion in the Environment Sector Report that is going to form part of the MTPIII.

6.2 Recommendations

Specific recommendations have been proposed to strengthen the institutions for implementation of the ProDoc. These include:

Training: and awareness

- Public awareness raising is required to demystify the notion that chemicals management at the moment is a NEMA or Ministry of Environment issue.

- Training various institutions on innovative concepts of sound chemicals and waste management that aim to prevent their use through cleaner alternatives, minimising use of chemicals and preventing pollution. Such training should include IPM, resource efficiency and cleaner production, circular economy approaches such as industrial symbiosis and chemical leasing, non-burn technologies notably, autoclaving and microwave
- There is need to intensify training to personnel testing chemicals in laboratories, handling hazardous goods at the ports of entry and along the supply chain including transporters and MSMEs. This will include enhancing inspection skills to customs officers, imparting knowledge and handling skills to first responders such as police and continuous awareness to nearby communities.
- Training on hazardous effect of chemicals and disposal techniques for regulatory authorities and industry
- Training on risk assessment, monitoring and evaluation of chemicals hazards by DOSHS staff

Documentation and knowledge management

It is therefore recommended that to effectively raise awareness and change behavior on chemicals management:

- the method that institutions have in place for collecting and analysing data and performance indicators and targets on chemicals management need to be reviewed.
- The format of environmental and safety audit reports need to be fine-tuned to generate quantitative data that can be analysed and trended

Monitoring and Research

- To avoid proliferation of poorly equipped laboratories, setting up of a POPs reference laboratory is suggested. This laboratory should be able to analyse all the 28 banned chemicals including the

uPOPs. KEPHIS has laboratory facilities that can analyse all including uPOPs but what it lacks is the sampling and analytical method.
Further consideration can be given to whether we should have up to three reference laboratories including for food safety surveillance, public health surveillance and for general analytical purposes in other environmental matrices

- To strengthen human capacity, training of staff should be provided on chemicals sampling protocol in core matrices, sample preparation, analysis and interpretation by monitoring and research institutions. Capacity built at the University of Nairobi can be used.

Coordination

A national coordination mechanism based at the Ministry of Environment and Natural Resources needs to be provided to bring coherence in chemicals management. This should include: establishment of shared databases.

Voluntary initiatives

- The voluntary pilot projects implemented on cleaner production, BATS/BEPs demonstrating their effectiveness for POP reduction as well as alternatives need to be documented, replicated and up-scaled.

Policy and regulations

- Completing the development of **Chemical Management Regulations** to regulate a sector where currently there are no effective controls. A lack of adequate legislation shall work against growth of the sector that includes; inability to export or re-export chemicals for failure to comply with international labeling requirements and chemical safety information.

- Infuse **voluntarism** in the current EMCA (Amendment), 2015, to give it legal recognition and give institutions and businesses latitude to explore innovative approaches for sound chemicals and waste management. Voluntary self-regulatory measures can supplement regulatory compliance as happens in the horticultural sector

- **Innovate compliance and enforcement** by integrating hard and soft approaches where information on new innovative approaches are provided, partnerships between regulators and providers of circular economy approaches enhanced, and incentives such as waiver of effluent discharge license fee provided. The full implementation of EMCA, in particular, the economic instruments and other incentives provided for in Section 57 meant to stimulate environmental innovations needs to be development and implemented.

Mainstreaming

- For long term sustainability, the SIP and NIP need to be positioned as the national "programmatic" framework for sound management of chemicals akin to the Green Economy Strategy and Implementation Plan (GESIP). The programmatic framework should provide for mainstreaming sound chemicals management and waste where relevant government sectors establish and participate in a national chemical safety co-coordinating mechanism, while maintaining their independence to execute individual components and projects within their areas of jurisdictions and competence. Otherwise as it is now, the SIP and NIP are viewed as a Ministry of Environment "thing".

7. REVIEW OF TORS FOR THE PROPOSED KENYA NATIONAL CHEMICAL MANAGEMENT COORDINATION COMMITTEE

7.1 Introduction

The Implementation Plan for SAICM developed in 2011, recommended for the establishment of a National Chemical Management Coordination Committee (NCMCC). The nature of this Committee and its Terms of Reference are presented. This section has examined these Terms of Reference and made comments. Further, an Operational Guidance Note has been prepared for the Committee's outputs.

7.2The Proposed Committee

In the SAICM NIP, this Committee is referred to as SAICM Implementation Committee. That this Committee will be formed and will consist of representatives from Government Principal Secretaries (or their representatives) from the Ministries of Environment and Natural Resources, Planning, National Development and Vision 2030, Finance, Ministry of Agriculture (Pest Control Products Board), Industrialization, Trade, Water and Irrigation.

The Committee will have powers to co-opt additional members if necessary. The Committee will meet at least twice yearly. Extraordinary meetings may be convened as needed. The Plan will be managed by a Project Management Unit (PMU) if a funded project is made or a section within the Directorate of Multilateral Environmental Agreements (DMEAs) at the MENA which will be headed by a full time National Program Coordinator (paid through the program) or officer who will be reporting to the Director MEAS. Among other responsibilities, the National Program Coordinator will promote the Program among other Government institutions, Non-GOK institutions and donor agencies.

7.2.1 Responsibilities

The Directorate of Environment and NEMA will provide logistical and administrative support for program activities such as meetings. The Government and the donor(s) will ensure that sufficient time and resources are allocated to the National Program Coordinator to carry out functions effectively.

For effectiveness, development of this strategy will aim at strengthening efficient utilization of current capacities while addressing the deficiencies identified in the SIP. Furthermore, as part of the NEMA strategic plan, it should support NEMA's overall strategy by streamlining procedures of consultation and coordination among lead institutions involved in the management of chemicals and wastes to reduce duplication. Directorate of Environment (DOE) shall identify specific priority actions that require building capacity to implement the Convention. It will also oversee that the actions, priorities, responsibilities, timelines are observed whilst monitoring progress.

7.3 Comments on the Terms of Reference for NCMCC

Objective:
The objective of the NCMCC is not stated, which I propose to be

"To engender a collaborative approach in the implementation of sound chemicals life cycle management with a view to promoting green growth by various sectoral agencies in line with their legislative mandates and international obligations"

Legal status
To give the Committee legitimacy and avoid it being ad hoc, it should be set up through a gazette notice and later recognized in the EMCA (amendment), 2015.

Membership

1. These TORs were prepared in 2011 before implementation of the Kenyan Constitution in 2013. The new Governance structure has devolved several government functions to the County level. I propose that the membership of NCMCC include the Chairman of the Council of Governors (CoG) as a primary stakeholder.

2. The issue of energy and petroleum has also become a priority issue in Kenya following the discovery of petroleum oil and gas. In the primary membership, the Ministry of Energy and Petroleum should be a member

3. The membership should also include: the Ministry of Health as the institution that deals with public health POPs, Ministry of Interior Coordination that deals with emergency preparedness, Ministry of ICT because of its strategic nature in electronic waste and Ministry of defense as it deals with ammunitions and explosives

Administration
The TORs give administrative support function to both the Directorate of Environment in the Ministry of Environment and Natural Resources as well as to NEMA. I propose that since this is an Inter-Ministerial Coordination Mechanism, administrative support be provided by the Ministry of Environment.
The Committee must first of all be guided by its own annual work programme and calendar to guide in conducting its business and stakeholder consultations.

Meetings
The TORs indicate that the NCMCC shall meet at least twice yearly. In line with good corporate governance, I suggest that the NCMCC meets at least quarterly.

Funding
A detailed reading reveals that the NCMCC's funding can come from Government or development partners. I suggest that core funding comes through the Ministry of Environment and Natural Resources

Functions
The ToRs do not state the functions of the NCMCC. In my view, these should be broad with the scope covering all issues linked to chemical management. The exclusions should only be policies, laws and conventions relating to biological weapons or the Framework Convention on Climate Change. These already have established mechanisms in MENR to deal with specific issues.

Its functions are categorized into four: those that focus directly on co-ordination; the other that drives a more advocacy role, third that NCMCC should be in a position to negotiate agreements and national positions prior to international meetings and lastly, that it should have a capacity building role to government departments that deal with chemicals management. These suggested functions are detailed below:

(a) Coordinating functions

1. ***Facilitate collaboration and cooperation between Ministries*** to support effective implementation of national laws and policies and compliance with commitment to international instruments
2. ***Provide advisory on alignment of action plans*** to implement national laws, policies and international agreements as it relates to the sound management of chemicals
3. ***Receive progress reports and updates*** on implementation of national laws and policies and international instruments, and report on progress on an annual basis. Report on progress on an annual basis.
4 ***Review the implementation*** of national and international laws and policies
5 ***Convene*** the Multi-stakeholder Committee and coordinate the exchange of information between the Committee and the Forum.
6 ***Address emerging issues*** on chemicals management as they arise.

(b) ***Advocacy functions:***

Raise awareness, to Ministries and institutions on the importance of sound management of chemicals with a view to securing the necessary financial and technical resources for implementation of national laws and policies and MEAs

Facilitate, the development of action plans to implement national laws, policies and International instruments/agreements

Promote, coherent governance of chemicals at national, county and institutional levels.

(c) Negotiating function

Undertake preparatory work, agree on Kenya's negotiating position and develop national positions for the meetings of the relevant Conventions and Agreements where a coordinated response is required.

(d) Capacity building function:

- Ensure that departments and institutions commit the necessary financial and technical resources for implementation of sound chemicals life cycle management

8 OPERATIONAL GUIDANCE NOTE FOR THE NATIONAL CHEMICAL MANAGEMENT COORDINATION COMMITTEE (NCMCC)

8.1 Foreward

Experience has shown that there are major implications touching on the environmental and financial matters if Kenya fails to implement an effective chemicals management approach that targets the risks which chemicals pose to the health and environment. Failure to do this will violate citizens' right to a clean and healthy environment. Additionally, Kenya is a Party to Multilateral Environmental Agreements that regulate chemicals management, which if not implemented can lead to failure to meet her commitments as well as have negative trade implications.

The responsibility for managing chemicals forms the mandate of several government departments. In that context, an effective system cannot be achieved without these departments working together to arrive at a common goal of risk reduction. Consequently, co-ordination becomes key from health, environment and trade perspective.

Coordination shall ensure that these three things happen: (i) the right to a clean and healthy environment for citizens is realized (ii) the impact of chemicals in the country is prevented, reduced and at the very least mitigated to acceptable levels (iii) the regulatory regime is comprehensive enough, effective and without gaps

8.2 The Operation of the NCMCC

Output 1: Project coordination mechanism established

The Project Management Unit (PMU) at the Ministry of Environment and Natural Resources shall ensure that the Ministry has officially established the NCMCC. The PMU comprising the National Project Coordinator, Project Technical Specialist and Project Assistant shall draft the work plan and budget for the NCMCC.

Output 2: Working groups formed

The PMU with guidance from the NCMCC shall establish two (2) working groups with expertise in specific areas to work under the NCMCC:

1. The working group on institutional and legal issues responsible for assessing and preparing a gap analysis on the current legislative and institutional framework pertaining to the management of chemicals and waste.
2. The Inventory working group will be responsible for POPs pesticides, industrial POPs and unintentionally produced POPs (uPOPs) usage/generation.

The members of the working groups should be representatives from all relevant institutions and other stakeholders (NGO, industry, farmers, waste disposal and recycling etc.).

Output 3: Workplan drawn and working groups assigned responsibilities

The PMU shall prepare the workplan for review and approval by the NCMCC. Before the approval by the NCMCC, the workplan shall be presented for stakeholder consultations. In the consultation process, special attention must be given to informing producers, importers and distributors, users of POPs containing goods and articles, and on the obligations of the country and their involvement in sound chemicals management including waste and priority setting processes.

Output 4: Launching the NCMCC
A high level national launch to get highest level of government commitment.

Output 5: At least 3 Meetings per year
The NCMCC shall convene at least three times a year.

Output 6: Chairman appointed
The chairmanship should be provided by the Ministry of Environment and Natural Resources. The vice-chairman should come from the private sector

REFERENCES

GoK, 2014. The National Environment Policy
GoK, 2015.The Environmental Management and Coordination (amendment) Act, 2015.
GoK, 2010. The Kenya Constitution 2010.
http://www.pops.itl
http://www.basel.itl
MoENR, 2011. The SAICM Implementation Plan
MoENR, 2014. The Updated Stockholm National Implementation Plan
MoENR, 2011. Capacity assessment for the sound management of chemicals to develop national SAICM implementation plan in Kenya
NEMA, 2010. The State of the Environment Report
Strategic Approach to International Chemicals Management: SAICM Texts and Resolutions of the International Conference on Chemicals Management (ISBN 978-92-807-2751-7).
Libreville Declaration is available in the website of UNEP Regional Office for Africa
http://www.unece.org/trans/danger/publi/ghs/ghs_rev06/06files_e.html. Accessed on 30/9/2017

ANNEX 1: LIST OF PEOPLE INTERVIEWED

Institutional Needs Analysis for Chemicals and Waste Management in Kenya

No.	Name	Contacts
1	Mr. Joram Njuguna	Water Resources Management Authority Email: joramknjuguna@gmail.com
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3	Mr. Mwai Mwitungu	National Environment Management Authority Email: mmwai@nema.go.ke
4	Mr. Oguna	Kenya Industrial Research and Development Institute (KIRDI)
5	Lolem Lokolile Michael Mwania Pauline Ngari	Ministry of Health lokolile@gmail.com Michaelmwania4@gmail.com pngari@gmail.com
6	Eng. Peter Kimori	County Government of Nairobi Email: kimori@nairobi.go.ke ; kimori@yahoo.com
7	Mr. Joel Mutai Ms. Grace Muchemi	Pest Control Products Board (PCPB) muchemi.grace@gmail.com mutaijoel@yahoo.com
8	Ms. Mary Mwangi	Directorate of Occupational Health and Safety Services mwmwangi16@gmail.com
9	Mr. Onesmus Mwaniki	Kenya Plant Health Inspectorate Services (KEPHIS) omwaniki@kephis.org
10		Kenya Agricultural and Livestock Research Organisation (KALRO)
11	Dr. Daisy Salifu	International Center of Insect Physiology and Ecology (ICIPE) dsalifu@icipe.org
12	Mr. James Kioko	Kenya Bureau of Standards (KEBS) kiokom@kebs.org
13	Mr. James Ndege and Thomas Owiti	Kenya Revenue Authority (KRA) ndegejames1@gmail.com Tel. 2816199
14	William Munyoki	Government Chemist wmunyoki@gmail.com
15	Mr. Steve Nyamori	Kenya National Cleaner Production Centre gnyamori@cpkenya.org
16	Mr. Samuel Matonda	Kenya Association of Manufacturers Samuel.matonda@kam.co.ke
17	Mr. Griffins Ochieng'	Centre for Environmental Justice and Advocacy ogriffins@yahoo.com
18	Dickson Andala	Kenya Chemical Society andalad@gmail.com

19	Dr. Fredirck Kengara	Technical University of Kenya fkengara@yahoo.com
20	Lolem Lokolile Michael Mwania Pauline Ngari	Ministry of Health lokolile@gmail.com Michaelmwania4@gmail.com pngari@gmail.com
21	Teresa Muthoni	Green Belt Movement tmaina@greenbeltmovement.org
	Nicholas Mwikwabe	Kenya Medical Research Institute (KEMRI) mmwikwabe@kemri.org
22	Dr. Fredirck Kengara	Kenya Chemical Society fkengara@yahoo.com

ANNEX 2: INTERVIEW QUESTIONNAIRE

Institutional Needs Analysis for Chemicals and Waste Management in Kenya

This questionnaire aims at understanding the institutional and needs to effective sound chemical and waste management and the implementation of SAICM in Kenya. Your responses will form an invaluable input in the elaboration of specific strategies to strengthen institutional framework for SAICM adoption planning.

1. Characterization of the institution

Name of Organisation:……
Respondent: ……
Mobile:……
Email:……
2. What is the mandate of your institution?
……
3. Projects/Activities
(a) What specific projects/mandates have you been/are implementing on sound chemicals and waste management? Please describe on a separate sheet or attach a file.

……...
(b) What exactly is (a) above meant to achieve/has achieved?

……
4. Potential for replication and up-scaling
(a)In your opinion what is it that can be replicated in this project/mandate?

……
5. Implementation Capacity and Needs
(a) Please indicate below staff involved in Chemicals Management (e.g. researchers, laboratory scientists, laboratory technologists, technicians) and their specialisations

……
(b) Please indicate the type and number of additional human resource your institution may need
……
(c) Please indicate below equipment (laboratory and field) for Chemicals Management in your institution.
……
(b) Please indicate the type and number of additional equipment your institution may need
……
6. Training
(a) Please indicate if any of your staff has been trained in Chemicals Management such as training on persistent organic pollutants (POPs), training on unintentially produced POPs?
……
(b) Please indicate any specific training needed for your staff to effectively perform sound chemicals management responsibilities
……

7. Information and networking

(a) Does your institution have any institutional partnerships in sound chemicals and waste management?

……

(b) If so, please explain them

……

(c) Does your institution participate in any knowledge sharing networks/platforms?

……

(e) If yes, please explain

……

(f)In what ways can Government facilitate sound chemical and waste management in your institution?

……

(g)What specific information would you require about chemicals and POPs?

……

8. Financing sound chemicals and waste management

(a) Is sound chemicals and waste management provided for in your institution's budget?

……

(b) If yes, where is the source of money?

……

(c) What percentage of this funding is from Government, development partners and private sector?

……

9. Mainstreaming

(a) Is sound chemicals management contained in your institution's policy?

……

(c) Please explain (a) above

……

10. SAICM Overarching Policy Strategy

(a) Please explain what you understand about the SAICM Overarching Policy Strategy

……

(b) Please explain if there are any activities being implemented in your institution under this Strategy

……

11. The proposed Kenya National Chemical Management Coordination Committee established at the Ministry of Environment

(b) What is your view on the composition of its membership and their roles?

……

(b) Any suggestions on how it can better achieve its goal?

ANNEX 3: TERMS OF REFERENCE

NATIONAL INDIVIDUAL CONSULTANT TO UNDERTAKE AN INSTITUTIONAL NEEDS ANALYSIS FOR CHEMICALS AND WASTE MANAGEMENT IN KENYA

Background

Kenya has received a grant from the Global Environment Facility (GEF) towards mainstreaming sound chemicals management and reduction of unintentionally produced persistent organic pollutants from open burning of waste and thermal disposal of health care waste. This five year, 2016-2021, project is implemented by the Ministry of Environment and Natural Resources (MoENR) in partnership with national and county government agencies, civil society and private sector. The project intends to protect human health and the environment by managing the risks posed by production, use, import and export of chemicals and reducing /preventing the release of U-POPs and toxic compounds originating from the unsafe management of waste in two key sectors: Health Care Waste and Municipal Waste. These sectors are among the highest priorities identified in the reviewed and updated National Implementation Plan.

The linkages between sound chemicals management, waste management in general and health care waste in particular, and how open burning of waste leads to emissions of unintentionally produced persistent organic pollutants (UPOPs) is outlined in the project document (Prodoc). The consultant is encouraged to read the Prodoc to acquaint themselves with the targeted project interventions. The Prodoc is available at http://www.environment.go.ke/wp-content/uploads/2017/02/Kenya-ProDoc-Fin-cleared-revised-Jan2016.pdf and additional information is available in the convention site www.pops.int

This specific consultancy relates to to the prodoc as follows:

There are specialized enforcement/ regulatory and research institutions and agencies in the country that address chemicals management at different levels of the chemicals lifecycle. However, they lack coordination arrangements and synergy in execution of their mandates and activities.

There are ad-hoc inter-ministerial coordination mechanisms for chemicals and wastes that are specific and time bound. However, the country lacks a well-organized inter-ministerial coordination mechanism for chemicals management to enhance collaboration among ministries and agencies in implementing their respective mandates and competencies and facilitate information sharing. Consequently, resource mobilization and optimization to foster a comprehensive approach to the management of chemicals is inefficient.

There are national institutions with specialized human risk assessment capacities and technical infrastructure. Basic technical training in various aspects of chemicals risk and hazard management is available locally at universities and specialised training institutions. However, there is a major deficiency in specialised training on chemicals of global concern and related technical infrastructure which require support from the government, development partners, private sector and the civil society.

There are institutional and administrative structures in the ministries and agencies to address chemicals risk management. However, there are deficiencies in terms of human and financial resources for chemicals management at all levels of the chemicals life cycle.

Component 1. Streamlining sound management of chemicals and waste into national and county development activities through capacity building of MENR, MOH, NEMA, county governments of Nairobi, Kisumu, Nakuru and Mombasa and the NGOs

Expected Outputs:
Output 1.1.2: Key institutions have knowledge and skills to formulate and implement necessary chemicals and waste environmental policies, consistent with sound chemicals management principles and obligations to international agreements.
Output 1.1.3 Key institutions have incorporated sound management of chemicals and wastes, including POPs, in their activities.
Output 1.1.4 National coordinating meetings on POPs held regularly (4 times per year). without GEF financial support.

Objectives of the assignment
The overall objective of this consultancy is to assess the institutional barriers to effective sound chemical and waste management and the implementation of SAICM in Kenya.

The specific objectives are to:
Identify the capacity of key institutions addressing drivers and barriers for chemical lifecycle as defined by SAICM and waste management issues as addressed by Annex c of the Stockholm Convention related drivers and barriers (institutional) to sound chemical management
Define and evaluate specific strategies to strengthen institutional framework for SAICM adoption planning in reference to the institutional barriers; and
Make recommendations on institutional capacity building for effective chemical and waste management.

Scope of work

The consultant will:
Carry out institutional stakeholders consultations with relevant public and private institutionss that are active in chemicals and waste issues including those carrying out specific mandates, mobilization of resources, defining institutional needs and responsibilitiess;

Report on how specific institutions(national,county, private, intergovernmental) are addressing mainstreaming sound chemical management.
Analyse the institutional effectiveness in terms of technical and technological delivery in terms of risk reduction, risk data collection, monitoring research and capacity building activities
Assessing the capacity building needs for institutions analysed in (i) above.
Carry out consultation with respective sectoral institutions (2 for pesticides, 2 for industrial, 2 for service, 2 for research and 2 academic, Ministry of finance and ministry of Planning and devolution) on how they are practically implementing the SAICM overarching policy strategy detailing how the and how innovative approaches to address modern approaches and technologies will be adopted;
Address how these institutions can approach the issue of including chemicals into the national budgeting process; and
Review terms of reference for the proposed Kenya National Chemical Management Coordination Committee established at the Ministry of Environment and develop operational guidance note for its outputs

Deliverables

The following are key deliverables for the consultancy:
Statement of work detailing how the consultants plans of this consultancy by week 1
A draft desk study report on institutions addressing chemicals and waste management;
A review of specific institutional mandates, capacity, human resources and addressing internationally listed chemicals under chemicals and waste cluster of MEAs and how synergy between institutions can be enhanced;
A Draft report containing outcome of consultations with the selected institutions as in (iv) above and any others with mandate to manage chemical issues as guided by SAICM on by week 2
Presentation of the above findings to stakeholder validation meeting 25 days after signing the contract including the views and recommendations of the stakeholders
A Final Chemicals and waste Management institutional needs assessment in Kenya (1 hard and soft copies) to be submitted to UNDP and MENR

Reporting Modalities

The Consultant will work under the overall guidance of the Team Leader, Energy, Environment and Climate Change, UNDP Country Office, Kenya with day to day supervision by the UNDP EECCU Programme Analyst in close collaboration with the project focal point at the Ministry of Environment and Natural Resources.

Duration of Consultancy

The assignment is expected to take 22 working days. The assignment is expected to be carried out between May to June 2017.

UNDP will cater for the travel costs out of Nairobi where such trips are deemed necessary after consultations, as well as convene and support one stakeholder meeting for feedback on the consultancy findings.

Program of Work

The consultant shall split time to cover the work schedules as follows:

Activity	**Timeframe (Days)**
Preparation / Desk analysis	2
Field Visit	10
Data entry/analysis	5
Draft report	2
Stakeholders Validation meeting	1
Revised and finalized report	2
Total	22

Qualification and Education Experience

Advanced University degree in, Finance /economics, law Environment/ Public Health, environmental protection and management, chemical and industrial engineering, and other relevant fields.

Experience

At least 5 years' experience in law, social sciences sound chemicals management, healthcare waste management, municipal and hazardous waste management;
Knowledge of and experience of mandates of chemical management institution with emphasis on capacity building at national level and implementation of the multilateral environmental agreements of SAICM and the Stockholm, Rotterdam, Basel, Minamata and other related conventions and agreements is an asset;
Experience in international project implementation is an asset;

Competencies

High level written and oral communications skill in English.
Must be a results-oriented team player with excellent interpersonal skills, including enthusiasm, tact, diplomacy and high integrity;
Concise and analytical thinking;
Professional in working with government counterparts, team player; and,
Must be able to communicate effectively in English language (verbally and in writing) in a cross-cultural environment.
Ability to work with minimal supervision

Evaluation Criteria

Only candidates obtaining a minimum of 70 points will be

Criteria	***Weight***	***Max. Point***
Technical	100%	100
Academic qualifications, experience and relavance.	*20*	*20*
Experience in Chemicals and waste management policy and capacity building, technology research and academic issues	*25%*	*25*
Knowledge of and experience with implementation of SAICM and Chemicals and Waste cluster MEAs	*25%*	*25*
Analytical and report writing skills	*20%*	*20*
Experience in result-based management	*10%*	*10*

Remuneration

The successful consultant will be paid on UNDP terms and condition for the relevant contract modality; and

Payment will be done against a disbursement schedule as outlined in the contract and based on receipt of clearly defined deliverables with a specific timeline.

Transport for field work will be provided by the project.

DSA will be provided to the consultant while in the field

EVALUATION

Method: cumulative analysis method will be used to evaluate proposals.

The evaluation Criteria as shown below shall be used to evaluate all the proposals received. The award of the Individual Contractors Contract shall be made to the individual contractors whose offer has been evaluated and determined as:

Responsive/compliant/acceptable, and

Having received the highest score out of a pre-determined set of weighted technical and financial criteria specific to the solicitation.

Technical Criteria weight - 70 points Financial Criteria weight - 30 points

The following formula will be used to evaluate financial proposal: p = y (μ/z),
p = points for the financial proposal being evaluated;
y = maximum number of points for the financial proposal;
μ = price of the lowest priced proposal;
z = price of the proposal being evaluated;

Financial Proposal (30%): **Your financial proposal shall include a breakdown of the lump sum indicating fees and any other expenses that consultant might think is required for the assignment.**

Incomplete application and applications received after the deadline will not be considered. Only selected candidates will be notified.

Application process

Interested and qualified candidates should submit their applications which should include the following:

UNDP Personal History Form (P11) - Template provided
Detailed Curriculum Vitae
Technical and financial Proposal and for implementing the assignment - Template provided
Qualified candidates are requested to email their applications to **consultants.ken@undp.org** to reach us not later than **5.00 P.M on Tuesday, 02 May 2017.**

Please quote **"Analysis of Chemicals and Waste institutional needs"** on the subject line.

ANNEXES

ANNEX 1 – PROCUREMENT NOTICE ANNEX 2 - TERMS OF REFERENCES (TOR)
ANNEX 3 - IC PROPOSAL FORM
ANNEX 4 - P11 TEMPLATE
ANNEX 5 - INDIVIDUAL CONSULTANT GENERAL TERMS AND CONDITIONS