



FEDERAL MINISTRY OF ENVIRONMENT

HEADQUARTERS, MABUSHI, ABUJA.

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Date. 18th August 2016

Executive Secretary
Secretariat of the Basel, Rotterdam and Stockholm Conventions
11-13, Chemin des Anémones - 1219 Châtelaine,
Switzerland.

**Subject: Transmission of Reviewed and Updated National Implementation Plan
prepared by Nigeria**

I am pleased to transmit the national implementation plan prepared by our Government to the conference of the parties in accordance with the provision of Article 7 of the Stockholm Convention through your office. This contains following: -

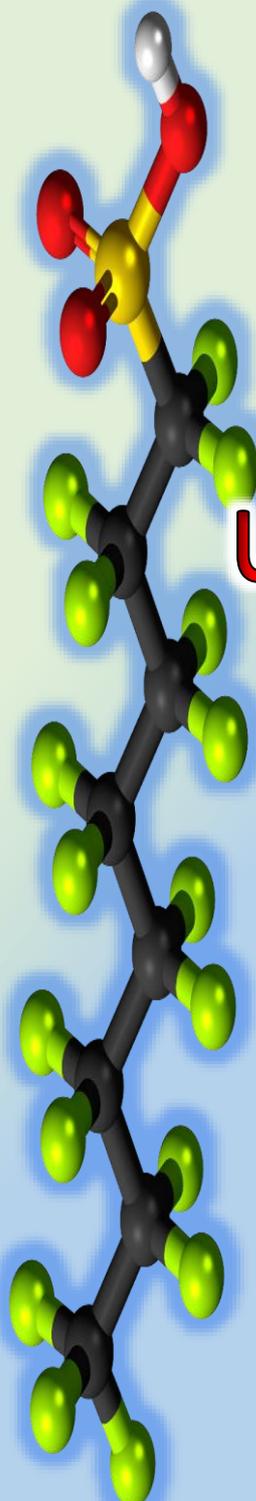
- X Electronic version of the NIP
 Hard copy of the NIP

2. This NIP/updated NIP addresses following: -

- X Initial 12 POPs
X Amendment by COP 4 that included 9 more POPs
X Amendment by COP 5 that included Endosulfan
X Amendment by COP 6 that included HBCD
 Amendment by COP 7 that included 3 more POPs

3. I would appreciate it very much if you could kindly acknowledge of this transmission at your earliest.

Mr. A. K. Bayero
Director (Pollution Control & Environmental Health
Federal Ministry of Environment
(Official contact Point)



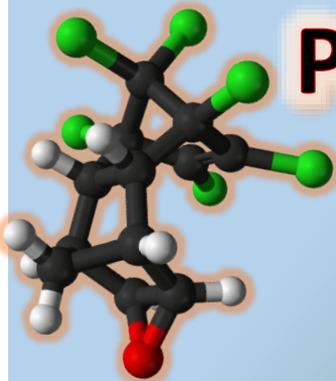
Federal Republic of Nigeria

Updated National Implementation Plan

for

the Stockholm Convention

on



Persistent Organic Pollutants

(c) 2016



Acknowledgement



Execution of the *Enabling Activities for the Review and Update of the National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants (POPs) Project* in Nigeria would not have been successful without stakeholders' convergent efforts, dedication, inclusive participation and supports.

"The roots of all goodness lie in the soil of appreciation for goodness." -Dalai Lama. On behalf of the Federal Government of Nigeria, Federal Ministry of Environment wishes to express its profound appreciation to all individuals, Corporate Organisations, State and Federal Ministries/Departments/Agencies, the Legislature, Industry, Civil Society Organisations, the Academia, Research Institutes, Development Partners, the Media and Resource Persons, who have contributed severally and collectively towards making this project a success.

To this end, the Ministry's special thanks go to members of the National Project Steering Committee for their functional guidance and the Project Coordinating Unit members for their hard work and dedication, culminating in another successful milestone, in our collective drive for protecting our citizenry against the deleterious impacts of POPs.

The Ministry is also grateful to the Global Environment Facility (GEF) and Implementing Agency (IA), United Nations Industrial Development Organisation (UNIDO), for providing the financial and technical supports for this project. It is noteworthy that Dr. IINO Fukuya of UNIDO-Vienna, Mr. Oluyomi Banjo of UNIDO Regional Office-Nigeria and Suman Sharma of BRS Secretariat have been very supportive.

Lastly, but of no less appreciation, is the professional prowess deployed in developing the POPs Assessment Reports and Updated NIP by the triad of National Experts on thematic POPs-issues, comprising Dr. Obi Anyadiiegwu, Mr Bosun Oladimeji and Barrister Caleb Muftwang, as well as the excellent technical advice by the Basel Convention Regional Coordination Centre for Africa (BCRCC-Africa), Ibadan, under the Directorship of Prof. Oladele Osibanjo. Thanks to Iva Bernhardt for his resourceful inputs.

It is the Ministry's aspiration to maintain and sustain the momentum of inclusive stakeholders' participation, commitment, collective decision-making and ownership, in the implementation of post-updated NIP activities.


Dr. Bukar Hassan
Permanent Secretary
Federal Ministry of Environment
July 2016

Foreword



Chemicals production/use is a fundamental component of a developing economy; albeit adoption of unsound management principles and practices portend threats to the public health and the environment. As an emerging industrialized nation, with prominent Commerce, Chemicals & Allied Industries, Services-oriented Businesses, Agriculture, Mining, Petroleum and other key sectors of the economy, in which chemicals are critical inputs/outputs, Nigeria has therefore taken robust steps to entrench strategies to concertedly address multi-faceted issues pertaining hazardous chemicals, in line with global best practices.

The need to protect man and the environment against destructive effects of hazardous chemicals, particularly the genre known as Persistent Organic Pollutants (POPs), either as industrial chemicals, chemical pesticides, chemicals-in-products, unintentionally produced chemicals, stockpiles or waste has consistently elicited global discourses on the international development agenda.

It was against this background that Stockholm Convention was negotiated and adopted in May 2001 by the comity of nations, among whom was Nigeria, with the aim of achieving POPs elimination, transition to non-POPs alternatives, targeting additional POPs for action, cleaning-up old stockpiles & waste containing POPs and working together for a POPs-free future.

Therefore, as a pioneer Party to the Convention, Nigeria demonstrated the potent intent to protect her environment and citizenry against POPs by developing her first National Implementation Plan (NIP) in 2009, which was transmitted to the Conference of the Parties (COP), in line with Article 7 thereof. The first NIP laid the groundwork for instituting and implementing, in a systematic and participatory manner, priority policies, regulatory reforms, resources allocation and other steps targetted at facilitating attainment of POPs-free environment in the Country.

Sequel to amendments to Annexes A, B and C of the Convention, via addition of new POPs by COPs in 2009, 2011 and 2013, it become obligatory for Parties to review and update their NIPs and transmit same to COPs, in line with Article 7((1)C) and Decision SC-2/7.

Nigeria, in compliance thereto, and exploring the opportunity of Article 13 of the Convention, accessed the Global Environment Facility (GEF) support for the *Enabling Activities for the NIP Review and Update Project*, with the United Nations Industrial Development Organization (UNIDO), as the Implementing Agency.

The NIP Update Project has been implemented with due diligence, exhaustive multi-stakeholders' consultations & participation and integrative decision making process. It has provided Nigeria the ample opportunity to assess the nature/extent of POPs availability and national infrastructural capacity for POPs management, vis-a-viz sectoral needs for meeting emerging Convention obligations. Consequently, stakeholders conjointly evaluated, validated and adopted the POPs

assessment reports, as well as, reached a consensus on national priorities, action plans and management strategies for tackling identified POP issues, as entrenched in the updated NIP.

To us as a nation, environmental treaties have interlocking significances, particularly in the realm of sustainable development, conservation of environmental resources (mineral, land, water & energy), reinforcing the natural capital and entrenching food security & safety. In light of this, the updated NIP will be synchronized with cognate instruments under the Strategic Approach to International Chemicals Management (SAICM), the Basel, Rotterdam and Minamata Conventions, as well as the Rio Conventions (Climate Change, Biodiversity and Desertification), with a view to entrenching an integrated environmental governance in Nigeria.

The Federal Government, is ready to give support, both politically and logistically to priority activities identified in the updated NIP and mainstream them into national developmental strategies and plans. The Government welcomes partnership with the private sector, bilateral & multilateral funding agencies and other development partners towards total realization of goals of the updated NIP.



Amina J. Mohammed, OFR

Honourable Minister of Environment, Federal Republic of Nigeria

July 2016

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List of Acronyms

ADI	Acceptable Daily Intake
ADP	Agricultural Development Programme
AfDB	African Development Bank
AG	Associated Gases
ASP	African Stockpile Programme
ATSDR	Agency for Toxic Substances and Diseases Registry
AU	African Union
BAT	Best Available Technology
BCRCCA	Basel Convention Regional Coordinating Centre for African Region
BEP	Best Environmental Practices
BPEO	Best Practicable Environmental Options
BRS	Basel, Rotterdam and Stockholm Conventions
BMW	Bavarian Motor Works
CAPL	Chemical and Allied Product Limited
CAS	Chemical Abstracts Service
CBO	Community Based Organisation
CIDA	Canadian International Development Agency
CIEN	Chemical Information Exchange network
CLN	CropLife Nigeria
ConOil	Consolidated Oil PLC
COPs	Conference of the Parties
CPC	Consumer Protection Council
DANIDA	Danish International Development Agency
DDT	Dichlorodiphenyltrichloroethane or 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
DISCO	Electricity Distribution Companies
DNA	Designated National Authority
DRTS	Directorate of Road Traffic Service
ECOWAS	Economic Community of West African States
ECN	Energy Commission of Nigeria
EIA	Environmental Impact Assessment
ELVs	End of Life Vehicles
EPR	Extended Producers Responsibility
EU	European Union
EU-MRLs	European Union-Maximum Residue Limits
E-waste	Electronic Waste
WEEE	Waste Electrical and Electronics Equipment
FAO	Food and Agricultural Organisation
FCT	Federal Capital Territory
FEPA	Federal Environmental Protection Agency

FFS	Federal Fire Service
FIRS	Federal Inland Revenue Service
FMARD	Federal Ministry of Agriculture and Natural Resources
FMoC	Federal Ministry of Communications
FME	Federal Ministry of Education
FMEnv	Federal Ministry of Environment
FMF	Federal Ministry of Finance
FMoH	Federal Ministry of Health
FMI	Federal Ministry of Information
FMIT&I	Federal Ministry of Industry, Trade & Investment
FMJ	Federal Ministry of Justice
FML&E	Federal Ministry of Labour and Employment
FMM&SD	Federal Ministry of Mines and Steel Development
FMP	Federal Ministry of Petroleum
FMST	Federal Ministry of Science and Technology
FMWA	Federal Ministry of Women Affairs
FMWP&H	Federal Ministry of Works, Power and Housing
FOS	Federal Office of Statistics
FRSC	Federal Road Safety Corp
GDP	Gross Domestic Product
GCFR	Grand Commander of the Federal Republic of Nigeria
GDs	Guidance Documents
GENCO	Electricity Generating Companies
GEF	Global Environment Facility
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GMP	Global Monitoring Plan
HBCD	Hexabromocyclododecane
HCBD	Hexachlorobutadiene
HCH	Hexachlorocyclohexane
HCW	HealthCare Waste
HS	Harmonized Commodity Description and Coding System or Harmonised System
IA	Implementing Agency
ICCM	International Conference on Chemicals Management
IDA	International Development Association
ICIPE	International Centre for Insect Physiology and Ecology (ICIPE)
IMSWM	Integrated Municipal Solid Waste Management
IUPAC	International Union of Pure and Applied Chemistry
JICA	Japan International Cooperation Agency
LGA	Local Government Area
LPG	Liquefied Petroleum Gas
LUTH	Lagos University Teaching Hospital

MAN	Manufacturers Association of Nigeria
MAW	Municipal and Agricultural Waste
MDAs	Ministries, Departments and Agencies
MEAs	Multilateral Environmental Agreements
MFA	Ministry of Foreign Affairs
MOT	Ministry of Transport
NABDA	National Biotechnology Development Agency
NAC	National Automotive Council
NAFDAC	National Agency for Food and Drugs Administration and Control
NAG	Non-Associated Gas
NASPIN	Nigeria Africa Stockpiles Programme Implementation Network
NAPRI	National Pharmaceutical Research Institute
NARICT	National Research Institute for Chemicals Technology
NATA	Nigeria Automobile Technicians Association
NBMA	National Biosafety Management Agency
NBS	National Bureau of Statistics
NCS	Nigeria Customs Service
NEP	National Environmental Policy
NEPAD	New Partnership for Africa's Development
NERC	Nigerian Electricity Regulatory Commission
NESREA	National Environmental Standard Regulatory and Enforcement Agency
NFP	National Focal Point
NGOs	Non-Governmental Organisations
NIP	National Implementation Plan
NOA	National Orientation Agency
NOLCHEM	National Oil and Chemicals Marketing Company
NPC	National Population Commission
NPC	National Planning Commission
NRI	National Research Institutions
NUC	National Universities Commission
OCPs	Organo-Chlorine Pesticides
ODS	Ozone Depleting Substances
OEMs	Original Equipment Manufacturers
Online-ERS	Online Electronic Reporting System
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
PAH	Poly-Aromatic Hydrocarbon
PBDEs	Polybrominated diphenyl ethers
PCB	Pentachlorobenzene
PCBs	Polychlorinated Biphenyls (PCBs)
PCDDs	Polychlorinated dibenzo-p-dioxins

PCDFs	Polychlorinated dibenzofurans
PCN	Polychlorinated naphthalene
PCP	Pentachlorophenol
PCU	Project Coordinating Unit
PFOS	Perfluorooctane sulfonic acid
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
POPRC	Persistent Organic Pollutants Review Committee
PPE	Personal Protective Equipment
PRTRs	Pollutant Release and Transfer Registers
PSC	Project Steering Committee
PSP	Private Sector Participation
SAICM	Strategic Approach to International Chemicals management
SC	Stockholm Convention
SDS	Safety Data Sheets
TCN	Transmission Company of Nigeria
TEQ	Toxicity Equivalence
TEQ/a	Toxicity Equivalence per annum
TETFund	Tertiary Education Trust Fund
TOR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Emergency Fund
UNIDO	United Nations Industrial Development Organisation
UNITAR	United Nations Institute for Training and Research
U-LAB	Used Lead Acid Battery
U-POPs	Unintentional-Produced Persistent Organic Pollutants
USAID	United States Agency for International Development
WHO	World Health Organisation
WTO	World Trade Organization

Executive Summary

A. Introduction

The global drive for industrialisation, economic development, improved food supply and better quality of human lives have actuated large-scale chemicals production and applications in all sectors of the economy, ranging from industry to health care delivery system.

Some of these chemicals, particularly Persistent Organic Pollutants (POPs), are characteristically toxic, persistent, possess the ability to bioaccumulate and biomagnify up food chains. Thus, without good management practices, these hazardous chemicals and their wastes can pose significant risks to human health and the environment especially the poorest members of the global community (UNDP, 2015).

Stockholm Convention on Persistent Organic Pollutants

In an attempt to address this global challenge, the Stockholm Convention on Persistent Organic Pollutants was adopted at a Conference of Plenipotentiaries on 22 May 2001 in Stockholm, Sweden and entered into force on 17 May 2004; it was ratified by Nigeria on 24 May 2004.

The Convention initially listed the 'dirty dozen' chemicals for global action, listed 'nasty nine', endosulfan and hexabromocyclododecane, in 2009, 2011 and 2013, sequentially. In May 2015, hexachlorobutadiene (HCBd), polychlorinated naphthalene (PCN) and pentachlorophenol (PCP) were also listed under various annexes; these will take effect on 15th December 2016.

POPs-chemicals are listed in 3 Annexes, viz: Annex A: comprising POPs listed for elimination; Annex B: listed for restriction/limitation and Annex C: for "unintentional production". Article 3 of the Convention makes it obligatory for parties to take actions to prohibit or eliminate the production and use or import or export of chemicals listed in Annex A (chemicals for elimination). Parties are also to restrict production and use of chemicals in Annex B (restricted use chemicals), as well as ensure that a chemical listed under Annex A or B is only imported for the purpose of environmentally sound disposal or for permitted use(s).

Infiltration of POP-chemicals into developing countries like Nigeria poses major public health and environmental concerns, due to gaps in infrastructural/regulatory capacities for ensuring their safe use and disposal (UNEP GMP Report, 2009).

In the event of amendments to any or all Annexes to the Convention and upon entering into force of such amendments, or as a result of any national triggering factor(s), Parties are obligated pursuant to Article 7 of the Convention, and taking into account the annex to decision SC-2/7, review and, if necessary, update their national implementation plans in order to address the following issues as they relate to each of the substances added to the Convention, viz:

- i. Measures to reduce or eliminate releases from intentional production and use (Article 3);
- ii. Measures to reduce or eliminate releases from unintentional production (Article 5); and
- iii. Measures to reduce or eliminate releases from stockpiles and wastes (Article 6).

National efforts at addressing POPs-issues in Nigeria

Nigeria has made cogent and robust policy, regulatory, legislative and administrative measures, targetted at addressing POPs-issues. These include development of the first National Implementation Plan, with clearly defined and prioritized activities (2002-2007), National Policy on Chemicals Management; National Action Plan on Health Care Waste Management; establishment of the National Institutional Framework and Strengthening Capacity for the Sound Management of Chemicals, including implementation of the Strategic Approach to International Chemicals Management (SAICM), Nigeria- Africa Stockpiles Program Implementation, among others.

Development of National Implementation Plan (NIP) for POPs management

The Convention specifically stipulates a number of tasks that need be undertaken within the context of NIP, namely: inventories of sources and emissions of POPs listed in annexes A and B to the Convention; developing action plans for the reduction of releases of unintentional by-products; strengthening capacity to report every five years on progress in phasing out polychlorinated biphenyls (PCBs); assessments of POPs-stockpiles and identifying management options; building capacity to identify sites contaminated by POPs as well as supporting communication, information exchange and awareness raising through multi-stakeholder participatory processes.

Subsequently, Nigeria, in compliance with Article 7(1(c)) of the Stockholm Convention, and exploring the opportunity of Article 13 thereof, accessed the Global Environment Facility (GEF) support for the Enabling Activities for the NIP Review and Update Project, with the United Nations Industrial Development Organization (UNIDO), as the Implementing Agency. Specifically, the immediate objectives of the project are, among others, to:

- prepare, endorse and submit the updated and reviewed NIP, including inventory, prioritization and action plans to the Stockholm Convention Secretariat;
- enable the country to fulfil her obligations under Article 7 of the SC and reporting requirements of the Convention;
- build the capacity of participating stakeholders to manage the additional POPs with newly developed technical skills, expertise; and
- gain stakeholders' endorsement of NIP including strategies and actions required by Nigeria in meeting its obligations under the convention.

Steps taken in the NIP Update Project Implementation

The project implementation has been coordinated by Federal Ministry of Environment (FMENV), which is the Designated National Authority (DNA) for chemicals and waste treaties, with collaboration and cooperation of relevant MDAs as well as other key players in all sectors of the economy, including the public and private sectors and development partners, in line with Article 7(2) of the Convention. The Enabling Activities NIP project activities included the following step-wise components: -

- Project Inception/ Establishing Coordination Mechanism and Stakeholders' Awareness-Raising (10th June 2014);

- Conducting Inventories of new POPs, Validation of Inventory Data by stakeholders and NIP Review and Update (Inventory training: 11 to 12 June 2014; field assessment (October 2014 to June 2015));
- Assessment of National Capacity and setting priority for management of new POPs (October 2014 to June 2015);
- Action plans and strategies for the Implementation of the Reviewed and Updated NIP (endorsement 17th September 2015); and
- Government endorsement and submission of updated NIP to the Stockholm Convention Secretariat (16-18 May 2016).

The reviewed and updated NIP serves as the ‘renegotiated & reinforced’ national policy framework tailored at addressing POPs-issues.

Structure of the updated National Implementation Plan

The endorsed updated NIP has been arranged into three chapters, with standard accessories, as itemised below:

- **Forward, Acknowledgment and Executive Summary;**
- **Chapter 1** provides the Introduction, Purpose and Structure of the NIP, Summary of the SC aims and obligations. It also describes the mechanism used to review/update the NIP and the stakeholder consultation process. A POPs summary and background, uses of chemicals and the risk they cause. Progress to date in implementing the Convention;
- **Chapter 2** contains the country profile including background information, general socio-demographical, political, economic, ecological data and information on the environmental management system in the country;
- **Chapter 3** includes Implementation Strategy for the NIP and Action Plans to achieve Convention obligations and additional objectives by the country (UNEP guidance July 2012);
- **Annexes to the updated NIP**, as enumerated here within.
- **Detailed thematic POPs Assessment Reports**, submitted in adjunct to the NIP, viz:
 - Legal, Socioeconomic and Gender Dimension Assessment Report;
 - POPS-Pesticides and UPOPS Inventory Report; and
 - Report of the Inventory of Polychlorinated Biphenyls, Polybrominated Diphenyl Ethers and Perflourooctane Sulfonic Acid and Its Salts.
- **Reports of series of stakeholders’ workshops**, submitted in adjunct to the NIP, viz:
 - Project Inception/Steering Committee Inauguration Workshop;
 - POPs Inventory Training Workshop;
 - POPs Inventory Data Validation Workshop; and
 - Updated NIP Endorsement Workshop.

B. Country Baseline

As an emerging industrialised nation, Nigeria records imports and consumption of hazardous chemicals, some of which are POPs for multifarious applications in development and economic sectors, namely: industry, agriculture, mining, public utilities, health care delivery system,

infrastructural development, among others, which substantially cumulatively contribute to the national Gross Domestic Product (GDP).

Institutional, Policy, and Regulatory Framework

Nigeria, as a pioneer party to BRS and other relevant conventions is robustly committed to total compliance with their obligations and developed various institutional, policy & regulatory frameworks, strategies and action plans for effective implementation of the treaties across the board.

Federal Ministry of Environment is the Designated National Authority (DNA) for the coordination and fulfilment of the country's obligations in the framework of Basel, Rotterdam and Stockholm (BRS) Conventions and other international agreements regarding the Persistent Organic Pollutants (POPs). However, POPs related activities are driven and coordinated through multi-stakeholder and multi-sectoral approach, incorporating MDAs, CSOs, the Academia and other relevant sectors, affected by or with capacities, competences, cognate mandates and capabilities in the realms of POPs management.

Bearing in mind that the global best practice enshrining long-term and stable solutions to POPs management is by building multi-stakeholder cooperation, institutional coordination and inclusive decision making process. This requires pooling complementary policies, strategies and management approaches, which comprise sectoral instruments related to POPs as well as strategies, programs and projects being undertaken by relevant bodies/corporate entities. These elements are either environment-specific or adapted from other sectors, due to cross-cutting mandates.

POPs-issues are cross-cutting, impacting or concerning state and non-state players. In Nigeria, sectoral laws and institutions have been created for the purpose of ensuring that the entire field of environmental issues is covered. Furthermore, new policies, legislations, regulations and standards are being enacted to meet exigent needs of global emerging issues in environmental management, particularly POPs. Nonetheless, capacity assessment conducted as part of the NIP Update Project implementation has revealed some gaps that need be filled.

Policy and Regulatory Framework

Effective national implementation of Stockholm Convention and other Chemical and Waste treaties requires strengthening policy and regulatory frameworks to regulate the life-cycle management of chemicals and waste, covering manufacturing, transportation, storage, handling and reprocessing (cradle to cradle), or destruction (cradle to grave), as may be permitted by relevant global instruments.

Multilateral Environmental Agreements

The need to protect and preserve the environment has consistently been a recurring burning issue, nationally and internationally. This has led to negotiation, adoption and signing of scores of Multilateral Environmental Agreements (MEAs), in addition to regional and global instruments adopted in pre and post-Rio Conference era. Multilateral environmental agreements are legal instruments with binding effects on countries that have agreed to become parties thereto,

through ratification or accession (INTOSAI-WGEA, 2010). An MEA/treaty procedurally comes into force, if it is ratified by the requisite number of countries.

Nigeria has played active roles in the negotiation and actualisation of set objectives of a list of MEAs, which form the over-arching international legal grundnorm (basic norm) for addressing environmental issues of global concerns. Some of these MEAs have either been ratified (before coming into force) or acceded to (after coming into force) by Nigeria and have either been or are in the process of being internalised, to complement the overall framework of national legislations, bilateral, sub-regional and regional treaties on varying environmental issues of national priorities.

Assessment of the POPs issues in the country

A survey conducted about a decade ago on pesticides usage in Nigeria indicated that over 15,000 metric tonnes/annum of pesticides, comprising about 135 chemical pesticides marketed locally under 200 different product brands and formulations, were imported during 1983 – 1990. In the same vein, the Federal Office of Statistics (FOS) in Lagos provided useful information on the importation of DDT and Hexachlorobenzene (HCB) into the country till the year 2002 (First NIP, 2009).

Although importation of certain hazardous chemicals such as POPs was banned in 1999 by the Nigerian Government, illegal/illicit trade in these chemicals still thrives in the informal sector, surreptitiously. This makes it difficult to maintain good statistics of POPs pesticides in the informal sector which is responsible for most cases of illicit traffics in hazardous chemicals.

With a view to updating the record in line with the amendments to Annexes to the Convention, an assessment of POPs-issues was conducted under the NIP Review and Update Project. This task was carried out by exploring relevant data sources, namely: import trade data, market surveys, consultations with critical players including the umbrella association for agro-inputs merchants, private researchers, State Governments, Research Institutes, pooling existing inventory data obtained under cognate POPs-projects, among others.

POP-Pesticides (Annex A, Part 1 Chemicals)

The use of Organochlorides Pesticides (OCP), including Lindane for varying purposes, namely: maintenance of public/private infrastructures integrity, vector control in the health sector, crop protection, among others, dates back to -pre-Rio Erath Summit era.

All pesticides including Lindane used in Nigeria, in the past, were imported from some developed countries in Europe, America and Asia, although a number of chemical industries then based in Lagos, Port Harcourt and Kaduna owned by the multinational oil companies. These industries were decommissioned, between 1990's and 2004, in line with international actions on POPs elimination/minimization. These old storage or production facilities are potential Lindane-contaminated sites that require proper characterisation and decontamination.

Lindane has been used in a wide array of sectors, including agriculture, forestry, veterinary, general household and building spray, pharmaceuticals and public health. For instance, Lindane was widely used as an insecticide in cocoa plantation. However, it was banned and withdrawn from the Nigerian Cocoa production system, in line with the new ICCO 2008 Legislations on the use of Cocoa pesticides (CRIN, 2015).

Nigeria has no industry that produces Chlordecone just like other POPs. Nigeria is one of the largest plantain producing countries in the world (FAO, 2006). While the use of Chlordecone may not be promoted by IITA, a document produced by IITA Youth Agripreneurs on Plantain Production in West Africa (2014) identified Chlordecone and other crop protection products as being effective for the control of stem borer or banana weevils.

The only record of importation of Dieldrin into Nigeria for the period of 2005 to 2015 was made in April 2014 by Paints and Coatings Manufacturers. No other record of Dieldrin importation was found for NAFDAC and NCS during this period. However, it is to be noted that this entry for Dieldrin was inadvertently passed, since Nigeria had put a ban on the importation and use of Dieldrin, being one of the dirty dozen.

There are indications that Dieldrin has been used intensively in the past for the control of soil and seed treatment in agriculture, for control of disease vectors such as mosquitoes and *Glossina palpalis* (Tsetse flies), for veterinary purposes as a sheep dip, and for the treatment of wood and the mothproofing of woollen products. Its apparently prolonged use, stockpiles and unsound management have resulted in contamination of the environmental media, food as well as human exposure, with attendant health cum socioeconomic implications. Importation of Aldrin, Chlordane, Heptachlor, Mirex and Toxaphene was prohibited by decision of the hazardous chemicals and waste management committee, under the Prior-Informed-Consent (PIC) Procedure, in 1999. In spite of aggressive public enlightenment campaigns embarked upon, these chemicals still thrive in the informal sector where vendors sell them 'under the counters.'

Although, due to data gap, it was postulated that Mirex and Toxaphene had never been used in Nigeria, the report of passive air sampling campaigns at the Produce Coordinating Unit, Sheda, FCT, conducted under *Supporting The Global Monitoring Plan On Persistent Organic Pollutant in six West African countries*, and analysed at IVM VU Amsterdam, MTM University of Orebor-Sweden and Jawura Environmental laboratory Lagos revealed concentrations of Dieldrin, Chlordanes, Mirex, Endosulfans, among others (UNEP, 2009).

Polychlorinated Biphenyls (Annex A, Part II Chemicals)

In 2008, the Nigerian Government undertook an initial PCBs evaluation in some electrical power generating, transmission and distribution facilities spread across 10 states. As a follow up to this study, Nigeria accessed the GEF-support for the implementation of National PCB Management Framework Project, intended to strengthen the Government's capacity to manage, monitor, control and, ultimately, phase out the use of PCBs. It also developed a baseline national inventory of PCBs and PCBs-containing equipment and a national PCBs management plan.

The assessment of Polychlorinated Biphenyls (PCBs) was mainly done in the power sector of the national economy, which has the largest collection of PCBs-containing line equipment in the country. The sector has infrastructures located in all 36 states of the federation, including the Federal Capital Territory (FCT), with about 250 transmission transformers, 34800 distribution transformers and over 2000 power transformers.

During this assessment, fifteen (15) states were covered and the main equipment considered were: transformers, capacitors and oils from transformers and capacitors. The states covered were **North West:** Kaduna, Kano & Sokoto; **North East:** Bauchi, **North Central:** Abuja, Benue, Niger; **South West:** Lagos, Ogun, Oyo; **South-South:** Delta, Rivers; **South East:** Abia, Anambra, Enugu.

Interpretation of PCB Inventory Data

Based on the analysis, it is evident that older states like Oyo (89.4%), Kaduna (43.1%), Lagos (30.1%) and Niger (39.6%) had higher values of PCBs containing equipment due to the presence of older transformers in those states that were produced pre 1980's (the year PCBs came into enforcement), hence these transformers were operated using PCBs containing oil which contaminated the transformers. Delta also had a high value of PCBs (56.4%) due to the presence of old transformers in old Local Government Areas (LGAs) of the states like Sapele and Ughelli.

Polybrominated Diphenyl Ethers (PBDEs)

Polybrominated Diphenyl Ethers (PBDEs) are a class of industrial aromatic Organobromine chemicals whose first commercial production was in the 1970s as additive flame retardants in a wide range of mainly consumer products (Centers for Disease Control). These additive PBDEs are the highest produced group of Brominated Flame Retardants (BFR). PBDEs were produced with three different degrees of Bromination and marketed as outlined below:-

- a) Commercial Pentabromodiphenyl Ether (c-PentaBDE)
- b) Commercial Octabromodiphenyl Ether (c-OctaBDE)
- c) Commercial Decabromodiphenyl Ether (c-DecaBDE)

Production of C-PentaBDE and C-OctaBDE stopped in 2004, while that of (c-DecaBDE) is still produced (Alaee et al., 2003; Prevedourous et al., 2004; SFT, 2009). DecaBDE is the most widely used PBDE globally.

Unintentionally Produced Persistent Organic Pollutants (UPOPs)

Open burning and uncontrolled incineration of municipal, industrial wastes and hospital/clinical wastes are well known sources of PCDDs/PCDFs. A large amount of accidental and deliberate combustion is taking place continually including the burning of tyres, as well as stripping insulation of copper wires and cables, and leads to dioxins release into the environment. Burning of bush, forests and sugar cane fields, to cut labour costs just before weeding for planting and/or harvest as appropriate also contribute to the formation of dioxins (FRN, 2009). Some sources of UPOPs that were identified are: **Waste Incineration, Ferrous and Non-Ferrous Metal Production, Heat and Power Generation, among others.**

Stockpiles of wastes electrical and electronic equipment

Wastes electrical and electronic equipment (WEEE) or E-wastes are a growing concern globally, with Cathode Ray Tube monitors (in TVs and computers) containing over 50% of total POPs-BDE in EEEs. These EEEs are often imported into Nigeria in fairly used conditions where the equipments are approaching end-of-life. The state of these EEEs thus facilitates the release of the POPs contained within them into the environment.

Summary of future production, use and releases of POPs - requirements for exemption

Currently, Nigeria has no plan to produce POPs-chemicals in the near future. However, the use of POPs-containing pesticides and industrial chemicals is bound to cease over time, as most of the

identified POPs are currently in phase-out stage. The capacity for safe disposal or destruction of these POPs needs be strengthened, as Nigeria currently has dearth of appropriate infrastructure for POPs destruction.

C. Strategy and action plan elements of the National Implementation Plan

As a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs) and other international treaties under the Chemicals and Wastes Synergy is committed to the realisation of their set objectives.

Consequent upon the foregoing, the Government of Federal Republic of Nigeria expresses her appreciation for the collective efforts, cooperation of the international community, especially GEF and UNIDO, in the development and endorsement of the Updated NIP, which is tailored towards achieving human and environmental health protection against POPs.

POPs-issues of national priority

The following cross-cutting priorities, among others, have been identified during the Inventory Data Validation and Priority setting Workshop held in Abuja 16 – 17th September 2015, which formed strong basis for the Action Plans on POPs:

- (i) Developing effective POPs legislative and regulatory frameworks.
- (ii) Increasing institutional capacity of government departments/agencies and other institutions.
- (iii) Developing programmes and regulations on monitoring of POPs chemicals.
- (iv) Developing mechanisms to promote proper management of stockpiles of POPs pesticides and PBDE, wastes and contaminated sites.
- (v) Opportunity for developing and maintaining simple, accessible and interactive database through sustained collaborative information sharing among stakeholders.
- (vi) Mainstreaming thematic concepts of the treaties into national development plans is exigent, in line with global best practices in environmental governance.
- (vii) integration of gender dynamics vis-à-vis POPs management within policies and work places.

Activities, Strategies and Time Frame

Strategies and actions to be undertaken by Nigeria, with the view to actualising effective and efficient implementation of the updated NIP, in fulfilment of Nigeria's obligations under the Stockholm Convention. These activities are based on Nigeria's situation verified in various inventory exercises as well as at the intervention priorities that were determined during the Priority Setting Workshop.

The following Measures and Action Plans are covered in the Updated NIP:-

- Measures to strengthen the national institutional capacity and the legal framework for POPs management;

- Action Plan for Production, import and export, use, stockpiles, and wastes of Annex A POPs pesticides (Annex A, Part I chemicals);
- Action Plan for Production, import and export, use, stockpiles, and wastes of POPs of Industrial use;
- Measures to reduce releases from unintentional production (Article 5);
- Action Plan for Identification of contaminated sites (Annex A, B, and C Chemicals) and remediation in an Environmentally Sound Manner;
- Action Plan for Facilitating or undertaking information exchange and stakeholder involvement;
- Measure to increase Public awareness, information and education (Article 10);
- Action Plan for Effectiveness evaluation (Article 16);
- Action Plan for Research, development and monitoring (Article 11); and
- Action plan for Technical and financial assistance (Articles 12 and 13).

1.0 Introduction

1.1 Chemical Production, Uses and Risks

The global drive for industrialisation, economic development, improved food supply and better quality of human lives have catalysed large-scale commercial production of synthesized hazardous chemical substances and their systematic multifarious applications in all sectors of human endeavours, namely: industry, agriculture, mining, public utilities and health care delivery system, among others.

Consequently, the global output of hazardous chemicals increased approximately 10- fold between 1970 and 2010 (*WHO, 2010*), while millions of people throughout the world lead richer, more productive and more comfortable lives because of the thousands of chemicals on the market today (*UNEP, in GCO 2012*).

Hazardous chemicals are often divided into three categories: pesticides, industrial chemicals, and unintentionally produced by-products. Some of these chemicals are characteristically toxic and persistent, hence possess the ability to bioaccumulate (build up in fatty tissues in individual organisms) and concentrate further or biomagnify up food chains. These chemicals belong to a kind, known as Persistent Organic Pollutants (POPs). Thus, without good management practices, these hazardous chemicals and their wastes can pose significant risks to human health and the environment especially the poorest members of the global community (UNDP, 2015).

1.1.1 Persistent Organic Pollutants (POPs): An Overview

Persistent Organic Pollutants (POPs) are defined as organic compounds that persist in the environment, bioaccumulate through the food web and can cause deleterious effects in human health & the environment (GreenFacts, 2016). POPs also possess the ability of being transported through the air, water and migratory animal species across international boundaries; deposited in regions where they have never been used or produced, where they eventually accumulate in terrestrial and aquatic ecosystems (fig. 1.1).

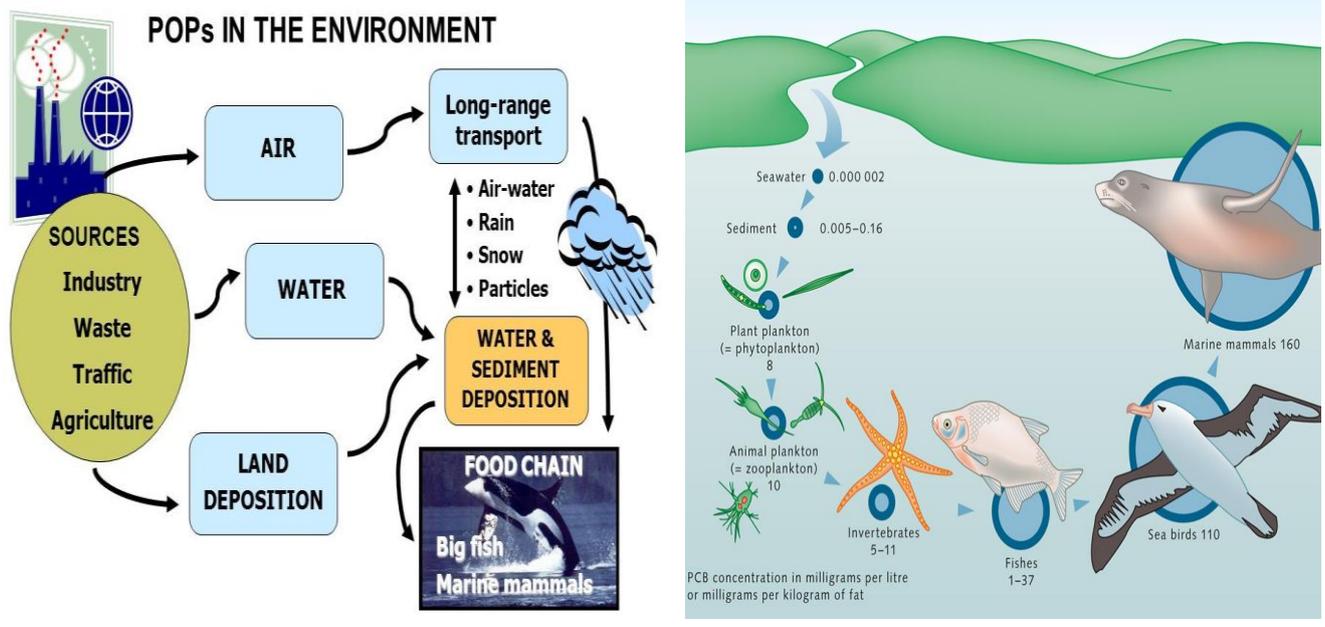


Figure 1. 1: POPs transportation, accumulation and magnification in the environment. Sources: WHO (2011), World Ocean Review (2015)

POPs-derived pollution burdens and their accompanying adverse toxicological and environmental implications have become the focus of growing national and international concerns, as priority hazardous chemicals. These, consequently, triggered concerted and targeted efforts of the international community to consistently call for joint global actions, with a view to reducing and eliminating releases of these chemicals and the consequent threats they pose to the environment of the whole globe (UNEP 2011), which effects are more prominent among the vulnerable groups, particularly children at developmental stages to whom these toxic contaminants can be passed through breast milk, among other exposure routes.

1.1.2 List of POP-chemicals

Article 8 of the Convention and Decision SC-2/8 have prescribed the process/procedure for listing candidate chemicals as Annex A, B or C POPs. The Stockholm Convention covered the ‘dirty dozen’ chemicals, at its adoption. The Conference of the Parties (COP) to the Stockholm Convention (SC), in its fourth meeting (SC COP-4) held in May 2009 added the ‘nasty nine’ (Decisions SC-4/10-SC-4/18), while endosulfan was listed at COP-5 in May 2011 (Decision SC-5/3). In addition, SC COP-6 held during the Joint meeting of Conferences of the Parties to Basel, Rotterdam and Stockholm (BRS COPs:) added hexabromocyclododecane to the Stockholm Convention (HBCD) (Decision SC-6/13).

At the Joint BRS COPs meetings in Geneva held in May 2015, three additional POPs, namely: hexachlorobutadiene (HCBD), polychlorinated naphthalene (PCN) and pentachlorophenol (PCP) were also listed under various annexes (Decisions SC-7/12 to SC-7/14). Currently 26 chemicals are listed as POPs in Annexes A, B and C, as applicable and each amendment by Conference of the Parties to the Convention is obligatorily deposited at the United Nations Depository, which issues communication notices, with a moratorium, for the amendment to take effect, in line with Article 29 of the Convention.

Section 22(3(c)) of the Convention expressly states that: *“On the expiry of one year from the date of the communication by the depositary of the adoption of an additional annex, the annex shall enter into force for all Parties that have not submitted a notification ...”*.

POP-chemicals are listed in 3 Annexes, viz: Annex A: comprising POPs listed for elimination; Annex B: listed for restriction/limitation and Annex C: for “unintentional production”.

1.1.2.1 Annex A POP-Chemicals

Annex A chemicals include:

- Aldrin – Pesticide
- Chlordane – Pesticide
- Dieldrin – Pesticide
- Endrin – Pesticide
- Heptachlor – Pesticide
- Hexachlorobenzene (HCB) – Biocide
 - by-product from the production of other chemical substances
 - trace/residue in other chemical substances
 - product from burning
- Mirex – Pesticide
 - additive in plastics and rubber for the reduction of burning rate
- Toxaphene – Pesticide
- Polychlorinated Biphenyls (PCBs) – Chemical substances used as oils in heat exchangers, transformers, capacitors, as additives in paints and plastics as well as additives in carbonless copy paper. They are also produced unintentionally during the burning processes.
- α -hexachlorocyclohexane - pesticide and by-product from the production of other chemicals
- β -hexachlorocyclohexane - pesticide and by-product from the production of other chemicals
- Chlordecone - Pesticide
- Hexabromobiphenyl – Industrial chemical substance
- Hexabromobiphenyl ether – Industrial chemical substance
- Heptabromobiphenyl ether – Industrial chemical substance
- Lindane - Pesticide
- Pentachlorobenzene - Pesticide, industrial chemical substance and by-product from the production of other chemicals
- Tetrabromodiphenyl ether – Industrial chemical
- Pentabromodiphenyl ether – Industrial chemical
- Endosulfan and its isomers – Pesticide (insecticides)
- Hexabromocyclododecane (HBCD) – Industrial chemical (fire retardant).

Article 3 of the Convention makes it obligatory for parties to prohibit or apply measures for the elimination of the production, use, import and export of the chemical compounds included in Annex A of the Convention.

1.1.2.2 Annex B POP-Chemicals

The following are Annex B POP chemicals:

- 1,1,1-trichloro-2,2-di(4-chlorophenyl) ethane, known as DDT – Pesticide
- Perfluorooctane sulfonic acid – Industrial chemicals/pesticide
- Perfluorooctane sulfonic fluoride – Industrial chemical.

In another sub-section of Article 3 of the Convention, Parties are requested to take measures for the limitation of production or use of the chemical substances included in Annex B to the Convention.

1.1.2.3 Annex C POP-Chemicals

Annex C chemicals in Stockholm Convention are:

- Dioxins and Furans – Produced mainly from combustion (fuel and waste) as well as by-products from various industrial processes. The group of dioxins consist of 75 types of polychlorinated dibenzo-p-dioxins (PCDDs) and 135 types of polychlorinated dibenzofurans (PCDFs)
- Hexachlorobenzene and Polychlorinated Biphenyls – They are included also in Annex A of the Convention as stated earlier. They are produced during the combustion process of fuels and wastes, as referred above for the dioxins.
- Pentachlorobenzene (PeCB).

1.2 Risks associated with POPs

It has been empirically observed that POPs exposure could cause birth defects in humans/animals and is also associated with some forms of cancer, immunological and reproductive disorders, damage to the central and peripheral nervous systems and a diminishing of intelligence, among others. There are international institutional attempts to reduce risks associated with hazardous human-made chemicals that pose a direct threat to human health and the environment.

The continuous infiltration of POP-chemicals into developing countries like Nigeria and their unceasing use in pest/vector control and other endeavours poses major public health and environmental concerns, due to gaps in infrastructural/regulatory capacities for ensuring their safe use and disposal (*UNEP GMP Report, 2009*).

1.3 Stockholm Convention on Persistent Organic Pollutants

In an attempt to address this global challenge, the Stockholm Convention on Persistent Organic Pollutants was adopted at a Conference of Plenipotentiaries on 22 May 2001 in Stockholm, Sweden and entered into force on 17 May 2004. The Convention was negotiated in five sessions between 1998 and 2000, with the final text agreed to in Johannesburg in December 2000, culminating in its adoption by more than a hundred countries in Stockholm in May 2001 (*Krueger et al., 2002*). Currently, 180 countries are parties to the Stockholm Convention.

The Convention takes holistic approach and sets out control measures covering production, use, trade, and disposal of hazardous pesticides and industrial chemicals, as well as containing measures to reduce by-products. Nigeria ratified the Convention on 24 May 2004.

The Convention has the objective of protecting human health and the environment from POPs and makes it obligatory for Parties to: -

- take actions to prohibit or eliminate the production and use or import or export of chemicals listed in Annex A (chemicals for elimination) (Article 3);
- restrict production and use of chemicals in Annex B (restricted use chemicals) (Article 3);
- ensure that a chemical listed under Annex A or B is only imported for the purpose of environmentally sound disposal or for a permitted use under the Convention (Article 3);
- take measures to reduce the release of chemicals listed in Annex C (unintentionally produced) (Article 5);
- develop strategies for identifying stockpiles of chemicals in Annex A (chemicals for elimination) or Annex B (chemicals for restricted use) (Article 6);
- manage stockpiles in a safe, efficient and environmentally sound manner (Article 6);
- take appropriate measures to dispose of POPs in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed, or dispose of the POPs in an environmentally sound manner when destruction or transformation is not an environmentally preferred option (Article 6);
- ensure that POPs are not subjected to disposal operations that may lead to recovery, recycling, reclamation, direct use or alternative use. (Article 6);
- identify contaminated sites and develop remediation measures in an environmentally sound manner (Article 6);
- develop, use and review an Implementation Plan (Article 7);
- consult with national stakeholders on the Implementation Plan (Article 7);
- propose a chemical for listing under Annex A, B and/or C (Article 8), if it is a position to do so;
- identify a National Focal Point to facilitate the exchange of information on POPs (Article 9);
- provide information and develop education and training programmes for policy makers and the public about persistent organic pollutants (Article 10);
- encourage and/or undertake research into POPs (Article 11);
- provide financial support and incentives for national activities under the Convention (Article 13);
- evaluate through the COP, the effectiveness of the Convention four years after its date of entry into force and periodically thereafter at intervals to be determined (Article 16).

In the event of amendments to any or all Annexes to the Convention and upon entering into force of such amendments, or as a result of any national triggering factor(s), Parties are obligated pursuant to Article 7 of the Convention, and taking into account the annex to decision SC-2/7, review and, if necessary, update their national implementation plans in order to address the following issues as they relate to each of the substances added to the Convention, viz:

- iv. Measures to reduce or eliminate releases from intentional production and use (Article 3);
- v. Measures to reduce or eliminate releases from unintentional production (Article 5); and

- vi. Measures to reduce or eliminate releases from stockpiles and wastes (Article 6).

The Convention is guided by the Conference of Parties (COP) that meets every two years. The POPs Review Committee (POPRC) provides guidance on scientific, technical and economic issues regarding the chemicals to be controlled.

1.4 National efforts at addressing POPs-issues in Nigeria

- Promotion of Best Available Technologies/Best Environmental Practices (BATs/BEPs) in the management of hazardous chemicals and waste;
- Development of a National Action Plan on Health Care Waste Management;
- Development of a National Policy on Chemicals Management and signing of Memorandum of Understanding amongst line MDAs for an integrated national framework;
- Development of the Chemical Information Exchange network (CIEN) website (www.estis.net/sites/cien_ng) as a medium for disseminating information on Safe and Sound Chemicals Management;
- Development of the National Hazardous Materials (Hazmat) Emergency Preparedness & Response Plan, as a platform for preventing, preparing for, and maintaining superior response capabilities in hazmat-related accidents, disasters, spills and other emergencies that may inevitably occur;
- Development of the first National Implementation Plan, with clearly defined and prioritized activities (2002-2007). It was transmitted to the Stockholm Convention Secretariat on 29th April, 2009;
- Establishment of the National Institutional Framework and Strengthening Capacity for the Sound Management of Chemicals, including implementation of the Strategic Approach to International Chemicals Management (SAICM), in accordance with national needs, priorities and capabilities;
- Nigeria was one of the seven African countries that participated in the Africa Stockpiles Programme. The programme was supported by CIDA, FAO and counter-part funding by the Federal Government, with set objectives:
 - cleaning up stockpiled pesticides and pesticide-contaminated waste in an environmentally sound manner;
 - catalyzing the development of measures to prevent future accumulation; and
 - providing capacity building and institutional strengthening on important chemicals-related issues.
- Pilot project for the Initial assessment of the nine new POPs in 2011 which indicated the occurrence of stock of new POPs in agricultural and fire service-sectors across the country and illicit application of some for fishing and cure of ailments.
- Pilot testing of Guidance Documents (GDs) for National Implementation Plan (NIP) review and updating, with support by the UNEP/ Stockholm Convention Secretariat - (ongoing).

1.5 Challenges in national POPs regulation efforts

The task of regulating sound management of POPs, like other hazardous chemicals, is a herculean mission and our national efforts in this regard have been met with challenges. These challenges include the following, among others:

- Inadequate infrastructures for the sound management of hazardous chemical waste, e.g. obsolete pesticides, contaminated sites for the interim storage of PCB wastes and PCB disposal facilities;
- Ineffective legal infrastructures, ineffective institutional frameworks (administrative, legislative and regulatory), insufficient Public Education and Awareness on chemical hazards;
- Capacity gaps in the management of POPs - Stockpiles and waste, such as obsolete POPs pesticides, empty POPs-pesticides containers, contaminated materials, and the contaminated soil around the pesticide stores, identified during the Nigeria-African Stockpile Program Implementation;
- Cost-intensive national public awareness/sensitization programmes on chemicals exposure risks and attendant adverse public health & environmental implication;
- Dearth of predictable, sustainable and adequate funding of general hazardous chemicals & waste management programmes/projects;
- Activities of entrepreneurs in the informal sector who are, to a substantial extent, responsible for growing illicit traffics and distribution of controlled chemicals, for which there is data gap;
- Gaps in legislative and regulatory frameworks required to meet the exigency of global emerging issues in chemicals management;
- Persistent non-disclosure of obligatory regulatory information on POPs management, by some players in the industrial sector, premised upon protection on Confidential Business Information (CBI);
- Insufficient capacity to respond to chemical emergencies, chemical risk assessment and interpretation.

1.6 Development of National Implementation Plan (NIP) for POPs management

1.6.1 Purpose and structure of the NIP

Article 7 of the Convention makes it obligatory for Parties to develop and endeavour to implement their plans, with set priorities for initiating activities to protect human health and the environment against the deleterious impacts of POPs. These plans are expected to provide frameworks for Parties to develop and implement, in a systematic and participatory manner, priority policies, regulatory reforms, resources allocation and other steps that will facilitate attainment of set objectives. NIPs developed by Parties are to be transmitted to the Conference of the Parties, within two years of the date on which the Convention enters into force (Article 7(1(b))).

Furthermore, Parties are required to review and update their National Implementation Plan on a periodic basis and in a manner specified by a decision of the Conference of the Parties (Article 7(1(c))).

The Convention specifically stipulates a number of tasks that need be undertaken within the context of NIP, namely:

- i. undertaking preliminary inventories of sources and emissions of POPs listed in annexes A and B to the Convention;
- ii. preparing case-specific action plans for the reduction of releases of unintentional by-products;
- iii. strengthening capacity to report every five years on progress in phasing out polychlorinated biphenyls (PCBs);
- iv. preparing assessments of POPs-stockpiles (old and new), waste products contaminated with POPs and identifying management options, including opportunities for their disposal; and
- v. building capacity to identify sites contaminated by POPs; and supporting communication, information exchange and awareness raising through multi-stakeholder participatory processes.

As indicated hereinbefore, Nigeria developed her first NIP between 21 August 2002 and 25 October 2007, which was transmitted to Conference of the Parties to the Stockholm Convention on 29 April 2009. The policy instrument was envisioned to achieve the following outcomes, among others:

- Protection of public health from the POPs effects;
- The national policy thrust for achieving elimination of POPs use and production; minimisation POPs-releases and sound management of POPs wastes and stockpiles, in line with articles 3, 4 and 5 of the Stockholm Convention;
- Promotion of a cleaner and healthier environment;
- Improvement of national institutional and available infrastructural capacities to manage POPs;
- Reduction of Nigeria's contribution to global pollutants loading; and
- Contributions to meeting her commitments under the Stockholm convention.

1.6.2 NIP Review and Update

The first NIP was targeted at addressing the dirty-dozen, which were identified for global action, by the Stockholm Convention at its inception. In order to address subsequent listing of additional POP-chemicals, the Conference of the Parties in its Decision SC-1/12, expressly outlined factors that could necessitate review and update of NIPs, viz:

External factors

- Changes in obligations arising from amendments to the Convention or its annexes, including the addition of chemicals to Annexes A, B or C;
- Decisions of the Conference of the Parties that may affect how Parties implement Convention obligations, including adoption of guidance or guidelines;
- Changes in the availability of technical or financial assistance;
- Changes in access to infrastructure external to the Party (e.g. disposal facilities).

Internal factors

- Reporting under Article 15 of the Convention indicating that the Party's implementation plan is not adequate;
- A change in national priorities;
- A significant change in national circumstances (e.g. infrastructure or institutional arrangements); and
- Inventories of persistent organic pollutants, after improvement or updating, indicating a change in the scope of the problem to be addressed.

Sequel to amendments to Annexes A, B and C of the Convention, via addition of new POPs by COPs in 2009, 2011, 2013 and 2015 it has become obligatory for Parties to review and update their NIPs and transmit same to COPs, through the Convention Secretariat, in line with Article 7((1)C) and Decision SC-2/7.

Nigeria, in compliance with Article 7(1(c)) of the Stockholm Convention, and exploring the opportunity of Article 13 thereof, accessed the Global Environment Facility (GEF) support for the Enabling Activities for the NIP Review and Update Project, with the United Nations Industrial Development Organization (UNIDO), as the Implementing Agency. Specifically, the immediate objectives of the project are, among others, to:

- prepare, endorse and submit the updated and reviewed NIP, including inventory, prioritization and action plans to the Stockholm Convention Secretariat;
- enable the country to fulfil her obligations under Article 7 of the SC and reporting requirements of the Convention;
- build the capacity of participating stakeholders to manage the additional POPs with newly developed technical skills, expertise; and
- gain stakeholders' endorsement of NIP including strategies and actions required by Nigeria in meeting its obligations under the convention.

The project implementation is being coordinated by Federal Ministry of Environment (FMENV), which is the Designated National Authority (DNA) for chemicals and waste treaties, with collaboration and cooperation of relevant MDAs as well as other key players in all sectors of the economy, including the public and private sectors and development partners, in line with Article 7(2) of the Convention.

Consequently, the reviewed and updated NIP serves as the 'renegotiated & reinforced' national policy framework tailored at addressing POPs-issues, such as:

- phasing out old and newly listed POPs;
- phasing-in POPs-alternatives to reduce their releases and achieve their ultimate elimination;
- development of BAT/BEP POPs management options; and
- remediating POPs contaminated sites, among others;

The EA NIP project activities are based on the following step-wise components:-

- Establishing Coordination Mechanism and Stakeholders' Awareness-Raising;
- Conducting Inventories of new POPs, Validation of Inventory Data by stakeholders and NIP Review and Update;
- Assessment of National Capacity and setting priority for management of new POPs;
- Action plans and strategies for the Implementation of the Reviewed and Updated NIP; and
- Government endorsement and submission of updated NIP to the Stockholm Convention Secretariat.

In view of the foregoing, mechanisms applied in the project implementation are highlighted below.

1.6.2.1 Coordination mechanism and awareness raising process

Project Inception/Steering Committee Inauguration Workshop was held in the Honourable Minister's Conference Room, FMENV Headquarters, Mabushi-Abuja, on 10 June 2014.

The workshop provided the platform for:

- raising awareness on POPs challenges and national obligations under the Stockholm Convention;
- bringing together all project partners to report on planned project activities, work plan and timeframes, for an inclusive and effective project implementation;
- enabling core stakeholders understand and take ownership of the project's goals and objectives; and
- constituting/inaugurating the Project Steering Committee (PSC), as a critical component in the project's decision-making structure, constituted by people of proven integrity, experiences and capabilities.

Figure 1.2 shows a cross-section of stakeholders, including the former Permanent Secretary (FMENV), PSC and PCU members, Development Partners, at the workshop proceeding.



Figure 1. 2: PSC and PCU members and Development Partners at the Inception Workshop

The Coordination Mechanism encompasses the PSC and Project Coordinating Unit (PCU), as outlined in Annex I.

1.6.2.2 POPs Inventory Training workshop

Training of identified sectoral representatives on POPs Assessment Protocols was organised from 11 to 12 June 2014 at the National Veterinary Council Building, Maitama-Abuja. The Workshop provided a rare opportunity for sectoral inventory officers and other relevant stakeholders to be trained on procedures for:

- gathering new POPs-related information;
- conducting new POPs inventories of trade, use, stocks and contaminated sites according to new POPs guidelines;
- assessing the national institutional and policy framework;
- considering the current national level of public awareness on new POPs;
- evaluating socio-economic implications of new POPs utilization, elimination and reduction; and
- meeting national obligations under the SC with respect to new POPs management.

The event was attended by eighty-five (85) participants representing relevant stakeholders, who unanimously reconfirmed their enthusiasm and commitments towards successful implementation of the NIP Review and Update Project. Annex II is the list of sectoral representatives who participated at the POPs inventory training workshop.

Figure 1.3 shows participants at the POPs Inventory Training Workshop.



Figure 1. 3: Sectoral stakeholders at the POPs Inventory Training Workshop.

1.6.2.3 Assessment of National Infrastructural Capacities for management Old and New POPs

Assessment of the nature/extent of POPs availability and national infrastructural capacity for POPs management was undertaken within the period of October 2014 to June 2015, based on national circumstances and available resources. National Experts of proven competence and experiences were engaged to conduct the assessment in key sectors of the economy, while Basel Convention Regional Coordinating Centre for Africa, Ibadan (BCRCC-Africa) provided the technical advice. The task was undertaken exclusively with due reference to UNEP Guidance Documents, Quality Assurance/Control process and other relevant standards/protocols. Steps taken were as follows:

- Three areas were identified for comprehensive assessment, namely:
 - Industrial POPs (PCBs, PFOS, PBDEs);
 - POPs pesticides (Annex A, Part I chemicals); and
 - Legal and Socio-economic Infrastructure.
- Three thematic National Experts were appointed to undertake the assessment, with Basel Convention Coordinating Centre for African Region - Ibadan providing technical assistance;
- National Assessment of Infrastructural Capacities for POPs management started from October 2014 to January 2015 (a period of about three months).
- Efforts were made to integrate all relevant stakeholder-institutions in assessment data gathering; however, not all provided feedbacks.
- Feedbacks were collated and subjected to analyses and peer-review, before final input from technical Adviser, BCRCC-Africa, Ibadan.

The inventory of POPs and other assessments have enriched works in the realm of exposure analysis, which is one of the four basic phases in the complex process of risk assessment, via:

- detection of obsolete POPs stockpiles, e.g. POP-pesticides in the agricultural sector, currently out of use and in deplorable technical condition, which might lead to serious accidents and pollution incidences.

- providing a necessary input for establishing a solid foundation for developing action plans targeted at addressing POPs issues in the country.

Collation, Analysis and Peer-review of Assessment Reports, carried out from March to April 2015. POPs assessment data collated by experts on various thematic issues was subjected to internal and peer review processes, before final input by the Technical Adviser: BCRCC-Africa, Ibadan.

1.6.2.4 Inventory Data Validation of Assessed National Infrastructural Capacities and Priority Setting for management of POPs

In line with the project implementation schedule, data collected during the exercise were appraised, validated and endorsed at a forum of national stakeholders convened in Abuja (16 to 17 September 2015).

The forum, attended by one hundred and forty (140) participants, provided an avenue for national stakeholders to evaluate, validate and adopt the POPs assessment data report produced by national experts, advise on final amendments, set national priorities, develop action plans and management strategies for tackling identified POPs issues, as well as, the capacity needs of the Government to effectively control POPs management.

A communiqué was issued at the end of the workshop (Annex III). Annex IV is the list of sectoral representatives who participated at the POPs Inventory Data Validation Workshop.



Figure 1. 4: Stakeholders at the POPs Inventory Data Validation Workshop

1.6.2.5 Reviewed and Updated National Implementation Plan Endorsement

The reviewed and updated NIP for the Stockholm Convention was developed, sequel to the stakeholders' validation of POPs Assessment Data and Formulation of Action Plans/Management Strategies for addressing priority POPs issues. The document was circulated to all stakeholders for necessary inputs, preparatory to the Endorsement Workshop held from 17 to 18 May 2016 with objectives, among others, to:

- obtain stakeholders' endorsement for the Reviewed and Updated NIP; and
- negotiate Statement of Commitment by stakeholders for integrating the NIP into National Development Plan and Strategies.

The NIP endorsement workshop was attended by the Honourable Minister of State for Environment, Mr. Ibrahim Usman Jibril (representing the Honourable Minister of Environment) and the Permanent Secretary (FMENV), Dr. Bukar Hassan and other dignitaries. It drew two hundred and four (204) participants from various sectors of the economy, which included State and Federal Ministries, Departments and Agencies (MDAs), Civil Service Organisations (CSOs), PCU, PSC members, the Legislature, the Media, Resource Persons, among others.

Outcomes of the workshop were Endorsement of the updated NIP document by consensus, culminating in issuance of Statement of Commitment drafted, negotiated and jointly adopted by all stakeholders for integrating the NIP into National Development Plan and Strategies. There were also specific calls for innovative financing of POPs projects by exploring International Development Association (IDA) support windows, South-South Cooperation, integrating POPs management into socio-economic development plans, projects and programs, among others.

The 'Statement of Commitment' adopted by stakeholders at the NIP Endorsement Workshop is attached as Annex V, while the list of participants at the workshop is affixed as Annex VI.

Figure 1.5 shows the pictures of stakeholders at the updated NIP Endorsement Workshop.



Figure 1. 5: Stakeholders at the updated NIP Endorsement Workshop

1.7 Structure of the updated National Implementation Plan

The updated National Implementation Plan is structured in line with 'Annex 7: Recommended Elements for Consideration in Outline of NIP', of the *Guidance for Developing, a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants* (July 2012).

The endorsed updated NIP has been arranged into three chapters, with standard accessories, as itemised below:

- **Forward, Acknowledgment and Executive Summary;**
- **Chapter 1** provides the Introduction, Purpose and Structure of the NIP, Summary of the SC aims and obligations. It also describes the mechanism used to review/update the NIP and the stakeholder consultation process. A POPs summary and background, uses of chemicals and the risk they cause. Progress to date in implementing the Convention;

- **Chapter 2** contains the country profile including background information, general socio-demographical, political, economic, ecological data and information on the environmental management system in the country;
- **Chapter 3** includes Implementation Strategy for the NIP and Action Plans to achieve Convention obligations and additional objectives by the country (UNEP guidance July 2012);
- **Annexes to the updated NIP**, as enumerated here within.
- **Detailed thematic POPs Assessment Reports**, submitted in adjunct to the NIP, viz:
 - Legal, Socioeconomic and Gender Dimension Assessment Report;
 - POPs-Pesticides and UPOPS Inventory Report; and
 - Report of the Inventory of Polychlorinated Biphenyls, Polybrominated Diphenyl Ethers and Perflourooctane Sulfonic Acid and Its Salts.
- **Reports of series of stakeholders' workshops**, submitted in adjunct to the NIP, viz:
 - Project Inception/Steering Committee Inauguration Workshop;
 - POPs Inventory Training Workshop;
 - POPs Inventory Data Validation Workshop; and
 - Updated NIP Endorsement Workshop.

2.0 Country Baseline

As an emerging industrialised nation, Nigeria records increasingly colossal imports and consumption of hazardous chemicals, some of which are POPs for multifarious applications in development and economic sectors, namely: industry, agriculture, mining, public utilities, public health care delivery system (particularly under disease vector control), infrastructural development, among others, which substantially cumulatively contribute to the national Gross Domestic Product (GDP).

The foregoing is not unconnected with growing international trade and cross-border investment flows, sophisticated consumption patterns, dynamic technological developments, smuggling, uncoordinated aid donations, poor stock management, among others. These ultimately lead to hazardous waste generation at the end of their shelf lives (or due to other circumstances such as global ban), stockpiles (due to dearth of POPs destruction facilities), deterioration under poor storage conditions and unintentional emissions, which may threaten human and environmental well-being.

In line with the global thrusts, the Federal Government of Nigeria, through FMENV and relevant MDAs, in consultation with relevant stakeholders, stimulated discussions and consensus building targeted at ridding our environment of POPs and associated challenges through enhancement of national, infrastructural, institutional and legislative capacities, as discussed in subsequent paragraphs.

2.1 Country Profile



Figure 2. 1: A Map showing countries that share common boundaries with Nigeria (Source: NPC)

Table 2. 1: Political and Economic Profile of Federal Republic of Nigeria

Capital	Abuja
Area	923,768 km ²
Land boundaries	4,477 km (Benin 809 km, Cameroon 1,957 km, Chad 85 km, Niger 1,608 km)
Coastline	853 km
Climate	Equatorial in the south, tropical in the centre, arid in the north
Natural Resources	Natural gas, petroleum, tin, iron ore, coal, limestone, niobium, lead, zinc
Land Use	Arable land: 38.4%; permanent crops: 7.4%; forest area: 9.0%; others: 45.2% (2012)
Irrigated land	2,932 km ² (2004)
Natural hazards	Periodic droughts; flooding
Environmental issues	Soil degradation; rapid deforestation; urban air and water pollution; desertification; oil pollution - water, air, and soil; has suffered serious damage from oil spills; loss of arable land; rapid urbanization
Geography note	The Niger River enters the country in the northwest and flows southward through tropical rain forests and swamps to its delta in the Gulf of Guinea
Population	177,155,754 (July 2014 est.)
Age structure	0-14 years: 43.2%, 15-24 years: 19.3%, 25-54 years: 30.5%, 55-64 years: 3.9%, 65 years and over: 3.1% (2014 est.)
Growth rate	2.47% (2014 est.)
Infant mortality	74.09 deaths/1,000 live births (2014 est.)
Life expectancy	Total population: 52.62 years - female: 53.66 years male: 51.63 years (2014 est.)
Total fertility	5.25 children born/woman (2014 est.)
Religions	Muslim 50%, Christian 40%, indigenous beliefs 10%
ethnic groups	More than 250 ethnic groups; Hausa and Fulani 29%, Yoruba 21%, Igbo (Ibo) 18%, Ijaw 10%, Kanuri 4%, Ibibio 3.5%, Tiv 2.5%
Languages	English (official), Hausa, Yoruba, Igbo (Ibo), Fulani and over 500 additional indigenous languages
Literacy	Definition: age 15 and over can read and write, total population: 61.3% - male: 72.1%, female: 50.4% (2010 est.)
Independence	1 October 1960 (from UK)
GDP	Purchasing power parity: \$478.5 billion (2013 est.) Official exchange rate: \$502 billion (2013 est.)
GDP real growth	6.22% (2014 est.) GDP - per capita Purchasing power parity - \$2,800 (2013 est.)
GDP composition	Agriculture: 30.9%, industry: 43%, services: 26% (2012 est.)
Membership of sub regional and regional Organization	Sub regional organisation: ECOWAS, Regional organization: AU
Form of government	Democratic government headed by President Muhammadu Buhari (GCFR)

(Sources: NBS, NPC and MB&NP).

2.1.2 POPs Issues, Overall Environmental Conditions and Priorities

2.1.2.1 POP-Pesticides Management

The Food and Agricultural Organization (FAO) defines pesticide as *any substance or mixture of substances intended for preventing, destroying, or controlling any pest, including vectors of human or animal diseases, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transporting or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies.* The term also includes substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport. In agricultural crop production, the term “pest” is used in the broad concept to refer to arthropod pests (insects, mites and millipedes), pathogens (viroids, viruses, bacteria, fungi, algae, and nematodes), vertebrates (rodents and birds), parasitic flowering plants and non-parasitic weeds, both annuals and perennials (WAAPP-Nigeria, 2013).

Some Annex A, Part I and Annex B POP-chemicals are OrganoChlorine Pesticides (OCPs) and are widely used as crop protection products (e.g. Chlordane, Endosulfan and Heptachlor), termite control in wooden structure, vector control in the health sector (e.g. DDT for malaria control) among others.

Although Nigeria is not a producer of chemical pesticides, her demands for pest/vector control in Agriculture and other sectors are met marginally by few local formulators and majorly through imports from exporting countries in Europe, Asia and South America. Nonetheless, some of the pesticide stocks have been received in form of aids under donor-funded projects. However, some have gone unused, stored under poor conditions, deteriorate and become obsolete, therefore threatening the environment and public health.

The need for effective clean-up of this stockpiled pesticides led to the adoption of the African Stockpiles Programme (ASP), a multi-stakeholder initiative, conceptualized to be implemented in a number of African countries over a 12-15-year period on a rolling basis. The first phase of ASP covered seven countries, namely: Nigeria, Ethiopia, Mali, Morocco, South Africa, Tanzania, and Tunisia. Objectives of the Programme were to clean up stockpiled pesticides and pesticide-contaminated waste in an environmentally sound manner among others.

2.1.2.2 Illicit use of pesticides and incidence of pesticides poisoning

Some POPs-pesticides like Lindane and Endosulfan are illicitly applied to water bodies by errant fishermen for the purpose of fishing, with attendant adverse public health implications. Additionally, there are incidences of unprofessional post-harvest application of pesticides such as Lindane for dressing nuts (e.g. kola nuts), cocoa beans, pulses (e.g. common beans) and preservation of vegetables, among others. There are reported cases of illicit peddling in the informal sector (figure 2.2) and illegal domestic uses such as indoor spraying for control of bedbugs, mosquitoes and ‘treatment of stomach ache’, among others.



Figure 2. 2: Pesticide peddlers in action

Chemicals poisoning incidents are common among illiterate farmers and others who apply POPs and other chemicals without adequate safety measures, occasioning exposure risks and attendant burdens of morbidity and mortality. Acute and chronic pesticide poisoning usually results from consumption of contaminated food, chemical accidents in industries and occupational exposure in agriculture. Pesticides are the major causes of cancer, cardiovascular diseases, dermatitis, birth defects, impaired immune functions, neurobehavioral disorder and allergy sensitization reaction (Erhunmwunse et al., 2012).

In 2008, about 120 cases of poisoning of students who had eaten beans contaminated with Lindane were reported in Gombe, while a study conducted revealed a high incidence of pesticide residues in beans sold in Lagos markets (Ogar, et al., 2013).

Furthermore, a stock of cream-white local beans suspected to contain pesticide-residues was intercepted in 2011 and report of analysis of representative samples at the National Agency for Food and Drugs Administration and Control (NAFDAC) laboratory, Kaduna indicated the presence of 2.31mg/kg Dichlorvos (DDVP), above EU-MRLs.

In a study conducted by Olufade et al (2014), it was reported that organochlorine insecticide residues of aldrin, dieldrin, heptachlor, endrin, chlordane and endosulfan were detected in some samples of cowpeas and dried yam chips analyzed with highest mean concentration of aldrin (0.580 ± 0.456 mg/kg) and heptachlor (0.402 mg/kg ± 0.073), respectively. Levels of residues detected in the cowpea grains and dried yam chips were generally above the EU-MRLs, suggesting that the foodstuffs were not safe for human consumption, as bioaccumulation of these residues was likely to pose health risks to the consumers.

2.1.2.3 POPs Stockpiles and Contaminated Sites

POPs stockpiles are generated as a result of a myriad of factors as enumerated in Chapter One. All sites where POPs have been produced, formulated, used or dumped can be considered as potential POPs contaminated sites. The main categories of sources are pesticide stocks bought for

the purpose of pest/vector control programmes in agriculture and health sectors, in excess of what is required, as a result of uncoordinated and unplanned procurement process, hence, have gone unused, stored under poor conditions, deteriorated and become obsolete.

Following advancement in technologies and product developments in industrial production, new ranges of composite manufactured goods and ensuing waste streams have emerged; thereby, presenting heavy, bulky and complex waste to process. These waste streams including POPs containing/contaminated goods end up at dump sites.

Most dump sites improvised from old laterite mining sites, gully erosion sites, open and undeveloped land, among others, are the ultimate destinations of many POPs-containing products such as e-wastes, scraps of end of life vehicles, industrial effluents containing cocktails of chemical wastes including POPs, due to their widespread application in a multitude of consumer and industrial goods. POPs-PBDEs can be leached from refuse by landfill leachate. In addition, bio-solids from wastewater treatment plants are known to contain POPs-PBDEs, which were disposed in landfills and applied in agricultural lands; these materials are in the global recycling flow and will continue to be used in consumer articles (UNEP, 2010; Shaw et al., 2010).

There are also legacy POPs stockpiles/contaminated sites such as a number of decommissioned formulation facilities/plants in Lagos, Port- Harcourt and Kaduna, owned by the multinational oil companies such as National Oil and Chemicals Marketing Company, NOLCHEM (Shell Petroleum Development Company was a major shareholder) now under new management as Consolidated Oil Plc (Con Oil), Mobil Oil Nigeria Plc and Chemical and Allied Product Limited (CAPL). NOLCHEM had plants formulating POPs and other organochlorine pesticides in Apapa, Lagos; Port Harcourt and Kaduna. Mobil Oil also had a plant formulating POPs in Apapa, Lagos; and Port Harcourt while CAPL had a formulation plant in Ibadan for Lindane and some POPS pesticides. In response to international concern about the deleterious health and environmental effects of all POPs pesticides, the formulation plants have been closed down since the 1990s except the CAPL plant at Ibadan, Oyo State that closed down in 2004 producing Lindane. Since no documented information about site decontamination of these plants when they were decommissioned is available, there is need to conduct a comprehensive site risk characterization for proper profiling and eventual decontamination, if necessary.

Furthermore, another critical source of POPs stockpiles is the massive stock of transformer oils containing PCBs used in closed systems such as electrical equipment, namely: electricity generation, transmission and distribution transformers, voltage regulators, switches, reclosers, capacitors, among others. Drums of PCBs oil and contaminated equipment are still being held in stock at different locations nationwide pending when there will be resources to support their sound disposal within or outside the country in line article 6 of the Stockholm Convention.

There is no national database on obsolete stocks, reservoirs and contaminated sites. A reliable estimate of the quantities of the obsolete stocks could not be made during the inventory exercise. This is a gap that must be filled. Furthermore, centralisation of all stockpiles at regionally designated controlled collection centres should be initiated, for ease of their containment/safeguarding, prior to their final sound disposal, reprocessing, destruction or irreversible transformation.

The gross effects of the foregoing are environmental/public health and safety concerns, such as pollution of air, water and soil media; this stance has been corroborated by Ezemonye (2005) who reported PCBs levels of 1500ng/L in River Ethiope and 2930ng/L in River Benue, which are known for fishing activities and farmland irrigation. PCBs are a class of toxic, carcinogenic POPs of immense global concern. Sources of the reported pollution loads are industrial activities, illegal disposal methods and neighbouring contaminated/dilapidated PCBs storage facilities.

Additionally, POPs stockpiles/contaminated sites also pose a wide variety of administrative, economic, and social problems that must be managed and solved through a complex service involving appropriate organizational, technical, and managerial capacity and cooperation among numerous stakeholders in both private and public sectors.

Consequently, it is absolutely necessary to carry out detailed inventory of POPs hotspots using approved internationally standardized methodologies in order to obtain sites to be remediated and for the evacuated POPs to be disposed accordingly. The locations can then be mapped in a digital imagery of Nigeria. The goal is to have the correct and updated digital map of contaminated sites ready for clean-up and remediation in accordance with Article 6 of the Stockholm Convention.

Comprehensive discussions on POPs stockpiles and contaminated sites can be found in Section 2.1.2.10.

2.1.2.4 POPs and Climate change issues

Nigeria is an emerging industrialised economy with remarkable activities in agriculture, manufacturing, commerce, and services-oriented subsectors, in which essential chemicals, including some Persistent Organic Pollutants (POPs), are utilized.

The long-term abandonment, accumulation and safeguarding (if any) of the obsolete POPs stock in various sectors of economy and contaminated sites observed in inventory activities conducted in the past (for example, during the Nigeria-ASP implementation) constitute hotspots for POPs discharges and emissions, nationwide. Under natural influences or anthropic causes, these stockpiles are potentially dislodged and transported in manners that are characteristic of POP-chemicals.

The 2009 global monitoring report of the Stockholm Convention, which was carried out in line with Article 16 of the Stockholm Convention on effectiveness evaluation and the global monitoring plan, recognised the importance of climate effects on POPs. In addition, Decision SC-4/31 of the Stockholm Convention Conference of Parties (COPs) on Global Monitoring Plans (GMPs), encourages further assessment of long-range transport of POPs while considering the effect of climate and on observed trends.

Nigeria has over the years observed and documented this phenomenon. For instance, perennial excessive precipitation and heat waves due to climate variability, recorded in recent past (2012-2013) have affected all States of the Federation including FCT Abuja with devastating environmental and public health impacts (figure 2.3). There has been widespread dislodgment of POPs-pesticide stockpiles by flash floods, leaching and runoff of pesticides applied on vast

farmlands and emissions from POPs-contaminated sites, including municipal wastes dump sites and dilapidated PCBs storage facilities. This scenario has led to pollution of the environmental core media and food items.

The following among others are cumulative effects of climate impacts on POPs management in Nigeria:

- Greater human exposure to POPs and inherent burdens of disease among the impacted population, particularly the vulnerable groups (women and children), decreased personal productivity and increased poverty level;
- Increased use of POPs-Pesticides due to multiplied pest infestation and dislodgement;
- Rapid re-volatilization of POPs from secondary sources, such as soil, surface water and vegetation, into the environment due to harsh tropical conditions within the country. For instance, the MONET Africa sampling campaigns conducted in Abuja recently indicated high level of POPs like endosulfan and PCBs in the air; and
- Potential cases of food and water insecurity due to wide spread pollution of environmental media.

Thus, it is of national priority to, among others:

- assess the extent of risks of POPs exposure, arising from the flood disasters in impacted states;
- undertake pilot projects on mitigation actions; and
- support the Stockholm Convention initiative to produce a systematic and authoritative global review of the impacts of climate change on POPs.



Figure 2. 3: Flash floods of this nature have the tendency to dislodge obsolete POPs stockpiles (Source: Guardian Newspaper, 2015)

2.1.2.5 UPOPs Emission and Sources

2.1.2.5.1 Health care waste management

Health care institutions in Nigeria face multiple and significant challenges in managing their bio-medical waste generated from their day to day activities and services. The current disposal method adopted by many health care delivery facilities, which include open burning on their premises, poses grave public health and environmental risks. The Health Care Waste (HCW) may also contain a large proportion of plastic materials which when burnt generate UPOPs including dioxin and furans that are major air pollutant of global concerned due to their characteristic burdens of morbidity and mortality.

A pilot survey conducted in 53 hospitals nationwide, between 2000 and 2004, revealed that health care waste streams were often collected and burnt in the open within the hospital premises or co-mingled with municipal solid wastes and disposed of at open dump sites, as most hospitals did not have HCW disposal facilities. Consequently, health care delivery facilities are major source of UPOPs emission in Nigeria. Inventory data collected on HCW management are attached hereto (Annex VII). Consequently, it has become exigent that environmentally sound health care waste management system, incorporating promotion of BAT/BEP-compliant mechanisms, techniques and technologies be instituted as a matter of national priority.

In an attempt to address this challenge with the available resources of the Government, some tertiary health institutions (University of Ilorin Teaching Hospital, Lagos University Teaching Hospital, Federal Medical Centre, Owo, National Pharmaceutical Research Institute (NAPRI) Idu – Abuja, National Orthopaedic Hospital, Igbobi, National Hospital, Abuja, among others) have been equipped with functional incinerators articulated with scrubbers, to assist them in managing their medical wastes in an environmentally sound manner (figure 2.4). With the success recorded under the National Hospital Intervention Scheme, efforts are ongoing to extend same gesture to remaining Federal Medical Institutions.



Figure 2. 4: An Incinerating facility for HCW management built by Lagos State Government (left) and another incinerator at Lagos University Teaching Hospital (right) in Lagos

2.1.2.5.2 Gas Flaring

Nigeria's hydrocarbon reserve features more gas than crude oil; for instance, in 2014, total crude oil and condensate production was 798,541,589 barrels giving a daily average of 2.19 million barrels per day with a total of 2,524.27 billion standard cubic feet of natural gas production. Nigeria's natural gas reserves are rated as the seventh in the world and the largest in Africa (EIA, 2006). The nation's gas reserve is distributed between associated gases (AG) and non-associated gas (NAG), which the country has capacity gaps in reutilization, hence resort to gas flaring.

Flaring of associated gas is the process of burning of surplus combustible vapours from an oil well, either as a means of disposal or as a safety measure to relieve well pressure (Ubani et al, 2013). Gas flaring contributes to UPOPs emission and other criteria pollutants which negatively impact on nearby communities and surroundings flora and fauna.

In the recent past, collection of associated gas, particularly from lower quality oilfields, was not economically feasible; hence, it was flared openly (figure 2.5). Recently, however, there have been concerted efforts by the Government to collect and process associated gas as Liquefied Petroleum Gas (LPG) or used in other different ways as a source of energy. According to NNPC statistics, flaring progressively decreased from 42.58% in 2004 through 31.45% in 2007 and 24.30% in 2010 falling to the most recent 11.47% in 2014.

Currently, gas flaring could be regarded as a significant source of UPOPs in Nigeria, thus, technical and financial supports are required by the Government in its efforts to reduce the environmentally damaging flaring and venting of gas associated with the extraction of crude oil, with the ultimate goal of actualizing gas re-utilization for clean energy production and cognate applications.



Figure 2. 5: Gas flaring in the oil and gas

2.1.2.5.3 Agricultural and Municipal Waste Management

Nigeria generates approximately 20 million tonnes of municipal waste annually, which is deposited in unmanaged waste dumpsites by private and municipal waste collectors (UNDP, 2010). A conservative estimate of municipal waste burned through spontaneous combustion and/or intentional fires is about 20%. Approximately 50% of the collected waste is organic providing alternative management opportunities such as composting for biodegradables with other waste categories reused or recycled.

Furthermore, Nigeria is an agrarian nation with about 65% of her population constituted by farmers, most of whom are small land holders. Traditional or old style farming is sustained on customary practices such as burning of agricultural stubble and waste in preparation for planting or hunting, to minimize labour costs. This age-long agricultural practice leads to local air pollution in the form of harmful substances including UPOPs releases.

In order to address the challenges posed by these unsound traditional practices, Nigeria approached GEF for the support to implement the project titled: *The Less Burnt for a Clean Earth Project: Minimization of dioxin emission from open burning sources in Nigeria (UPOPs Project)*. The project was conceptualised to enhance human health and environmental quality by reducing releases and exposures to unintentionally produced POPs originating from unsustainable waste operations.

UPOPs project was piloted in two (2) States namely: Kano & Anambra, executed with technical support provided by UNDP and focused on strengthening institutional and legislative frameworks for reducing UPOPs emissions from municipal and agricultural wastes. The project implementation commenced on 27 April 2011 and completed in 2015. The following are some landmark success records of the UPOPs project, viz:

- Community-based waste sorting and composting programme established in Durayi, Kabuga, Kano. About 5MT of compost is being produced per month from the community's waste.
- Upgraded Gyadi Gyadi open dumpsite in Kano into a controlled dumpsite.
- Introduced alternatives approaches to open burning of agricultural waste. Crop residues that would have been burnt are now converted into animal feeds and mulching materials.
- Trained over 600 scavengers on effective waste sorting methodology.
- Reduced UPOPs emission from open burning of MAW in the two pilot States by 30%.
- Produced policy and guidance documents on sound management of municipal and agricultural waste, namely:
 - National Policy on Municipal and Agricultural Waste (MAW) Management;
 - Guidance Notes for the Reduction of Open Burning of Municipal and Agricultural Waste;
 - National Reduction Strategy for the Prevention of Open Burning of MAW; and
 - National Awareness Raising Brochure on the Effects and Prevention of open burning of MAW.

- Conflict resolution between farmers and Fulani herdsmen over grazing. (Converting farm residue to animal feed has greatly reduced cattle grazing on farms and less than 40% of herdsmen from Doguwa and Danbatta move from place to place in search for pasture.
 - Kano State Government has budgeted for replication of compost plant in 7 other LGAs.
 - Some farmers' cooperatives as well as individuals have purchased crop shredders for commercial purposes.
 - A Microfinance Bank and DFID are discussing with the Project Management on replication in Kano.
 - Some foreign investors have indicated interests and are presently discussing with REMASAB on further replication.



Figure 2. 6: Composting facility established by UPOPs Project in Kano

2.1.2.5.4 Singeing of Animal hides and skins

Singeing in an open fire is a common traditional process by which hair on the skin of slaughtered ruminants such as goats, sheep and cattle is removed. This method of preparing the animal carcasses/skins and hides is popular among butchers in Nigeria, due to general belief that it 'tends' animal skins for eating and 'sweetens' the meat to consumers' delight (FAO, 1985).

It is mostly done by the use of cheap and accessible fuels such as firewood, scrap tyres, spent oils, used plastic materials among others. In most instances, scrap tyres are preferred as they are cheaper & more caloric and produce more flame with less heat; hence, it is able to selectively burn off the hair on the animal without cracking the hides. Used tyres burn with dark thick smoke and emit toxic chemicals like dioxins and furans, carbon monoxide, sulphur dioxide, polyaromatic hydrocarbons (PAHs), among others, with associated serious public health and environmental risks

(USEPA, 1994; ATSDR, 1998). Furthermore, hides singed this way and boiled are consumed as local delicacy known as ‘ponmo’ (fig 2.7).



Figure 2.7: Singed and boiled cow hides (ponmo), a native delicacy in Nigeria

Due to health related problems associated with eating red meat, cattle hide also known as ponmo, kanda or ganda has become a substitute for red meat in Nigeria which in turn has resulted in the increased demand of these products. However, recent studies have indicated that hides singed with used tyres or spent engine oil may be contaminated with heavy metals and toxic organic chemicals, which may impact burdens of morbidity among consumers (Ekenma *et al*, 2014).

2.1.2.6 Waste Electrical Electronic Equipment (WEEE)

Nigeria has recorded an unprecedented growth in different sectors of the economy, due to Government’s developmental initiatives which have attracted flow of investments, increased commercial and industrial activities, emergence of bilateral trade relationships and trade liberalisation. This policy thrust has been a crucial impetus for the influx of new ranges of composite luxury goods, hi-tech products and devices like Electrical and Electronic Equipment (EEE). Due to its complexity and rapid growth, Waste Electrical Electronic Equipment (WEEE) is now an emerging policy issue (nationally, regionally and globally). Without Environmentally Sound Management (ESM), WEEE poses threats to the global environment and public health (Cueva, 2014).

WEEE or E-waste consists of all waste from electronic and electrical appliances which have reached their end-of-life period or are no longer fit for their original intended use and are destined for recovery, recycling or disposal. It includes the computer set and its accessories monitors, printers, keyboards, central processing units; typewriters, mobile phones and chargers, remotes, compact

discs, headphones, batteries, LCD/Plasma TVs, air conditioners, refrigerators and other household appliances.

Therefore, with soaring consumerism and an anticipated geometric rise in EEE merchandise in the country, the mounting e-waste in municipal solid waste has continued to be an issue of serious concern.

In 2005, Basel Action Network (BAN 2005) conducted a study titled “Exporting Reuse and Abuse to Africa” which reported an annual importation of about 5 million Personal Computer units into Nigeria, with a weight estimated at 60,000 metric tons, a large percentage of which are unserviceable. These items contain over 1,000 different substances, many of which are toxic and create serious pollution as a result of unsound disposal (Osibanjo, 2014).

WEEE as a key source of environmental and public health risks

Today the electronic waste recycling business is carried on nationwide and is a rapidly consolidating business in the informal sector. This venture is most undertaken by the informal sector, which extracts precious materials therefrom (figure 2.8). All electronic scrap components contain contaminants such as lead, cadmium, beryllium or brominated flame retardants.

To overcome the diverse and complex problem of hazardous e-waste management, a multidisciplinary approach is required to implement the mechanism for collection, sorting, reusing, repairing, remanufacturing to reduce emissions and save energy.

Recycling and disposal of hazardous e-waste may involve significant risk to workers and communities and great care must be taken to avoid unsafe exposure in recycling operations and leaching of a material such as heavy metals from landfills and incinerator ashes.



Figure 2. 7: Waste electrical electronic equipment: a source of environmental and health challenges

Furthermore, unregulated activities of the informal sector give rise to serious social and environmental concerns, as scavengers and dismantlers work unprotected, thereby, exposed to biological, chemical, and physical hazards.

Interventional Initiative on Management of WEEE

As a preliminary step instituting national policy thrust on sound management of WEEE, Nigeria conducted an E-waste country assessment with the support of Swiss Federal Laboratories for Material Science and Technology (EMPA), United Nations Environment Programme (UNEP) and Basel Convention Secretariat in 2012. The study revealed that an average of 500 containers of electronic products enter the country monthly, through Lagos Seaport, out of which 70% contain non-functional computers, computer peripherals, televisions, VCRs, DVD Players, stereo equipment, cell phones, among others (Osibanjo, 2014).

This imported WEEE stream and near end-of-life consignment entering the country illegally add on to the domestically generated stockpiles, thereby widening the national capacity gaps in the management of municipal and hazardous waste. It is to be mentioned that a number of factors have accentuated proliferation of WEEEs or EEEs, viz:

- Advances in electronics, communications, controls and sensor technologies.
- The era of sophisticated controls and integrated communications.
- Expansion of Global market for electrical and electronic products continues to accelerate, with associated short life spans of the products.
- Global industry trends: >50 % of the iron, copper, aluminum, lead and Palladium Group Metals (PGM) coming from “urban Mining”.
- The value chain: For every one million cell phones that are recycled, 16 tons of copper, 350 kilos of silver, 34 kilos of gold and 15 kilos of palladium can be recovered.

In addressing challenges posed by the foregoing, Nigeria has implemented the following interventional actions:

- Networking and collaborating with relevant national stakeholders and international organisations on sound management of e-waste;
- Draft National Policy on e-waste;
- Development of Regulations for the Electrical Electronic Sector to control pollution from all operations and ancillary activities on the Nigerian Environment and cover both new and used Electrical/Electronic Equipment (EEE/UEEE). The regulations are based on 'cradle to cradle' approach to electrical/electronic products management. Contents of the Regulations include the following:
 - the principles of 5Rs which are: Reduce, Repair, Re-use, Recover and Recycle as the primary drivers of the sector;
 - best Practices in the manufacture of Electrical/Electronic Equipment (EEE);
 - guidelines for Importation of UEEE;
 - the Polluter Pays Principle;
 - practice of Environmentally Sound Management (ESM);
 - the Extended Producer Responsibility; and
 - responsibilities and roles of stakeholders.

- The Government is presently discussing with some Original Equipment Manufacturers (OEM) like HP, Dell, Nokia and Philips towards establishing a collection/take back system under the Extended Producers' Responsibility Program (EPR);
- Capacity building of regulatory officers, including Customs, Standards Organization of Nigeria (SON) etc., for effective import and export control;
- Registration and awareness raising programmes for Importers of EEE;
- Regulations being developed on the management of ELVs, particularly for:
 - sound management of BDE-containing components;
 - import control;
 - database management, including deregistration;
 - Guidelines for Importation of motor vehicles;
 - the Polluter Pays Principle;
 - practice of Environmentally Sound Management (ESM);
 - the Extended Producer Responsibility; and
 - responsibilities and roles of stakeholders;
 - capacity building of sectoral regulatory bodies, including Customs, FRSC for effective import and export control; and
 - licensing of ELV management facilities.
- National capacity building for POPs assessment/analyses, for example, establishment of the Global Environmental Outlook Research Center (GRC) Reference Laboratory in Ibadan, Nigeria (figure 2.9).
- Establishment of a Pilot Scheme at Ogijo managed by Maintenance Systems Consultants Limited. (MSC) on a Private Public Partnership (PPP) program on Waste to Wealth.



Figure 2. 8: E-waste recycling facility operated by Lagos State Government in collaboration with MSC in Lagos

2.1.2.7 Management of Obsolete Pesticides

Nigeria is an agrarian nation with about sixty percent of her population constituted by farmers, who engage in cropping and animal rearing. Farming and animal husbandry are prone to pest and vector attacks which inflict heavy economy losses on the practitioners, hence, necessitating application of control measures including use of hazardous chemicals.

Historically, chemical pesticides have contributed to the protection of crop, human and animal health against pest destruction and vector infestation. Hence, vast quantities are being procured in Nigeria by Governments and private merchandise. Some of these pesticides, however, have gone unused, stored under poor conditions, deteriorate and become obsolete. These obsolete pesticides have accumulated throughout the country over the decades, thereby, threatening the environment and public health. Associated with the foregoing, is the challenge of sound management of empty pesticide containers and contaminated equipment, which are otherwise converted to secondary uses, with attendant adverse public health and environmental consequences.

A number of factors have been identified as being responsible for the accumulation of these pesticides, namely; smuggling of hazardous pesticides into the countries, improper storage of these pesticides, lack of disposal facilities, poor stock management, product bans, mismanagement of pesticides, uncoordinated aid donations, among others.

The need for effective clean-up of this stockpiled pesticides led to the adoption of the African Stockpiles Programme, a multi-stakeholder initiative, conceptualized to be implemented in a number of African countries over a 12-15-year period on a rolling basis in which Nigeria participated. The Africa Stockpiles Programme in Nigeria (Nigeria-ASP) was conducted between September 2006 and June 2010 with a detailed inventory of obsolete pesticide stocks and associated waste in Government-owned stores and their locations, conducted in thirty-six states and FCT (Table 2.2). Figure 2.10 shows obsolete pesticide stocks being inventoried.



Figure 2. 9: Obsolete POPs pesticide stock being inventoried

Table 2. 2: Summary of Nigeria-ASP inventory data

Government-owned stores inventoried (holding agricultural inputs procured under interventional Projects like ADP, FADAMA, etc.)	305
Number of Inventory and store forms completed	2,538
Man-hours spent in completing this assignment	8,288
Obsolete pesticides	64.94 tons
Pesticides requiring testing	27.757 tons
Usable pesticides	70.1 tons
Contaminated equipment	14.802 tons
Contaminated soil	66.1 tons
Contaminated and dilapidated stores	68
Stores that require normal safeguarding	65
Stores for emergency safeguarding	1 store in Kano state, and 8 stores at Onireke Ibadan, Oyo state
Empty containers (about 142,233 units)	1.712 tons

As a follow-up to the Nigeria-ASP, a pilot project, titled *CleanFarms Project*, conceptualised by CropLife International (CLI) and CropLife Nigeria (CLN) in collaboration with Food and Agricultural Organisation (FAO), was implemented in FCT and four (4) States, namely: Niger, Benue, Kaduna and Nasarawa States. Objectives of the Project were to undertake inventory of all obsolete pesticides and empty containers in the private sector and eventually to safeguard them.

At the end of the inventory exercise, a total of 9.9 tonnes of obsolete pesticides and 72,192 empty containers were identified, out of which about 10% were leaking. Some of the obsolete stocks are being safeguarded at the Agricultural Development Project (ADP) storage facility in Minna, Niger State, in preparation for their destruction through Best Available Technique/ Best Environmental Practice (BAT/BEP) approach (CLI, 2010). Figure 2.11 illustrates safeguarding activities carried out during the CLI Cleanfarm project implementation.



Figure 2. 10: Safeguarding of obsolete pesticides during Cleanfarms Project

Furthermore, 32MT of obsolete Dichlorvos (DDVP) 100%, imported from India, was discovered in a private pesticide merchant store during the CleanFarms project Inventory activity. The consignment was destroyed at an incinerating facility in Port-Harcourt, Rivers State (CLI, 2010).Annex VIII shows the CleanFrams pilot inventory data.

Going by findings of the Nigeria Africa Stockpile Programme, factors responsible for accumulation of obsolete pesticides in Nigeria are still extant with attendant socio-economic, environmental and public health implications. Considering the geographical spread of Nigeria and inherent diversity of challenges in the realm of pesticide management, it has become exigent to intensify corrective policy actions, which can only be achieved by pooling sector-based data on pesticide management, for informed high-level decision making process. Thus, core stakeholders have, through various fora, identified the need to undertake the following activities as being of national priority, viz:

- i. Review and update of obsolete pesticide and contaminated equipment inventory data collected during the Nigeria-ASP implementation;
- ii. Comprehensive inventory of obsolete pesticides and contaminated equipment in private stores in the remaining 32 States of the Federation not covered during the CLI-initiated Cleanfarms project;
- iii. Establishment of empty pesticides and contaminated equipment management facilities; and
- iv. Development of national capacity for sound disposal/destruction of POP-pesticides, in accordance with BAT/BEP requirements.

2.1.2.8 Municipal and Agricultural Waste Management

UPOPs emission arising from open burning of municipal and agricultural waste was discussed in section 2.1.2.5, in which the work programme on elimination of UPOPs from these sources was discussed vis-à-vis implementation of the national UPOPs project, completed late 2015.

It is to be emphasised here that apart from UPOPs emission, other criteria pollutants are also emitted or discharged as a result of unsound management of municipal and agricultural waste, which streams are mostly co-mingled.

The continuous pollution of environmental media arising from ineffective municipal and agricultural waste management strategies, occasioning debasement of quality of life and sanitary balance in urban and sub-urban areas, has necessitated the need to create better environmental conditions and evolve a workable national strategy for solid waste management.

Consequently, the Federal Government has embarked upon robust policy initiatives and actions towards strengthening the national capacity for sound management of municipal and agricultural waste, as outlined below.

- Waste to Energy Programmes:
 - Establishment of Briquetting plants at Ogoja, Cross River State and Gboko.
 - Cow-to-Kilowatt Project for the sound management of abattoir waste, Ibadan, Oyo State.
- Implementation of the Community-based MDG projects at Ota, Maiduguri, Yenegoa, Ilorin and Gombe.
- Establishment of Transfer Loading Stations in Abeokuta, Oshogbo, Enugu and Gusau.
- Establishment of Integrated Waste Management Facilities (IWMF) under Public Private Participation in Kano, Anambra and Ekiti States.
- Development, Design and Production of Technical Guidance Manual and Transfer of Technology for Landfill Development in Nigeria.
- Development of Municipal and Agricultural Waste Management Policy for Nigeria highlighted in section 2.1.2.8.

2.1.2.9 Management of Polychlorinated Biphenyls

Historically, PCBs have been used in all sectors of Nigerian economy: as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution; stabilizing additives in flexible PVC coatings of electrical wiring and electronic components; pesticide extenders, cutting oils, flame retardants, hydraulic fluids, sealants (used in caulking, etc.), adhesives, wood floor finishes, paints, de-dusting agents, and in carbonless copy paper. As such, PCBs pose immediate and potential threat to the public health and environment.

In view of this apparent challenges, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on Persistent Organic Pollutants (POPs), which obligates parties to eliminate the use of PCBs in equipment (e.g. transformers and capacitors); and develop strategies for identifying stockpiles of in-use PCBs-containing equipment/substances and wastes containing PCBs and contaminated sites, for safe disposal.

The first National Implementation Plan (NIP), developed by Nigeria with the support of GEF, identified PCBs management as one of the top priority areas for POPs management, hence approached GEF for support to develop the National Framework for Sound Management of PCBs and PCBs-containing

equipment with technical assistance by World Bank. The project outcomes include the following, among others:

- Data generation on national PCBs management, which is necessary for discharging the reporting obligation under the Stockholm Convention.
- Reduction in PCBs- contamination and adverse environment/health-related incidents due to informed decision-making process.
- Improved public awareness on sound management of PCBs.
- Strengthened National Capacity for sound management of PCBs waste.

2.1.2.10 POPs Contaminated Sites in Nigeria

Anthropic activities such as manufacturing, agriculture, mining, energy production using fossil fuels, open burning of waste, services-oriented businesses among others, are associated with POPs-laden emissions and discharges in the absence of sound waste management options. These POPs-releases and discharges ultimately find their ways into environmental compartments, thereby contaminating and devaluing their natural capitals.

The following are potential sources of POPs waste stockpiles and contaminated sites in Nigeria:

- Locations where electrical equipment (particularly transformers and capacitors) are/were stored and serviced which are of grave concern in environmental protection considerations.
- Contaminated transportation equipment and impacted soil around the storage areas and areas where the transfer of the substances took place.
- Locations where POPs waste is/was potentially dumped (including co-disposal of hazardous and/or domestic waste).
- Former Organochlorine Pesticides Manufacturing/Formulation Plants.
- Public/Private warehouses holding stockpiles of obsolete Pesticides.
- Municipal Solid waste dumps, which are set on fire to reduce volume of waste.
- Mechanical service stations/villages such as Mechanic Villages and scrap yards nationwide, where End-of-Life Vehicles are dismantled for the purpose of recovering valuable components.
- Sites where confiscated goods such as fake/expired pharmaceuticals and chemical products, smuggled items, drugs or narcotics, are destroyed via open burning.
- Sources that may be identified under the national Poly-chlorinated biphenyls (PCBs) inventory in the power sector.
- Sites where animal skins and hides are singed using firewood, used tyres or other refuse-derived fuels.

It is noteworthy that the management of stockpiles and POPs- waste ensuing from the international action on new POPs ultimately brings upon additional compliance burden on the nation, which underlines and necessitates capacity strengthening and enhancement, to be able to effectively and efficiently implement emerging obligations.

It was in line with the foregoing that Nigeria, in collaboration with Ghana, sought and assessed GEF support for the implementation of the Regional Project to develop appropriate strategies for

identifying sites contaminated by chemicals listed In Annexes A, B, And/Or C Of the Stockholm Convention. Objectives of this project are, among others, to:

- build capacity for systematic identification of POPs contaminated sites and institutional strengthening for mitigation of the contaminated sites.
- develop regional and national policy and legal framework for sustainable management of POPs contaminated sites
- build the capacity in the region to develop appropriate strategies for identifying sites contaminated by POPs and other Persistent Toxic Substances (PTSs); and
- develop a toolkit for identifying POPs contaminated site and explore the viability of environmentally sound and low cost remediation technologies.

2.2 Institutional, Policy, and Regulatory Framework

Nigeria, as a pioneer party to BRS and other relevant conventions is robustly committed to total compliance with their obligations, singularly and collectively. She has therefore developed various institutional, policy & regulatory frameworks, strategies and action plans for effective implementation of the treaties across the board.

2.2.1 Background

Federal Ministry of Environment is the Designated National Authority (DNA) for the coordination and fulfilment of the country's obligations in the framework of Basel, Rotterdam and Stockholm (BRS) Conventions and other international agreements regarding the Persistent Organic Pollutants (POPs). However, POPs related activities are driven and coordinated through multi-stakeholder and multi-sectoral approach, incorporating MDAs, CSOs, the Academia and other relevant sectors, affected by or with capacities, competences, cognate mandates and capabilities in the realms of POPs management.

As a Party to Stockholm Convention, Nigeria is obligated to promote the development and adoption of necessary measures to reduce and/or eliminate the risks to humans and wildlife from the release of POPs to the environment, including strengthen national policy, regulatory enforcement, institutional and technical capacity for POPs regulation.

Bearing in mind that the global best practice enshrining long-term and stable solutions to POPs management is by building multi-stakeholder cooperation, institutional coordination and inclusive decision making process, this requires pooling complementary policies, strategies and management approaches, which comprise sectoral instruments related to POPs as well as strategies, programs and projects being undertaken by relevant bodies/corporate entities. These elements are either environment-specific or adapted from other sectors, due to cross-cutting mandates.

Several laws and institutions have been created for the purpose of ensuring that the entire field of environmental issues is covered. Some of these new interventions have been juxtaposed on the old multiplicity of implementing institutions and sectors. Additionally, new policies, legislations, regulations and standards are also in the process of being enacted to meet exigent needs of global emerging issues in environmental management, among which are sound management of chemicals, particularly POPs.

2.2.2 Roles and responsibilities of Institutions involved in Chemicals/POPs management

As indicated in the earlier section, POPs-issues are cross-cutting, impacting or concerning state and non-state players. Table 2.3 briefly describes institutions and bodies that are relevant in POPs and general chemicals regulations and their respective responsibilities.

Table 2. 3: Roles and Responsibilities of Institutions involved in Chemicals/POPs Management

S/N	Institution	Economic Sector	Roles in POPs Management
1.	Federal Ministry of Environment (FMEnv)	Government: Thematic focal area: Environment	<p>Formulating national environmental policies, including strategies, legal, socio- economic and institutional frameworks for the improvement of environmental quality and protection of natural resources, including issues related to pollution, chemical risk and hazardous wastes management;</p> <p>Designated National Authority (DNA) for chemicals & wastes-treaties and competent authority for POPs elimination and emissions reduction programme/project implementation;</p> <p>Implementation of activities for pollution prevention and control, environmental monitoring and hazardous materials emergency preparedness and response;</p> <p>Responsible for guiding the life cycle management of POPs-chemicals, covering the import control, handling, transportation, treatment and disposal;</p> <p>Regulating the trans-boundary movement of hazardous chemicals on the National Prior-Informed Consent (PIC) list;</p> <p>Key player in the risk evaluation and profiling of candidate-alternatives to POPs-pesticides, for various applications;</p> <p>Reporting research findings and risk profile of candidate alternatives to the Stockholm Convention Conference of the Parties for dissemination;</p> <p>Advise the Federal Government on National Environmental Policies and priorities, the conservation of natural resources and sustainable development and scientific and technological activities affecting the environment and natural resources;</p>

S/N	Institution	Economic Sector	Roles in POPs Management
			<p>Promoting cooperation in environmental science and conservation technology with similar bodies in other countries and with international bodies connected with the protection of the environment and the conservation of natural resources;</p> <p>Cooperating with Federal and State Ministries, Local Government, statutory bodies and research agencies on matters and facilities relating to the protection of the environment and the conservation of natural resources; and</p> <p>Prescribing standards for and making regulations on water quality, effluent limitations, air quality, atmospheric protection, ozone protection, noise control as well as the removal and control of hazardous substances.</p>
2.	Federal Ministry of Health	Government: Thematic focal area: Health	The Ministry formulates, disseminates, promotes, implement, monitor, and evaluates health policies in Nigeria. It is the coordinating executive body on issues relating to public health.
3.	Federal Ministry of Science and Technology	Government: Thematic focal area: Research & Development	The Ministry facilitates the development and deployment of science and technology apparatus to enhance the pace of socio-economic development of the country through appropriate technological inputs into productive activities in Nigeria.
4.	Federal Ministry of Labour and Employment	Government: Thematic focal area: Labour	<p>The Ministry has the following mandates, among others: employment generation; labour administration and inspection; skill development and certification; labour safety, health, welfare and education.</p> <p>The Ministry is concerned about workplace protection of workers against exposure to hazardous chemicals and waste; ensures compliance by industries with the use of Personal Protective Equipment (PPE) by factory workers.</p>

S/N	Institution	Economic Sector	Roles in POPs Management
5.	Federal Ministry of Agriculture and Rural Development	Government: Thematic focal area: Agriculture	<p>The Ministry regulates agricultural researches, agriculture and natural reserves, forestry and veterinary researches.</p> <p>The Ministry also has the responsibility of optimizing agriculture and integrating rural development for the transformation of the Nigerian economy with a view to attaining food security and positioning Nigeria as a net food exporter and socio-economic development.</p> <p>The Ministry is a major user of crop protection products and chemical pesticides for disease vector control in animal husbandry.</p> <p>It is also responsible for undertaking farm extension services such as collection and dissemination of information to farmers on proper use of pesticides and alternatives thereto.</p>
6.	Federal Ministry of Industry, Trade & Investment	Government: Thematic focal area: industrial/ investment regulation	<p>The Ministry plays a decisive role in the diversification of the resource base of the economy by promoting trade and investment with special emphases on increased production and export of non-oil and gas products that would lead to wealth and job creation.</p> <p>It also supervises industries and companies that handle chemicals in their production processes, though not an institutional manager of industrial chemicals and pesticides.</p>
7.	Federal Ministry of Mines and Steel Development	Government: Thematic focal area: solid mineral resources	<p>The Ministry of Mines and Steel is responsible for identifying the nation's solid minerals, advising Government on the formulation and execution of laws and regulations guiding the various stages of prospecting, quarrying and mining; and monitoring sale and consumption of solid minerals in the country, through the issuance of permits, licenses, leases, among others.</p>

S/N	Institution	Economic Sector	Roles in POPs Management
			Solid mineral mining sector is a chief source of POPs emission, for example, coal mining and coal-fired power generating plants.
8.	Federal Ministry of Transport and Aviation	Government: Thematic focal area: Transport & Aviation	<p>The Ministry is responsible for the establishment of safe, efficient, affordable and seamless intermodal transport system, in line with global best practices. The ministry also formulates, updates and implements the National aviation master plan for the overall development of the aviation industry in the country. It also collects, stores, analyses and disseminate meteorological data to end users; install maintain, and upgrade equipment and infrastructure on timely basis and at all airports.</p> <p>Transport and Aviation subsectors are <i>vehicles</i> facilitating intermodal consignment and freighting of industrial chemicals and chemical products, which are crucial in chemical import and export trades.</p>
9.	Federal Ministry of Finance	Government: Thematic focal area: Financial regulation	<p>The Ministry of Finance is responsible for:</p> <ul style="list-style-type: none"> • general supervision and control of public fund of the federation, including development and contingency fund; • management and control of Consolidated Revenue Fund; • securing and managing the investment of the federation; • control and management of public expenditure; • control and management of external finances of the federation; and • processes co-financial obligations under foreign donor-funded project implementation.
10.	National Environmental Standards and Regulations Enforcement Agency (NESREA)	Government: Thematic focal area: Environmental regulations	NESREA is a parastatal of the Federal Ministry of Environment and is charged with the responsibility of enforcing all environmental laws, guidelines, policies, standards and regulations in Nigeria.

S/N	Institution	Economic Sector	Roles in POPs Management
11.	Department of Petroleum Resources (DPR)	Government: Thematic focal area: Oil and Gas regulations	DPR is a parastatal of Federal Ministry of Petroleum and has the statutory responsibility of ensuring compliance with petroleum laws, regulations and guidelines in the Oil and Gas Industry. Its mandate includes monitoring operations at drilling sites, producing wells, production platforms and flow stations, crude oil export terminals, refined products import terminals, refineries, storage depots, pump stations, retail outlets, and any other location holding crude oil, natural gas and petroleum products, among others.
12.	Standard Organisation of Nigeria (SON)	Government: Thematic focal area: Standard Regulations	SON is a parastatal of the Federal Ministry of Industry, Trade and Investment (FMITI) and has the responsibility of developing and enforcing standards relating to products, measurements, materials and processes, certification of industrial products, assistance in the production of quality goods among others.
13.	National Agency for Food and Drug Administration and Control (NAFDAC)	Government: Thematic focal area: Food, drugs & allied products regulations	NAFDAC is a parastatal under the Federal Ministry of Health which regulates and controls the manufacture, importation, exportation, distribution, advertisement, sale and use of food, drugs, cosmetics, medical devices and packaged water (known as regulated products) and chemicals. NAFDAC is a key stakeholder in the chemical import and export control.
14.	Nigerian Ports Authority (NPA)	Government: Thematic focal area: seaports management	The agency is a parastatal of the Federal Ministry of Transport & Aviation and is responsible for: <ul style="list-style-type: none"> • developing, owning and operating ports and harbours; • providing safe and navigable channels; • offering cargo handling and storage services, • maintaining port facilities and equipment • ensuring safety and security within the port premises.

S/N	Institution	Economic Sector	Roles in POPs Management
			Seaports are major route through which chemicals are imported into the country, thus chemical-bearing containers are statutorily monitored at the port, in line with national import/export control regime.
15.	Nigeria Customs Service (NCS)	Government: Thematic focal area: import and export control	The Nigeria Customs Service is responsible for prevention and suppression of smuggling. It also performs collaborative function with sister regulatory bodies in combating importation of toxic and hazardous substances (including wastes), illegal commercial activities and trade in illicit goods (such as obsolete or banned chemicals), among others. NCS maintains a database on import and export trades based on Automated System for Customs Data (ASYCUDA++) platform. ASYCUDA is computerised customs management system which covers most foreign trade procedures and generates trade data that can be used for statistical economic analysis (UNCTAD, 2016).
16.	Consumer Protection Council (CPC)	Government: Thematic focal area: Consumer rights protection	CPC is a parastatal of the Federal Ministry of Industry, Trade and Investment. The Council is responsible for eliminating hazardous products from the market, providing speedy redress to consumer complaints, protection of consumers' rights, consumer education and advocacy, among others.
17.	Manufacturers Association of Nigeria (MAN)	Industry: Thematic focal area: manufacturing	MAN is the umbrella body for Manufacturers of locally produced commodities, including chemicals and allied products. The group is segmented into various subsector such as Food, Beverages and Tobacco subsector; Chemicals and Pharmaceuticals sub-sector; Basic metal, Iron and Steel, and Fabricated Metal Products sub-sector; Domestic & Industrial Plastic, Rubber and Foam sub-sector; Electrical & Electronics sub-sector; Motor Vehicle and Miscellaneous Assembly sub-sector; Pulp, Paper and Paper products, Printing and Publishing sub-sector; Textile, Wearing Apparel, Carpet, Leather/Leather Footwear subsector; and Wood and Wood Products (including furniture) sub-sector, among others. These subsectors are potential sources of POPs-in-products, POPs' emissions and discharges.

S/N	Institution	Economic Sector	Roles in POPs Management
18.	National Bureau of Statistics (NBS)	Government thematic focal area: statistics	The National Bureau of Statistics (NBS) is mandated to coordinate statistical operations of the National Statistical System in the production of official statistics in all the Federal Ministries, Departments and Agencies (MDAs), State Statistical Agencies (SSAs) and Local Government Councils (LGCs).
19.	Federal Road Safety Corps	Government thematic focal area: Road Safety	<p>The corps is responsible, inter alia, for making the highways safe for motorists and other road users. In carrying out its mandate, the corps maintains a database of registered vehicles on Nigerian roads, through production and issuance of Number Plates.</p> <p>The database operated by FRSC serves as resourceful input for updating and intensifying policy actions towards minimising and or eliminating POPs emissions in the transport sector.</p>
20.	Academia and Research institutes	Government /private thematic focal area: Research and Capacity development	Academia and research institutes have comparative advantages in research-related services, technology transfer and capacity building, chemical risk assessments, development of safer alternatives to hazardous chemicals, technical support on national implementation of environmental treaties, policy actions, among others.
21.	Directorate of Road Traffic Services (DRTS)	Government thematic focal area: Road transport and vehicle inspections	<p>DRTS in the states and FCT are responsible for technical inspection of vehicles, issuing vehicle licenses and road worthiness certificates within their respective states of jurisdiction.</p> <p>In discharging their mandates, DRTS maintain state-based database of licensed vehicles. The database operated by DRTS, when harmonized with Federal Road Safety Corps (FRSC) data for respective states, serves as a resourceful input for estimating POPs emissions in the transport sector.</p>
22.	Civil Society Organisations	Non-Governmental Organization thematic	CSOs are non-state actors that complement the work of state actors (government) in the areas of public enlightenment and educational programme on chemical risk prevention, promotes transparency and accountability in policy formulation and implementation:

S/N	Institution	Economic Sector	Roles in POPs Management
		focal area: advocacy and technical support	General policy discussions, project designs, implementation and monitoring. The group includes NGOs, gender group, labour, among others.
23.	Nigerian National Petroleum Corporation (NNPC)	Government thematic focal area: Oil and Gas	<p>NNPC is the state oil corporation with the interests in exploration activities, refining, petrochemicals and products transportation as well as marketing. NNPC is the sole owner and operators of the four petroleum refineries in Nigeria.</p> <p>The Oil and Gas sector is a major source of annexes A, B and C POPs.</p>
24.	National Oil Spill Detection and Response Agency (NOSDRA)	Government thematic focal area: Environmental regulations in Oil and Gas	<p>NOSDRA is a parastatal of FMENV mandated to conduct timely, effective and appropriate response actions to oil spills, as well as ensuring clean and remediation of all impacted sites to all best practical extent.</p> <p>It is also responsible for mapping high risk/priority areas in the oil-producing environment for protection as well as ensure compliance of oil industry operators with all existing environment for operators with all existing environmental legislations in the petroleum sector.</p>
25.	Federal Ministry of Foreign Affairs	Government thematic focal area: international diplomacy	The Ministry is responsible for the formulation and execution Nigeria's foreign policies. It is also responsible for Bilateral or Multilateral with other States, Regional and International Organisations, and serves as formal point of contact with the international community.
26.	Federal Ministry of Information and Culture	Government thematic focal area: raising awareness and promoting information and culture.	<p>The Ministry is responsible for the management of the image, reputation and promotion of the culture of the people and Government of Nigeria, through a dynamic Public Information System that facilitate access by the citizens and the global community to credible and timely information about our nation.</p> <p>The Ministry, by itself or through its Agencies, is the lead organisation for disseminating information to the public on development initiatives and policy frameworks on environment, in general.</p>

S/N	Institution	Economic Sector	Roles in POPs Management
27.	Federal Ministry of Communications	Government thematic focal area: communication technology	<p>The Ministry is mandated to carry out the following:</p> <ul style="list-style-type: none"> • Facilitate universal, ubiquitous and cost effective access to communications infrastructure throughout the country; • Promote the utilisation of ICT in all spheres of life to optimise the communications infrastructure – digital content creation, domestic software applications and the delivery of private and public services over the internet; • Promote and facilitate the development of the ICT industry and increase the contribution of the ICT industry to GDP; • Utilise ICT to drive transparency in governance and improve the quality and cost effectiveness of public service delivery in Nigeria. <p>The Government’s laudable policy thrust on computerisation of public service and other cognate initiatives will lead to increased application of ICT devices and equipment. This however will ultimately be ensued with generation of Waste Electrical Electronics Equipment (WEEE), which is priority POPs issue in developing countries like Nigeria.</p>
28.	Federal Ministry of Budget and National Planning	Government thematic focal area: Budget and National Planning	<p>The Ministry is mandated among others, to:</p> <ul style="list-style-type: none"> • implement budget and fiscal policies of the Federal Government of Nigeria; • undertake periodic review and appraisal of the national human and material resources capabilities of Nigeria with a view to advancing their development, efficiency and effective utilization; • manage multilateral/bilateral economic co-operation, including development aid and technical assistance; and • deal with matters relating to regional economic co-operation, including the Economic Community of West African States, the African Common Market, the United Nations Economic Commission for African and the South-South co-operation.

S/N	Institution	Economic Sector	Roles in POPs Management
29.	National Biosafety Management Agency (NBMA)	Government thematic focal area: Environment (biosafety)	NBMA is a parastatal of FMENV charged with the responsibility to provide a regulatory framework, institutional and administrative mechanism for safety measures in the sustainable development of science of modern biotechnology and its application while protecting human and environmental health.
30.	Federal Fire Service	Government thematic focal area: Emergency Responder/Management	FFS is an Agency of Government supervised by the Interior Ministry. The Agency Mandate covers Emergency response which includes: <ul style="list-style-type: none"> • response to emergency involving HAZMAT materials and fire resulting from chemical/oil spill; • decontamination of areas affected by chemical spill; and • rescue of victims of hazardous materials and related accidents.
31.	Institute of Chartered Chemists of Nigeria (ICCON)	Government/ Private thematic focal area: Advocacy, Technical Support, Research and Capacity development	ICCON is primarily responsible for the teaching, learning and practice of Chemistry in Nigeria. The institute has the largest network of chemists in Nigeria who are more informed with the knowledge of chemicals, in this case, POPs.
32.	Federal Ministry of Women Affairs and Social Development	Government thematic focal area: Gender Advocacy and Mainstreaming	Federal Ministry of Women Affairs and Solid Development is mandated to: <ul style="list-style-type: none"> • serve as the national vehicle to bring about speedy and healthy development of Nigerian Women, Children, the socially disadvantaged and physically challenged, and the main-streaming of their rights and privileges in national development process; and • help build a Nigerian Society that guarantees equal access to social, economic and wealth creation opportunities to all, irrespective of gender, places premium on protection of the child, the aged and persons with disabilities.

S/N	Institution	Economic Sector	Roles in POPs Management
33.	The Federal Ministry of Justice	Government Thematic Focal Area: Justice	Federal Ministry of Justice is the legal arm of the Federal Government of Nigeria, primarily concerned with bringing cases before the Judiciary that are initiated or assumed by the Government.
34.	The Federal Ministry of Education	Government Thematic Focal Area: Education	The Ministry has the following mandates, among others:- <ul style="list-style-type: none"> • Formulate and co-ordinate a national policy on education; • Collect and collate data for purposes of education Planning and Financing; • Prescribe and maintain uniform standard of education throughout the Country; • Control and monitor the quality of education in the Country; • Harmonize educational policies and procedures of all the States of the Federation through the instrumentality of the National Council on Education (NCE); • Effect co-operation in educational matters on an international scale; and • Develop curricula and syllabuses at the National Level.
35.	CropLife Nigeria	Private Sector Thematic Focal Area: Agrochemical formulation/merchandise	CropLife Nigeria (CLN) is an affiliate of CropLife International, which is the global ambassador for the plant science industry, encouraging understanding and dialogue whilst promoting agricultural technology in the context of sustainable development. CLN members are formulators and distributors of crop protection products (pesticides), who are encouraged to observe and implement the same international standards and apply all stewardship measures and activities as defined by the “FAO Code of Conduct” to which all members of the CropLife network are committed.

2.2.3 Policy and Regulatory Framework

Effective national implementation of Stockholm Convention and other Chemical and Waste treaties requires strengthening policy and regulatory frameworks to regulate the life-cycle management of chemicals and waste, covering manufacturing, transportation, storage, handling and reprocessing (cradle to cradle), or destruction (cradle to grave), as may be permitted by relevant global instruments.

2.2.3.1 Policy Instruments for chemicals /POPs Management

Nigeria has developed a number of sectoral policy documents that are adoptable and adaptable platform for enshrining sound management of chemicals and waste, including POPs issues of national priority, in line with the Global Best Practices and in tune with national peculiarity and circumstances. Nonetheless, there are capacity gaps in actual implementation of the policies, as reported in the section on Assessment of the POPs issue in the country. Some of the relevant policy instruments are:

- i. The National Agenda-21, which is the domesticated version of Agenda 21 on Sustainable Development adopted by the Rio Conference of 1992, incorporates Chapter 19 on Environmentally Sound Management of Toxic Chemicals including the Prevention of Illegal International Traffic in Toxic and Dangerous Products. It is aimed, among others, at:
 - integrating environment into development planning at all levels of government and the private sector; and
 - addressing sectoral priorities, plans, policies and strategies for the major sectors of the economy.
- ii. National Policy on Environment from 1999, which objective is to ensure sustainable development based on proper management of the environment. The goal of the Policy is to achieve sustainable development in Nigeria, and, among others, to:
 - secure for all Nigerians a quality of environment adequate for health and wellbeing; and
 - restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere to preserve biological diversity and the principle of optimum sustainable yield in the use of these natural resources and ecosystems.
- iii. Environmental Enforcement Policy, which is aimed at providing actions to take in enforcing environmental legislation, standards, regulations and guidelines fairly and appropriately in a manner that will protect environmental quality and safeguard public health.
- iv. National Policy on Chemicals Management, 2010 which has the following goals, among others:
 - To implement an integrated life-cycle management of chemicals based on risk assessment (Material Safety Data Sheet (MSDS); Certificate of Analysis (CoAs); and other technical reports);
 - To establish a sustainable management system including Best Practice, Risk Communication systems on chemicals; and

- To integrate sound chemicals management and safety in the national Planning processes.
- v. National Bio-diversity Strategy and Action Plan 2007, which goal is to develop appropriate framework and programme instrument for the conservation of Nigeria's Biological diversity and enhance its sustainable use by integrating Biodiversity consideration into national planning, policy and decision-making processes.
 - vi. National Policy on Climate Change (2015), which objective is to serve as a framework for tackling environmental challenges occasioned by global changes in the climate.
 - vii. National Action Programme to Combat Desertification (2000), which ultimate objective is to sustain and promote, within ecological limits, the productivity of arid, semi-arid, sub-humid and other areas vulnerable to desertification, in order to improve the quality of life of their inhabitants.
 - viii. National Policy on E-waste Management (in progress), which goal is to foster sustainable national development through environmentally sound management of E-waste.
 - ix. National Dispersant Use Policy (2012), which objective is to provide standards guidelines, procedures and protocols for the production and application of dispersants in the Nigerian Environment, in order to achieve sustainability in the petroleum sector.
 - x. National Implementation Strategy for the Global Harmonised System (GHS) for labelling and classification of hazardous chemicals, which objectives are among others to:
 - devise an approach to provide for the full implementation of the GHS in Nigeria;
 - ensure an integrated life-cycle approach which will be harmonised across the chemical value chain;
 - ensure continued alignment with international trends in the further development of GHS; and
 - ensure that national law prescribes compliances with the GHS requirements.
 - xi. National Forestry Policy 2006 is aimed at achieving sustainable forest management that would ensure sustainable increases in the economic, social and environmental benefits from forests and trees for the present and future generations, including the poor and the vulnerable groups.
 - xii. National Environmental Sanitation Policy, which objective is to stimulate, promote and strengthen all government regulations concerned with housing and urban development, food security, water supply, sanitation related endemic diseases and illnesses, flood and erosion control, drought control, school health services and environmental education.
 - xiii. National Oil Spill Contingency Plan aimed at internalising the International Convention on Oil Pollution Preparedness Response and Cooperation from 1990 to which Nigeria is a signatory.
 - xiv. National Drought and Desertification Policy, which main goal is to reduce (or where possible prevent) the adverse effects of drought and desertification, and

- halt or even reverse the processes of desertification, to the end that people's lives are immensely improved and poverty reduced.
- xv. National Framework on PCBs management 2014, which is aimed at strengthening national capacity to manage, monitor and control POPs and ultimately phase out the use of PCBs in the course of protecting human health.
 - xvi. National Policy on Municipal and Agricultural Waste Management from 2012, which objective is to develop an integrated, coordinated, environmentally sound, efficient, and economically sustainable municipal and Agricultural waste management system, with specific provision for UPOPs emission control.
 - xvii. National Healthcare Waste Management Policy (2013) which goal is to create an enabling environment that contributes to effective and efficient healthcare waste management practices with minimal harmful environmental impact.
 - xviii. National Information and Communication Technology (ICT) Policy (2012) which main objective is to provide a comprehensive framework for the ICT sector which encourages investment, enables the rapid expansion of ICT networks and services that are accessible to all at reasonable costs, strengthens all productive sectors, and facilitates the transformation to a knowledge-based economy.
 - xix. National Health Policy (2004), which objective is to strengthen the national health system such that it will be able to provide effective, efficient quality, accessible and affordable health services that will improve the health status of Nigerians.
 - xx. National Biotechnology Policy (2001), which focussed on the harnessing of biotechnology as a developmental tool to contribute in several sectors to the well-being of the Nigerian economy. In doing this, it is responsive to the National Biodiversity strategy and Action Plan and several other policy documents.
 - xxi. The National Agriculture Policy which declares that it is of priority to mobilize biotechnology in the development of agriculture. It elaborates this to the point of indicating how seeds would be a tool in the advancement and development of agriculture.
 - xxii. Nigeria National Biosafety Policy (2005) which overall objective is to provide a regulatory regime and guidance for the sustainable development of the science of modern biotechnology, its application and safe use of its products without prejudice and risk to public health, environmental health, national sovereignty, human dignity and fundamental human rights.
 - xxiii. National Policy on Science, Technology and Innovation (STI) 2011 which objective is to build a strong Science, Technology and Innovation capability and capacity needed to evolve a modern economy.

2.2.3.2 Extant Legal Frameworks Addressing Chemicals/POPs Management

Table 2.4 outlines and analyses the strength of a number of extant sectoral chemicals management-related legal instruments in Nigeria, adoptable and amenable for the maximum protection of the citizenry and the Nigerian environment, against deleterious effects of hazardous chemicals including POPs, in line with the global best practices and in tune with Nigeria's national peculiarity and circumstances.

Table 2.4: List of extant legal frameworks addressing chemicals management

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
1.	The Constitution of the Federal Republic of Nigeria, 1999 (as amended)	The National Assembly	All category of chemicals	The grundnorm (basic norm) of Nigerian Environmental laws	Section 20	1
2.	National Agency for Food and Drug Administration and Control (NAFDAC) Act, Cap N1 LFN 2004	NAFDAC	Food, drugs and medical devices	An Act which created NAFDAC as a body corporate to handle issues of food and drug administration in Nigeria. Regulate and control the importation, exportation, manufacture, advertisement distribution of chemicals and allied products.	Section 5(a) and all Regulations made pursuant to it.	1
3.	The National Environmental Standards and Regulations Enforcement Agency (NESREA) Act 2007 Act	NESREA	All chemicals except in the oil and gas sector	The Act created NESREA as a parastatal of the Federal Ministry of Environment, which is charged with the responsibility of enforcing all environmental laws, guidelines, policies, standards and regulations in Nigeria (except oil and gas sector). The Act empowers NESREA to enforce compliance with	Section 7 (d) & (e) and all Regulations made pursuant to it.	1

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				regulations on the importation, exportation, production, distribution, storage, sale, use, handling and disposal of chemicals		
4.	The Consumer Protection Council (CPC) Act 1992	CPC	Industrial, agrochemical, domestic	Issues guidelines to manufacturers, importers, dealers and wholesalers in relation to their obligation under this Decree	Section 2(g) and all regulations made pursuant to it.	2
5.	The Standards Organisation of Nigeria (SON) Act 56 of 1971as amended by Acts No.20 of1976, Act No.32of 1984 and Act No.18 of 1990	SON	Standards for quality of chemicals.	To designate, establish and approve standards in respect of metrology, materials, commodities, structures and processes	Section 4(b) and all regulations made pursuant to it.	1
6.	Decree 33 of 1977, DPR guidelines and Standards	DPR	Oil and Gas industry	Supervising all petroleum industry operations being carried out under licenses and leases in the country in order to ensure compliance with global best practices.	Section 11(2) and all Regulations made pursuant to it.	1
7.	Federal Road Safety Act 2007	FRSC	Recommending devices for minimising or	Preventing or minimizing accidents on the highway; clearing obstructions on any	Sections 2, 3, 11, 30, 45 and all Regulations	3

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
			eliminating accidents on the road.	part of the highways; educating drivers, motorists and other road-users.	made pursuant to it.	
8.	Road Traffic Act, LFN, 1990	Directorate of Motor Vehicle Administration	Industrial, Agrochemical, domestic and Medical	Registration of vehicle, issuance of drivers' license, organizing of technical inspection of vehicle and compilation of statistics and movement of goods and passengers by roads.	All provisions made pursuant to the mandate.	3
9.	The Factories Act Cap 126 Laws of the Federation of Nigeria, 1990	FED.MIN.OF LABOUR	Occupational safety and health	Enforcement of safety and health standards in Nigerian workplaces. It provides minimum standards of safety and health in Nigeria	Sections 2, 3, 11, 1, 30, 45. All regulations made in pursuance to the Act.	2
10.	NPA Decree No.38 of 1999	Nigerian Ports Authority	Maritime	Develop, own and operate ports and harbours; Provide safe and navigable channel Offer cargo handling and	All Regulations made pursuant to the mandate.	3

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				storage services; Maritime Port facilities		
11.	NDLEA DECREE NO.48 of 1989	NDLEA Federal Ministry of Justice	Narcotics and Psychotropic	Regulation and monitoring	All Regulations made in fulfilment of the duties of the NDLEA and Federal Ministry of Justice.	1
12.	Harmful Toxic Waste (Special Criminal Provision) Act, Cap. H1 LFN 2004	NESREA/NOSDRA	Toxic waste Industrial, Agrochemical, domestic and Medical	This statute criminalizes wrong handling of toxic wastes and dumping of toxic waste. It contains penalties for dumping of harmful toxic wastes in Nigeria.	Environmental protection; human health; pollution and all Regulations made pursuant to it.	2
13.	Registration of Chemicals Procedure (for new chemical formulation and chemicals that are subject to PIC-procedure)	FMENV	All categories of chemicals	A procedure that stipulates the mode of registration of chemicals in Nigeria.	Registration procedure is pursuant to enabling laws and BRS Convention requirements for SMC.	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
14.	National Environment Protection (Pollution Abatement in Industries and facilities Generating wastes) Regulations S.I.15 of 1991	FMENV	Industrial waste and facilities Generating wastes	A regulation that enforces the reduction in the emissions from industries and facilities generating wastes	All sections of the regulation	2
15.	National Environmental (Domestic and Industrial Plastic, Rubber & Foam Sector) Regulations, 2010 S. I. No. 17	FMENV	Domestic and Industrial Plastic, Rubber & Foam	To prevent and minimize pollution from all operations and ancillary activities from Domestic and Industrial Plastic, Rubber and Foam Sectors to the Nigerian environment	All sections of the regulation	2
16.	National Environmental (Ozone Layer Protection) Regulations, 2009. S. I. No. 32	FMENV	Ozone Layer	To prohibit the import, manufacture, sale and the use of ozone-depleting substances (ODS).	All sections of the regulation	2
17.	National Environmental (Permitting and Licensing System) Regulation, 2009. S. I. No. 29	FMENV/ NESREA	Licensing and issuance of permits	To enable consistent application of environmental laws, regulations and standards in all sectors of the economy and geographical region.	All sections of the regulation	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
18.	National Environmental (Chemicals, Pharmaceuticals, Soap and Detergent Manufacturing Industries) Regulations, 2009 S.I. No. 36	FMENV	Chemicals, Pharmaceuticals, Soap and detergent manufacturing industries	To prevent and minimize pollution from all operations and ancillary activities from this Sector in order to protect Nigerians and its environment.	All sections of the regulation	2
19.	National Environmental (Food, Beverages and Tobacco Sector) Regulations, 2009 S. I. No. 33	FMENV	Food, Beverages and Tobacco	To prevent and minimize pollution from all operations and ancillary activities of food, beverages and tobacco sector to the Nigerian environment.	All sections of the regulation	2
20.	National Environmental (Mining and Processing of Coal, Ores and Industrial Minerals) Regulations, 2009. S. I. No. 31	FMENV	Mining and Processing of Coal, Ores and Industrial Minerals	To minimize pollution from mining and processing of coal, ores and industrial minerals.	All sections of the regulation	2
21.	National Environmental (Textile, Wearing Apparel, Leather and Footwear Industry)	FMENV	Textile, Wearing Apparel, Leather and Footwear Industry	To prevent and minimize pollution from all operations and ancillary activities from the Textile, Wearing Apparel, Leather and Footwear sectors to Nigeria's environment	All sections of the regulation	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
	Regulations, 2009 S. I. No. 34					
22.	National Environmental (Sanitation and Wastes Control) Regulations, 2009. S. I. No. 28	FMENV	Sanitation and Wastes Control	To provide the legal framework for the adoption of sustainable and environment friendly practices in environmental sanitation and waste management to minimize pollution.	All sections of the regulation	2
23.	National Interim Guidelines and Standards for Industrial Effluents, Gaseous Emissions and Hazardous Wastes Management in Nigeria	FMENV/ NESREA/ NOSDRA	Guidelines and Standards for Industrial Effluents, Gaseous Emissions and Hazardous Wastes Management	Guidelines and Standards for Industrial Effluents, Gaseous Emissions and Hazardous Wastes Management in Nigeria. The guidelines are popularly referred to as “the green book.”	The guideline is an omnibus document on issues of SMC and pollution control.	1
24.	Pesticides Registration Regulation 2005	NAFDAC	Pesticides	Under this regulation, no pesticide shall be manufactured, formulated, imported, exported, advertised, sold or distributed in Nigeria unless it has been registered in accordance with the provisions of these Regulations.	All sections of the regulations	1

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
25.	Mineral Oils (Safety) Regulations, 1963	DPR	Workers safety in oil industry	Safety regulations for workers in the Oil Industry. They also contain offences in case of breach of the regulations.	All sections of the regulations	2
26.	Petroleum Refining Regulations, 1974 (as amended)	DPR	Workers safety in oil industry	For Refineries on how they should be operated. The regulations go hand-in- hand with the Mineral Oils (Safety) Regulations 1963.	All sections of the regulations	2
27.	National Environmental (Watershed, Mountainous, Hilly and Catchments Areas) Regulations, 2009. S. I. No. 27	FMENV	Watershed, Mountainous, Hilly and Catchment Areas	Provisions for the protection of water catchment areas	All sections of the regulation	2
28.	National Environmental (Wetlands, River Banks and Lake Shores) Regulations, 2009. S. I. No. 26	FMENV	Wetlands, River Banks and Lake Shores	Provisions for the conservation and wise use of wetlands and their resources in Nigeria and ensure sustainable use of wetlands for ecological and tourism purposes and to protect wetland habitats for species of fauna and flora.	All sections of the regulations	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
29.	National Oil Spill Contingency Plan (NOSCP)	NOSDRA/ DPR	Oil and gas sector	In accordance with the international convention on oil pollution preparedness, Response and Co-operation (OPRC) 1990, to which Nigeria is a signatory.	NOSCP is an operational equipment for the Oil & Gas sector.	2
30.	National Oil Spill Detection and Response Agency (NOSDRA). Act of 2006	NOSDRA	Oil and gas sector	The Act establishes NOSDRA with responsibility for preparedness, detection, and response to oil spillages in Nigeria.	All sections of the Act	2
31.	Handbook on Waste Management (2001)	FMENV	Waste Management	Guidelines on Management of waste in Nigeria. It contains modules of disposing wastes in such a way that they will not be harmful to the society.	The Handbook is a resource documents for municipal and hazardous waste management	2
32.	Guidelines on Hazardous Chemicals Management, (2001)	FMENV	All Hazardous Chemicals	Applicable to facilities and activities involving the transportation, production, handling, storage, and disposal of hazardous chemicals and materials.	The Guideline is a resource document for SMC	1

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
33.	Guidelines on Pesticides Management and Handbook on Safe and Effective Use of Pesticides	FMARD	Human and the Nigerian Environment	Guidelines for the manufacture, formulation, importation, exportation, advertisement, sales and use of pesticides in Nigeria. The purpose is to curtail or stop chemicals from affecting individuals in the course of the manufacture, distribution or use of pesticides.	The Guideline is a resource document on issues of safe management pesticides.	1
34.	Blueprint on Environmental Enforcement (A Citizen's Guide, 2001)	FMENV	Human	Guideline on how citizens can comply with environmental management issues. It contains sanitation measures for the compliance of citizens.	A resource document for environmental compliance and enforcement.	
35.	Blueprint on Compliance Monitoring Inspection (Inspector's Guide, 2001)	FMENV	Industries	A guide for Inspectors from the Ministry of Environment in the course of carrying out inspections in the environment.	All sections of the guide	2
36.	Petroleum Regulations of 1967 and 1969	DPR	Oil and Gas Workers	These regulations ensure safety of personnel during petroleum operations.	All sections of the regulations	2
37.	Petroleum Act 1969	DPR		An act to provide for the exploration of petroleum from the territorial waters and the	All sections of the Act	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				continental shelf of Nigeria and to vest the ownership of. It also provides all on-shore and off-shore revenue from petroleum resources derivable there from in for Federal Government of Nigeria and all other matters incidental there to.		
38.	National Environmental (Base Metals, Iron and Steels Manufacturing/ Recycling Industries) Regulations, 2010. S. I. No. 14	FMENV	Base Metals, Iron and Steels Manufacturing/ Recycling Industries	The Regulation is to prevent and minimize pollution from all operations and ancillary activities of the sector in the Nigerian Environment.	All sections of the regulation are relevant	3
39.	Management of hazardous and solid waste regulation S.I.15 of 1991 (No. 102 Vol. 78, August, 1991)	FMENV	Hazardous chemical products and dangerous waste constituents.	This regulation defines the requirements for groundwater protection, surface impoundments, land treatment, waste piles, landfills, incinerations etc.. It also describes the hazardous substance tracking programme with a comprehensive list of acutely hazardous chemical products and dangerous waste constituents. It also spelt out	All sections of the regulation	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				the requirements and procedures for inspection, enforcement and penalty.		
40.	National Effluent Limitation Regulation, S. I. 8 of 1991 (No. 42, Vol.78 August, 1991)	FMENV/ NESREA/ NOSDRA	Detoxification of effluent and chemical discharges from industries.	This regulation makes it mandatory for industries with wastes facilities to install anti-pollution abatement equipment on site based on the Best Available Technology (BAT) for detoxification of effluent and chemical discharges. It is specific to each category of waste generating facility with respect to limitations of solid and liquid discharges or gaseous emissions into the ecosystem.	All sections of the regulations	2
41.	Pollution Abatement in industries generating wastes Regulation, S.I. 9 of 1991 (No. 42, Vol.78 August, 1991)	FMENV	Toxic waste generating Industries	The regulation imposes restrictions in the release of toxic substances and stipulate requirements for pollution monitoring units, machinery for combating pollution and contingency plan by industries; submission of lists and details of chemicals used by industries	All sections	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				to FMENV; requirement of permit by industries for the storage and transportation of toxic waste; the generator's liability; strategies for waste reduction; permissible limits of discharge into public drains; protection of workers and safety requirements for Environmental Audit (or Environmental Impact Assessment of new projects) and penalty for contravention.		
42.	Environmental Impact Assessment (EIA) Sectoral Guidelines for Manufacturing Projects, 1995	FMENV	New Projects	Guidelines for Manufacturing Projects, among others were made. The guidelines are intended to assist the proper and detailed execution of EIA of projects in consonance with the EIA Act 1992 in line with a defined EIA management procedure. The Act No. 86 of 1992 makes EIA mandatory for all new major public and private projects in Nigeria. The Act gives specific powers to the	All sections of the Act and sectoral guidelines published thereto.	1

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				FMENV to facilitate environmental assessment of projects.		
43.	Criminal Code Act, LFN, 2004	FMENV	Safeguarding water and atmosphere wilful vitiation.	The provisions of the Criminal Code apply in relation to any offence against any order, Act, Law or statute and all persons charged with any such offence. The Act makes it an offence punishable with up to 6 months' imprisonment for any person who violates the environment in any way so as to make it obnoxious to the health of persons in general, dwelling or carry out business in the neighbourhood, or passing along a public way.	Specifically, Sections 245 & 247; other sections that are applicable for circumstantial offences.	3
44.	Labour Act, LFN, 2004	FML&P	Occupational safety and health	This ensures the health and safety of workers in Sections 66 and 67 of the Act. Section 88 (1) (g) of the Act, states that the Minister of Labour may make such procedural or ancillary provisions as he/she considers necessary or conveni	Sections 77 and 98	2

S/N	Legal Instrument (type, reference year) and Regulation(s)	Responsible Institution	Chemical Use Category Covered/strength (Application field)	Objectives	Relevant Provisions	Enforcement Ranking
				ent to facilitate the operation of this Act. It is on this basis that the Factory Inspectorate Division is created to ensure safety of workers in factories.		
45.	S.1.8 National Environment Protection (Effluent Limitation) Regulation 1991	FMENV/ NESREA/ NOSDRA	Chemicals and Chemical Waste	Environmental protection; effluent and waste water pollution control	Sections 1-6	2
46.	S.1.9 National Environment protection (pollution Abatement in industries and facilities Generation wastes). Reg. 1991	FMENV/ NESREA/ NOSDRA	Chemicals and chemical waste	Environmental protection, pollution Abatement; safety	Sections 1-23	2
47.	S.1.5 National Environment protection (management of solid and Hazardous Wastes). Regulation, 1991	FMENV/ NESREA/ NOSDRA	Industrial and Consumer Chemicals radioactive substances agrochemical	Environmental protection, sound environmental management of solid and hazardous waste including storage trans-boundary movement, treatment and disposal	Part 1-12	2

NB: Enforcement Ranking: 1 – Effective 2 – Fair 3 – Weak; Source: Nigeria National Chemical Profile Report 1999

2.2.4 Multilateral Environmental Agreements

Environmental exploitation is the buoy that sustains global economy and development. Conversely, the environment is the 'sink' for all negative upshots of explorative activities that bring about this universal growth. Environmental degradation, in whatever form, ultimately transcends international borders and is not a respecter of national sovereignty, gender, social class, creed or caste and their impacts can only be addressed through effective, coherent and coordinated transnational environmental governance, backed with sector-specific global treaties to protect the global commons.

The need to protect and preserve the environment has consistently been a recurring burning issue, nationally and internationally. It was against this background that the Earth Summit expressly stated inter alia in Principle 12 of Rio Declaration that *Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.* This singular declaration has led to negotiation, adoption and signing of scores of Multilateral Environmental Agreements (MEAs), in addition to regional and global instruments adopted in pre-Rio Conference era. Multilateral environmental agreements are legal instruments with binding effects on countries that have agreed to become parties thereto, through ratification or accession (INTOSAI-WGEA, 2010). An MEA or treaty procedurally comes into force, if it is ratified by the requisite number of countries.

Nigeria took active part in the negotiation processes leading to adoption and signing of many of the MEAs, to which she is a Party.

MEAs constitute an important part of the global environmental management framework and are designed to coordinate policy action to tackle global or transboundary environmental problems cooperatively (Brunner 1997) and are powerful tool for the implementation of policies directed at sustainable development goals. They are premised on the ideas that we live in a global common (including the air, water, land, flora, fauna), with natural resources and that nations must cooperate in developing strategies to protect these resources (Brack et al, 2003).

MEAs can be, and are, categorized according to different typologies, criteria or groupings. The classifications tend to vary and are not mutually exclusive (INTOSAI-WGEA, 2010). MEAs are hereby classified as follows:

- a) **Biodiversity and Wildlife Treaties** such as the 1992 United Nations Convention on Biological Diversity & its protocol and the 2000 Cartagena Protocol on Biosafety;
- b) **Treaties that are targeted at protecting the atmosphere**, such as the 1985 Vienna Convention for the Protection of the Ozone Layer, and its protocol, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer; and the 1992 UN Framework Convention on Climate Change, and its protocol, the 1997 Kyoto Protocol (which came into force in February 2005);
- c) **Instruments dealing with the marine environment**, including the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter; the 1973 Convention for the Prevention of Pollution from Ships, and its

protocol, the 1978 MARPOL Protocol; and the 1982 UN Convention on the Law of the Sea, together with an implementing agreement,

- d) **Treaties regulating the use of chemicals**, including the 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the 2001 Stockholm Convention on Persistent Organic Pollutants, the Montreal Protocol could be considered under this category, since it regulates the production and consumption of ozone-depleting chemicals.
- e) **Those dealing with waste**, including the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (see also under marine environment).
- f) **Global or regional**: for example, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) applies throughout the world; the Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa (Bamako Convention) applies only within the African region (INTOSAI-WGEA, 2000).
- g) **Others**, including the 1991 Espoo Convention on Environmental Impact Assessment, the 1992 UN Convention to Combat Desertification, and the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Duncan, et al (2003)).

A number of MEAs cut across more than one classification; for example, the Montreal Protocol classified under Treaties that are targeted at protecting the atmosphere can also fall under those regulating the use of chemicals.

2.2.4.1 Nigeria's Commitment to International Environmental Agreement and Treaties

Nigeria has played active roles in the negotiation and actualisation of set objectives of a list of MEAs, which form the over-arching international legal grundnorm (basic norm) for addressing environmental issues of global concerns. Some of these MEAs have either been ratified (before coming into force) or acceded to (after coming into force) by Nigeria and have either been or are in the process of being internalised, to complement the overall framework of national legislations, bilateral, sub-regional and regional treaties on varying environmental issues of national priorities.

Nigeria is conscious of the fact that the global best practice or a benchmark for better environmental governance is to integrate organizations, appropriate domestic policy instruments, financing mechanisms, rules, procedures and norms to meet national commitments under relevant MEAs, to which the nation is Party.

Table 2.5 summarizes Nigeria's commitment levels vis-a-vis national implementation of a list of global environmental agreements (or MEAs).

Table 2. 4: Nigeria's Levels of Commitment to international Environmental Instruments

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
1.	The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) 1971	Ramsar, Iran 02.02.1971	01.12.1975	To promote the conservation and wise use of all wetlands through local, regional, and national actions and international cooperation, as a contribution towards achieving sustainable development worldwide.	Acceded 02.10.2000
2.	Protocol to amend the Convention on Wetlands of International Importance especially as Waterfowl HABITAT	Paris 03.12.1982	01.10.1986	To render the Convention more effective.	Ratified 02.10.2001
3.	Convention Concerning the Protection of the World Cultural and Natural Heritage	Paris, 23.11.1972	17.12.1975	To encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity.	Ratified 23.10.1974
4.	Convention on International trade in endangered species (CITES) (Washington Convention)	Washington, D.C 03.03.1973	01.07.1975	To ensure that international trade in specimens of wild animals and plants does not threaten their survival. To this aim, it imposes a duty on Parties to subject international trade in specimens of selected species to certain controls via licensing of import, export, re-	Ratified 09.05.1974

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
				export, and introduction from the sea of species.	
5.	United Nations Convention on the Law of the Sea	Montego Bay, Jamaica 10.12.1982	16.11.1994	To establish national sovereignty over marine resources lying within coastal waters and aims to provide countries with incentive to better manage these resources, by obligating Parties to protect and preserve the marine environment.	Ratified 14.08.1986
6.	International Convention on Oil Pollution Preparedness, Response and Cooperation	London, 30.11.1990	13.05.1995	To strengthen the legal framework for the control of environmental pollution by oil, in general, and marine pollution by oil in particular, by providing a basis for preparedness, and for a response-capability, to deal with incidents of oil pollution in the marine environment.	Acceded 25.05.1993
7.	The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and	New York 04.08.1995	11.12.2001	To ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks. It sets out principles for the conservation and management of these fish stocks and provides a framework for cooperation in the conservation and management of these resources.	Ratified

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
	Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement)				
8.	Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982	New York, 28.07.1994	28.07.1996	To provide for revised modalities of the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, in particular the International Seabed Authority.	Signed 28.07.1995
9.	African Convention on the Conservation of Nature and Natural Resources	Algiers 15.09.1968	16.06.1969	To encourage individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.	Ratified 07.05.1974
10	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	Bamako, 30.01.1991	22.04.1998	To create a framework of obligations to strictly regulate the trans-boundary movement of hazardous wastes to and within Africa.	

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
11	Convention for the Protection of the Ozone Layer	Vienna, 22.09.1985	1988	To establish a framework for cooperation, development of policies, and formulation of agreed measures in order to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify the ozone layer.	Acceded 21.10.1988
12	Montreal Protocol on Substances that Deplete the Ozone Layer	Montreal, 16.09.1987	01.01.1989	To protect the ozone layer by taking measures to control global emissions of substances that deplete it. Its definitive objective is the elimination of these materials based on scientific developments, taking into account technical and economic considerations as well as developmental needs of developing countries.	Acceded 31.10.1988; London Amendment Ratified 27.09.2001
13	Convention Concerning Occupational Safety and Health and the Working Environment	Geneva 22.06.1981	11.08.1983	To prevent accidents and injury to health by minimizing the causes of hazards inherent in the working environment.	Ratified 03.05.1994
14	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Basel 22.03.1989	05.05.1992	To ensure that the management of hazardous wastes and other wastes, including their transboundary movement and disposal, is consistent with the protection of human health	Ratified 13.03.1991, Basel amendment ratified 24.05.2004

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
				and the environment whatever the place of disposal.	
15	United Nations Framework Convention on Climate Change	New York, 09.05.1992	21.03.1994	To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate by setting emission limits to be accomplished within a determined timeframe to allow ecosystems to adapt naturally to climate change, to ensure the non-threat to food production and to enable economic development to proceed in a sustainable way.	Ratified 22.04.1998
16	Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification	Paris 17.06.1994	24.06.1998	To fight desertification and mitigate drought effects in nations with serious drought and/or desertification issues, through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach, and contributing to the achievement of sustainable development in affected areas.	Ratified 08.07.1997

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
17	Convention on Biological Diversity	Rio de Janeiro, 05.06.1992	21.03.1994	To conserve biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, taking into account all rights over those resources.	Ratified 29.08.1994
18	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides on International Trade	Rotterdam, 10.09.1998	24.02.2004	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 and to contribute to their environmentally-sound use.	Ratified 28.06.2001
19	Stockholm Convention on Persistent Organic Pollutants	Stockholm 22.05.2001	17.05.2004	To protect human health and the environment from persistent organic pollutants. The Convention protects human health from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to humans and wildlife.	Ratified 24.05.2004
20	Protocol to the United Nations Framework	Kyoto 11.12.1997	16.02.2005	To ensure that aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A to the Protocol do not	Acceded 10.12.2004

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
	Convention on Climate Change			exceed the assigned amounts, with a view to reducing overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 – 2012. Besides setting binding constraints on greenhouse gas emissions, the Protocol encourages the use of economic incentives to meet with the changes. The Kyoto Protocol is an amendment to the UN Framework Convention on Climate Change.	
21	International Treaty on Plant Genetic Resources for Food and Agriculture	Rome, 03.11.2001	29.06.2004	To promote conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security	Ratified 10.06.2002
22	Protocol on Biosafety to the Convention on Biological Diversity (Cartagena Protocol)	Montreal, 29.1.2000	11.09.2003	To ensure an adequate level of protection in safe transfer, handling and use of living modified organisms resulting from biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements.	Ratified 15.07.2003

S/N	Instruments	Place and Date of Signature	Date of Entry into force	Objective	Status of implementation
23	International Convention for the Prevention of Pollution from Ships (MARPOL)	London 02.11.1973/ 17.02.1978	02.10.1983	Its main objective is to minimize pollution of the seas, including dumping, oil and exhaust pollution, while its stated object is to preserve the marine environment through the complete elimination of pollution by oil and other harmful substances and the minimization of accidental discharge of such substances.	Ratified 19.03.1976
24	Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (as amended)	London 29.12.1972	30.08.1975	To control pollution of the sea by dumping, and to encourage regional agreements supplementary to the Convention.	Ratified 19.03.1976
25	International Plant Protection Convention	Rome 6.12.1951	03.04.1952	To secure common and effective action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control.	Adhered 17.08.1993
26	Minamata Convention on Mercury	Kumamoto, Minamata, Japan Oct. 2013		To protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury.	Signed 10/10/2013, to be Ratified in August, 2015

2.2.5 Non-Binding Instruments Relevant to POPs Management

2.2.5.1 Strategic Approach to International Chemicals Management (SAICM)

This is a policy framework to promote chemical safety around the world. SAICM has its overall objective as the achievement of the sound management of chemicals throughout their life cycle so that, by 2020, chemicals are produced and used in ways that minimize significant adverse impacts on human health and the environment. This “2020 goal” was adopted by the World Summit on Sustainable Development in 2002 as part of the Johannesburg Plan of Implementation.

- SAICM is distinguished by its comprehensive scope; ambitious “2020” goal for sound chemicals management; multi-stakeholder and multi-sectoral character; endorsement at the highest political levels; emphasis on chemical safety as a sustainable issue; provision for resource mobilization; and formal endorsement or recognition by the governing bodies of key intergovernmental organizations.
- SAICM comprises of the **Dubai Declaration on International Chemicals Management**, expressing high-level political commitment to SAICM, and an **Overarching Policy Strategy** which sets out its scope, needs, objectives, financial considerations underlying principles and approaches and implementation and review arrangements. Objectives are grouped under five themes: risk reduction; knowledge and information; governance; capacity-building and technical cooperation; and illegal international traffic.
- The Declaration and Strategy are accompanied by a **Global Plan of Action** that serves as a working tool and guidance document to support implementation of SAICM and other relevant international instruments and initiatives. Activities in the plan are to be implemented, as appropriate, by stakeholders, according to their applicability.

2.2.5.2 Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is an internationally agreed system for classification and communication of hazards posed by chemicals.

Thousands of chemicals are produced, traded and used internationally, many of which have dangerous properties. These chemicals can be managed safely if appropriately labelled, but many developing countries do not have the legal and technical capacities in place to do so. The same chemical hazards are sometimes classified and communicated in different ways in different countries. As a result, workers, consumers, and the environment are not protected in the same way. To tackle this challenge, since 2003, countries have begun to implement the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

The GHS document (“The Purple Book”) provides countries with the regulatory building blocks to develop or modify existing national programmes in accordance with the internationally agreed provisions of the GHS. The first official version of the GHS was adopted in December 2002 by the UN ECOSOC Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals (UN-SCEGHS) and published in 2003. The GHS puts

in place relevant recommendations on the Transport of Dangerous Goods (1956), the International Labour Organisation (ILO) Convention No. 170 (1990) and Chapter 19 of Agenda 21. UNITAR and ILO are the designated focal points for capacity building in the UN-SCEGHS.

In response to growing requests from developing countries for capacity development to implement the GHS, UNITAR and ILO initiated in 2001 the "UNITAR/ILO Global GHS Capacity Building Programme". The Programme provides training on the development of situation/gap analyses, national GHS Implementation Strategies, Legislation, Chemical Hazard Classification, Labelling, Safety Data Sheets (SDS), as well as, related support measures such as comprehensibility testing. GHS is yet to be implemented in Nigeria and efforts are being made to implement it in Nigeria.

A National GHS Planning Meeting was held in 2005 to discuss infrastructure and development of the GHS Project. The National GHS Coordinating Agency is the Federal Ministry of Environment and members of the GHS Implementation Committee include key governmental departments and representatives of business & industry and public interest & labour organizations.

Efforts are in top gear towards developing a harmonized Hazardous Chemicals Management Bill. The draft bill has been subjected to a multi-stakeholder-sectoral review process to facilitate inclusive ownership and acceptance. This National GHS implementation Strategy was developed in 2008.

2.2.5.3 Compliance issues of the Extant Legal and Institutional Frameworks in addressing POPs Management

In compliance with national obligations under the Stockholm Convention, particularly, Articles 3, 5 & 6 relating to the measures to be taken to reduce, or eliminate production, use, and releases of POPs programmatic and targeted strategies need to be engendered in the national planning process in order to address POPs-related challenges in the country. These strategies must evolve from inclusive stakeholders' consultations and deliberations. The following sections succinctly discuss key steps in actualizing this.

2.2.5.4 Assessment of policy and institutional capacities

Flowing from the need for proper regulations of POPs and chemicals through effective legislations, it will be necessary to holistically address chemicals management at all stages of their life cycles, i.e. 'cradle to cradle,' hence, there is a need for overarching legislation to address this challenge. The overarching legislation should properly clarify and/or harmonize mandates. This will streamline the budgetary process and save costs associated with duplication of functions all the government agencies with cross cutting mandates related to chemicals management.

In order to achieve the foregoing, the National Policy thrusts including enabling legislative frameworks need be reviewed, updated and strengthened to meet the exigencies of global emerging issues in chemicals and waste agenda.

2.2.5.5 Inventories of POPs stock and emissions

With the amendments of the various treaties on chemical management coming into force and the creation of new laws on chemical management, parties are obligated to develop inventories in order to avail information on the new POPs at the national level. National inventories are an important tool in reporting on priority chemicals like POPs. They are also a source of public information. They identify major sources of releases and provide estimates of amounts of chemicals used, released and disposed of. Inventories of new POPs were therefore conducted to identify their production, use and imports and then to prioritize which ones needed national actions, like mercury due to their wide use.

2.2.5.6 Monitoring of POPs

One of the properties of POPs is their potential for long-range transport and therefore measurement and monitoring of their levels in the environment is important. Strategic data obtained from monitoring will enrich policy and the country's regulatory framework. It will also feed into the Global Monitoring Plan (GMP) of the Convention.

Nigeria is participating in the MONET-Africa Programme, anchored by UNEP/RECETOX Czech Republic, involving Passive Air and Water Sampling (PAS & PWS) to monitor background levels of POPs. Nigeria is also participating in the UNEP/WHO GMP-Phase 2 with fourteen African countries, namely: DR Congo, Egypt, Ethiopia, Ghana, Kenya, Mali, Morocco, Mauritius, Nigeria, Senegal, Tanzania, Togo, Tunisia, Uganda, Zambia. GMP-2 is to be implemented with a GEF-fund and counterpart financing by partnering nations.

2.2.5.7 Reporting

One of the requirements of the Stockholm Convention is for Parties to report on measures taken to implement relevant provisions of the Convention and their effectiveness. This includes Measures to reduce or eliminate releases from intentional production and use, as well as unintentional releases of POPs; Identification of articles in use and wastes containing chemicals listed in Annexes A, B and C; and Production, import and export of these chemicals. Article 15 has established an Online Electronic Reporting System (online ERS) and the Government Officers for reporting.

Nigeria has successfully submitted the national report for the third reporting cycle, hence, she is in compliance Article 15.

2.2.5.8 Capacity building

In the processing of developing this updated NIP, stakeholders identified the need for capacity building activities to enable the nation meet her emerging compliance burden pursuant to the convention, as amended.

The review process has identified technical assistance programmes, policy, legal frameworks and institutional capacity under the current NIP that require strengthening with a view to addressing new POPs. It is of national priority to promote institutional strengthening of regulatory bodies with cognate mandates on chemicals import/export trade control such as

NESREA, NAFDAC, SON, NCS and FFS to enable them effectively track trafficking in POPs at Ports of entry/exit and effectively respond to Hazardous materials/chemicals emergencies.

Furthermore, the development of tariff codes specific for POPs can improve on tracking them at points of entry and provide more accurate data on imports and exports of POPs.

Universities and Research Institutions need be strengthened in their infrastructure, to enable them conduct risk assessments on chemicals of national/global concerns and develop their safer, technically feasible, accessible and affordable alternatives. Scientific expertise will be developed. Nigeria will take advantage of guidance, expertise, assistance and training support from international and regional organizations like ECOWAS, UNIDO, WHO, FAO, UNITAR, UNEP, ICIPE, etc.

In implementing her updated NIP, Nigeria will also participate actively in bilateral, regional and global cooperation programmes that offer capacity training activities for the assessment of chemicals, including POPs.

2.2.5.9 Awareness Raising

Article 9 of the Convention requires Parties to exchange information, facilitate public information, awareness and education (Article 10), report to the Convention Secretariat (Article 15) and periodically update implementation Plans (Article 7). Many fora on implementation of international treaties on chemicals management have been organized during which stakeholders unanimously called for adoption of a mechanism for information exchange on emerging chemicals issues, with specific recommendation on adoption of SAICM.

Communication and awareness raising on POPs (including newly listed chemicals) will facilitate informed public participation in policy decision-making process on adoption of POPs-alternatives and inclusive ownership of interventional investments in environmentally-safe POPs management. This will specifically engender equitable representation and activism of the business community, academia, government organizations at national and state levels, legal and policy experts and indigenous communities, non-Governmental Organisations, in formulating coherent and coordination policy actions on POPs.

2.2.5.10 POPs and Gender Mainstreaming

Gender mainstreaming is the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality (UNIDO, 2015).

Inequalities limit women's participation in decision making, restrict their access to financial, technical and environmental resources and prevent them from contributing to or benefitting from interventional programmes/projects, thus limiting attainment of their set goals.

The Global Best Environmental Practice is the acknowledgement and integration of gender perspectives into environmental and sustainable development deliberations, as canvassed by the 1985 Fourth International Women's Conference and Principle 20 of the Rio Declaration on Environment and Development (1992).

It has been established that several factors, including differences in occupational roles, household responsibilities, and biological susceptibility impact gender differences in exposure to toxic chemicals and the resulting health impacts. In Nigeria, chemical poisoning incidents are common among women farmers, the elderly and children, who apply POP-chemicals on farm or indoors, without adequate preventive or protective measures. Figure 2.12 shows women at work during cropping and harvest stages, playing their traditional roles as primary providers for the family.



Figure 2.11: Women farmers as primary providers for the family (Source: Transformation, 2014).

Women and children are the primary care takers of most families, food preparers and gatherers of fuel used in the household. Thus, they can play a role in protecting or minimizing the risk of themselves and their families to exposure from chemicals when they are informed about the risks and how to prevent/respond to them. Enlightenment of women will help a great deal because they would create awareness within themselves and pass it on to their children.

It is against this background that the Government will continue to make deliberate efforts in advancing gender mainstreaming when formulating policies/programmes on sound POPs management and National Development Planning, in order to enable women contribute their quota in nation building and a safer environment for livelihood.

2.2.5.11 Assessment Findings on Challenges Limiting Effective POPs Regulations in Nigeria

The under listed issues, among others, are some of the factors affecting effective POPs regulations in Nigeria:

- No designated poison centers with capabilities to handle issues of POPs and general chemicals poisoning. There are infrastructural and human capacity gaps in medical institutions charged with managing cases of poisoning;
- Inadequate regulatory capacity for tracking illicit trans-boundary trafficking of POPs and other hazardous chemicals;
- Gaps in legislative frameworks on chemical/POPs issues, including inadequate sanctions for their defaults/infractions;
- Dearth of public awareness on sound chemical management, particularly in areas of environmentally sound disposal of obsolete chemicals and waste;
- Proliferation of the informal sector in chemicals management and illicit trafficking in banned chemicals;
- Inadequate data on chemicals/POPs issues in Nigeria arising from negligence of sectoral stakeholders in commerce and industry to provide feedback on inventory of POPs stocked in their storage facilities;
- Dearth of sustainable, adequate and predictable funding mechanism for POPs management projects;
- Proliferation of obsolete POP stockpiles due to improper procurement process unsolicited international donor supports and the dynamic nature of global regulatory actions on chemicals, example; additional listing of certain chemicals as POPs;
- Capacity gaps in identification and Remediation of POPs-Contaminated sites;
- Unprotected handling of POPs and other hazardous chemicals in work places and dearth in provision of compatible protective kits and/or ineffective enforcement of their use where provided;
- Law enforcement Officers are not properly trained/enlightened on issues of POPs and so prosecuting violators of laws on POPs issues may be difficult for them;
- Generally, there are capacity needs at the level of State Governments in internalising sound chemicals management into their development planning processes;
- There is the need for the country to involve chemicals legislation regimes with adequate provisions for Extended Producers Responsibility (EPR); and
- All chemicals-related treaties need be domesticated to facilitate their effective reformulation and national implementation.

2.3 Assessment of the POPs issues in the country

This section discusses findings of an assessment of the nature and extent of POPs availability, including monitoring activities in human and physical environment, as well as governance structure within which the updated NIP will be implemented.

A survey conducted about a decade ago on pesticides usage in Nigeria indicated that over 15,000 metric tonnes/annum of pesticides, comprising about 135 chemical pesticides marketed locally under 200 different product brands and formulations, were imported during 1983 – 1990. In the same vein, the Federal Office of Statistics (FOS) in Lagos provided useful information on the importation of DDT and Hexachlorobenzene (HCB) into the country till the year 2002 (First NIP, 2009).

Although importation of certain hazardous chemicals such as POPs was banned in 1999 by the Nigerian Government, illegal/illicit trade in these chemicals still thrives in the informal

sector, surreptitiously. This makes it difficult to maintain good statistics of POPs pesticides in the informal sector which is responsible for most cases of illicit traffics in hazardous chemicals.

With a view to updating the record in line with the amendments to Annexes to the Convention, an assessment of POPs-issues was conducted under the NIP Review and Update Project. This task was carried out by exploring relevant data sources, namely: import trade data, market surveys, consultations with critical players including the umbrella association for agro-inputs merchants, private researchers, State Governments, Research Institutes, pooling existing inventory data obtained under cognate POPs-projects, among others.

2.3.1 Assessment of POP-Pesticides (Annex A, Part 1 Chemicals)

POP-chemicals grouped in Annex A, Part I of the Stockholm Convention, including their sectoral applications and COP's positions relating to their respective exemptions are outlined in Table 2.5, extracted from the Convention Text, as amended.

Table 2. 5: List of Annex A, Part I Chemicals

Chemical	Activity	Specific exemption ¹
Aldrin* CAS No: 309-00-2	Production	None
	Use	Local ectoparasiticide Insecticide
Alpha hexachlorocyclohexane* CAS No: 319-84-6	Production	None
	Use	None
Beta hexachlorocyclohexane* CAS No: 319-85-7	Production	None
	Use	None
Chlordane* CAS No: 57-74-9	Production	As allowed for the Parties listed in the Register
	Use	Local ectoparasiticide Insecticide Termiticide Termiticide in buildings and dams Termiticide in roads Additive in plywood adhesives
Chlordecone* CAS No: 143-50-0	Production	None
	Use	None
Dieldrin* CAS No: 60-57-1	Production	None
	Use	In agricultural operations
Endrin* CAS No: 72-20-8	Production	None
	Use	None
Heptachlor* CAS No: 76-44-8	Production	None
	Use	Termiticide Termiticide in structures of houses Termiticide (subterranean) Wood treatment In use in underground cable boxes
Hexabromobiphenyl *	Production	None

2.3.1.1 Lindane and its Isomers

The use of Organochlorides Pesticides (OCP), including Lindane for varying purposes, namely: maintenance of public/private infrastructures integrity, vector control in the health sector, crop protection, among others, dates back to -pre-Rio Erath Summit era.

All pesticides including Lindane used in Nigeria, in the past, were imported from some developed countries in Europe, America and Asia, although a number of chemical industries

then based in Lagos, Port Harcourt and Kaduna owned by the multinational oil companies such as National Oil and Chemicals Marketing Company (NOLCHEM), where Shell Petroleum Development Company was a major shareholder, Mobil Oil Nigeria PLC, Chemical and Allied Product Limited (CAPL) then had plants formulating POPs-Pesticides. These industries were decommissioned, between 1990's and 2004, in line with international actions on POPs elimination/minimization.

CAPL factory based in Ibadan, south-western part of Nigeria, was formerly used for producing Lindane, until 2004 when it was closed down. These old storage or production facilities are potential Lindane-contaminated sites that require proper characterisation and decontamination. Since its two other isomers are formed in greater quantities during its production, it is assumed that such a site will contain a lot of α -HCH and β -HCH Lindane isomers in environmental samples around the area.

Lindane has been used in a wide array of sectors, including agriculture, forestry, veterinary, general household and building spray, pharmaceuticals and public health. For instance, Lindane was widely used as an insecticide in cocoa plantation. However, it was banned and withdrawn from the Nigerian Cocoa production system, in line with the new ICCO 2008 Legislations on the use of Cocoa pesticides (CRIN, 2015).

Furthermore, following listing of Lindane and its isomers as POPs under Annex A in 2009, Nigeria has intensified coherent and coordinated efforts, involving all relevant players, to put a stop to the abuse and misuse of Lindane in fishing. Its use as a second-line treatment for lice and scabies is being discouraged, due to increasing resistance, lack of efficacy, and toxicity. Consequently, the following alternative treatment protocols are being promoted for the control of lice and scabies:

- Treatment of Lice: The use of 4% Dimethicone lotion. Dimethicone lotion has been shown to be more effective than Malathion and Permethrin treatments (Burgess, et. al 2005); mechanical removal of lice using wet combing method and application of hot air which is an effective and safe treatment for lice and unlikely to evolve resistance; and
- Treatment of Scabies: In separate clinical trials in Nigeria, extracts of essential oils from Neem (*Azadirachta indica*) and Bush Tea (*Lippia multiflora*) resulted in about 97% cure rate of scabies patients with no adverse reactions (IPEN, 2009).

Alternatives to Lindane In Agriculture

In Nigeria, the use of Lindane as a pesticide to reduce damage to economic crops, e.g. cocoa, is becoming outmoded given a wide range of non-insecticidal methods and POPs-free alternatives as outlined below:

Non-insecticidal alternatives

- Crop rotation where a non-host species is planted to reduce the damage of infestation and maintain low levels of pests;
- Fallowing the area for a few years before planting to starve the pests;
- Balanced fertility levels to ensure that plants are not predisposed to disease; and

- Use of more competitive crop varieties to limit losses from these pests, among others.

Non-POPs Alternatives to Lindane use in Agriculture:

Adoption of safer alternatives like Imidicloprid and Thiamethoxam which are Neonicotinoid insecticides found to be less toxic than Organophosphate and Carbamate insecticides. There is no documented evidence of potential POPs characteristics of the two products.

Studies on Lindane Contamination in the environmental, food and humans

A number of studies on environmental fates of Lindane and other OCPs have been conducted by private researchers in Nigeria, most of which have been published in reputable international journals and books.

The first case of human exposure to a pesticide in Nigeria occurred in 1958, all members of the family of a local chief who was a prominent cocoa farmer at Okebode in South Western Nigeria were hospitalised after eating a leaf earlier sprayed with Lindane (Ibatayo, 2006). In the same vein, blood samples from Koko in Delta State (where illegal dumping of toxic waste from Italy in 1987-1988 occurred) were collected for analysis of toxins from four categories of individuals; residents close to dump site, dockworkers, neighbours and lastly hospital workers. The concentration of Lindane recorded in the blood of residents near the Koko dump sites was highest in the study area. The result was compared with results in Taiwan cases of similar incident and was found that the Koko incident victims had lower level of Lindane than the victims from Taiwan (Odare, 1991; Osibanjo, 2002).

In another study conducted by Bamgbose et al (2007), one hundred and Fifty (150) samples of colostrum were collected from donors who had just given birth (before the production of true milk) at a postnatal centre, were monitored for OCPs and PCBs-contamination. Analysis was performed by preliminary lipid extraction followed by partitioning on a column and finally by gas liquid chromatography equipped with an electron capture detector. Lindane, total DDT and PCBs were detected in all samples with a concentration range of 2-16 ng/ml for Lindane, 28-750 ng/ml for DDT and 16-1431 ng/ml for PCBs. The mean values were 14.12 ng/ml, 186 ng/ml and 468.62 ng/ml, respectively.

These research findings and others documented in the past are of critical concern in view of Nigerian government vigorous campaign that mothers' breast milk is best for children. During pregnancy, Organochlorine residues can be transferred in utero to the developing foetus via the placental blood supply (Sala et al., 2001). Thus, infants are being exposed to these Xenobiotics while the toxicological hazards and risks have not been studied (Osibanjo, 2007). It has been established that many chemicals stored in a woman's body are passed onto her child during pregnancy and later through breast-feeding (CDC 2003) which explains why human milk is a medium of determining POPs-pollution (Solomon and Schettler 1999).

Import/export

Records of importation clearance obtained from Nigeria Customs Service for years 2006 to 2010 did not show any Lindane imported into the country as it is a banned chemical. Lindane's GHS code 290351 was not found in the system audit of NCS for the five years indicated above. However, it is not unlikely that Lindane may be camouflaged and smuggled into the country through illegal cross-border trade routes by unscrupulous people, as evidenced by the report

of initial assessment of new POPs, conducted in 2010, in which Lindane was found to be concealed in a retailers' shops, in Benin City.

It is essential to carry out further studies on this and establish the sources of Lindane in Nigeria by carrying out visits to the so-called illegal importers their associated wholesalers, retailers and end users.

There are some laboratories equipped with gas chromatograph having electron capture detector which can be used for its trace analysis in Nigeria, notably in universities and some privately owned analytical laboratories. We still believe that more capacity is required for rapid analysis using most modern state-of-the-art equipment for its determination.

2.3.1.2 Chlordecone

Nigeria has no industry that produces Chlordecone just like other POPs. Nigeria is one of the largest plantain producing countries in the world (FAO, 2006). Before it was banned, Chlordane was used in the greatest quantities as a soil insecticide for controlling termites and soil-borne insects whose larvae feed on the roots of plants (Fdanthine, 2006) and had been used extensively in the tropics for the control of banana root borer (Langford, 1978); it is also regarded as an effective insecticide against leaf-cutting insects, a fly larvicide, as a fungicide against apple scab and powdery mildew (Information Canada, 1973), control rust mite on non-bearing citrus, and potato and tobacco wireworm. While the use of Chlordecone may not be promoted by IITA, a document produced by IITA Youth Agripreneurs on Plantain Production in West Africa (2014) identified Chlordecone and other crop protection products as being effective for the control of stem borer or banana weevils, as itemized in Table 2.7.

Table 2. 6: Examples of insecticides for the control of stem borers

S/N	Nematicides	Rate Per Plant (Grams)	No. Of Applications Per Year
1.	HCH (50%)	40 commercial. Product (c.p)	3
2.	Chlordecone	1 active ingredient (a.i)	2
3.	Isofenphos	1.2 active ingredient (a.i)	3
4.	aldicarbe	1.5 active ingredient (a.i)	3
5.	Carbofuran	2 active ingredient (a.i)	3

Source: IITA Youth Entrepreneurs (2014).

In a study conducted by Adeyemi, et al (2011) on Organochlorine pesticide residues in water samples of Lagos Lagoon, substances such as Chlordane, Endosulfan, Hexachlorobenzene, Dieldrin and Aldrin were detected in larger concentration (0.001 to 0.996 µg/L), while while Heptachlor, Methoxychlor, DDT and DDE were detected in lower concentrations (< 0.368 µg/L). The workers posited that findings revealed a wide-range distribution of the OCPs in the sampled location and the possibility of contamination arising from point sources by way of direct discharge and recent applications of most of the OCPs through agricultural run offs.

Lagos lagoon is a sink for sewages from residential and industrial sources, as well as run-offs from neighbouring agricultural activities.

The foregoing is a pointer to the fact that a large quantity of Chlordane must have been used in Nigeria in the recent past, probably stockpiled or smuggled, bearing in mind also that it is stable in soil and breaks down very slowly, so can remain in soil for decades (Eitzer et al., 2003). Exposure to Chlordane may occur through consumption of contaminated meat, fish, shellfish, root crops and other foods (Fdanthine, 2006). It is against this background that WHO/UNEP Milk Survey, to be conducted under GMP-2 Project in Sixteen African Nations, in which Nigeria is participating, will monitor chlordane and other OCPs in nursing mothers.

Nonetheless alternatives to Chlordecone such as CypermethrinR, KarateR, DDVR, GlycelR, 2.4 D AmineR and Atrozines are accessible, affordable and available in Nigeria.

2.3.1.3 Dieldrin

The only record of importation of Dieldrin into Nigeria for the period of 2005 to 2015 was made in April 2014 by Paints and Coatings Manufacturers. No other record of Dieldrin importation was found for NAFDAC and NCS during this period. However, it is to be noted that this entry for Dieldrin was inadvertently passed, since Nigeria had put a ban on the importation and use of Dieldrin, being one of the dirty dozen.

There are indications that Dieldrin has been used intensively in the past for the control of soil and seed treatment in agriculture, for control of disease vectors such as mosquitoes and *Glossina palpalis* (Tsetse flies), for veterinary purposes as a sheep dip, and for the treatment of wood and the mothproofing of woollen products. Its apparently prolonged use, stockpiles and unsound management have resulted in contamination of the environmental media, food as well as human exposure, with attendant health cum socioeconomic implications. It has been established that Aldrin and Dieldrin are synthetic Organochlorine insecticides with similar chemical structures, while Aldrin quickly breaks down to Dieldrin in the environment or in the body (Bogaert, 2000).

Osibanjo (2002) indicated that 217 fruits and vegetables, four major cereal (rice, maize, sorghum and soybeans), as well as food products of animal origin from different location within Nigeria were analyzed for the presence of Organochlorine. Meat, pulses and cereals were discovered to contain DDT, Aldrin and Dieldrin above maximum residue limit (MRL) while, others contain the pesticides below MRL (Osibanjo and Adeyeye, 1995; Osibanjo and Adeyeye, 1997; Adeyeye and Osibanjo, 1999). Most samples had maximum residue levels below the FAO's maximum residue limits (MRL). However some samples of meat, cereals and pulses had DDT, Aldrin and Dieldrin with levels above the MRL. Thus meat and pulses form the greatest sources of human exposure to POPs in Nigeria.

The high levels obtained for DDT, Aldrin and Dieldrin could be correlated interior residual spraying (IRS) with DDT for malaria control and Aldrin & Dieldrin for termite control respectively. The study further established that the dietary intakes of HCHs, DDTs, Aldrin and Dieldrin came predominantly from tubers, pulses and cereals. The dietary intakes of Aldrin and Dieldrin in Nigeria were estimated for the first time and found similar to the values for India but higher than the values of Japan and European countries. The dietary intake values

for DDTs and HCHs were below the Acceptable Daily Intake (ADI) of the FAO and those of the developed countries these findings are outlined on Table 2.8.

Table 2. 7: Overall mean concentration ($\mu\text{g kg}^{-1}$) of Organochlorine residue in Nigeria

	MRL	Fruits	Vegetable	Tuber	Cereals	Cow	Pig	Goat	Fish
DDT	1000-5000	6.9	28.3	30.4	81	164	510	141	4.80
Aldrin	20-200	1.9	2.1	8.0	8.0	28	244	61	-
Dieldrin	-	-	-	32	45	312	337	14	-
Heptachlor	200	ND	ND	ND	9.5	ND	ND	ND	3.60
DDE	-	5.8	4.7	12	29	106	374	90	-
MRL (Maximum Residue Limits) FAO/WHO, 1986. ND (Below detection limit)									

Source: Osibanjo, 2003)

In a related survey conducted by Akan, et al (2015), it was reported that there are evidences that Dieldrin though banned is still in use, due to its low cost and affordability. Aldrin and Dieldrin were detected in measurable concentrations (2.96 Mg/l and 11.25 $\mu\text{g/g}$), (4.36 Mg/l and 13.37 $\mu\text{g/g}$) in both water and sediment samples from river Benue.

2.3.1.4 Endosulfan

The record provided by NAFDAC for 2005 to 2015 showed importation of Endosulfan between October 2008 and September 2010 only, implying probable compliance on addition of Endosulfan to the list in 2011. The volume brought through the borders in 2010 was 262,400 litres. There was massive importation of Endosulfan in 2009, of about 1 million liters, probably because importers were aware of its being slated for consideration for addition to the list in the coming years. Since 2010, no record of Endosulfan importation was made into the country. Record provided for 2008 was just between November and December accounting for 156,000 litres of Endosulfan. Alternatives to Endosulfan being used in cocoa farms for the control of mirids and black pod disease include Thiamethoxam, Acetamiprid, Cypermethrin, Coper oxide and Copper hydroxide (CRIN, 2015b). The record of Endosulfan importation obtained from NAFDAC is summarized in Table 2.9 below.

Table 2. 8: Summary of Endosulfan Importation (2005 – 2015)

Year	Quantity (L)
2010	262,400
2009	968,520
2008	156,000
Total	1,386,920

2.3.1.5 Others (Aldrin, Chlordane, Heptachlor, Mirex and Toxaphene)

Importation of Aldrin, Chlordane, Heptachlor, Mirex and Toxaphene was prohibited by decision of the hazardous chemicals and waste management committee, under the Prior-Informed-Consent (PIC) Procedure, in 1999. This explains why NAFDAC and FMENV stopped issuing import permits for the list of POPs-pesticides into the country, with effect from 1999 when the national ban was imposed, hence have no record of its import. In spite aggressive public enlightenment campaigns embarked upon, these chemicals still thrive in the informal sector where vendors sell them ‘under the counters.’ There is no statistics of POPs pesticides in the informal sectors, which could be significant, as the ban has driven the marketers underground to the black market.

Record of importation obtained from NCS showed several items which are probably not POPs-Pesticides as the companies that imported them are not related to agriculture but paints, drugs and dairy companies (Refer Report on POPs-pesticides Inventory). This is actually one of the gaps of the HS classification that groups a lot of chemical substances together based on their structure and functional groups but are not in any way related in terms of their use. On the other hand, NAFDAC record for Years 2005 to 2015 did not list any of the other POP-Pesticides including Aldrin, Chlordane, Heptachlor, Mirex and Toxaphene.

However, it is not unlikely that these chemicals were imported and stockpiled in the past, with tendency to have some contaminated sites.

Although, due to data gap, it was postulated that Mirex and Toxaphene had never been used in Nigeria. The report of passive air sampling campaigns at the Produce Coordinating Unit, Sheda, FCT (north-central region of Nigeria, January 2008 – June 2008), conducted under *Supporting The Global Monitoring Plan On Persistent Organic Pollutant in six West African countries*, and analysed at IVM VU Amsterdam, MTM University of Orebor- Sweden and

Jawura Environmental laboratory Lagos revealed concentrations of Dieldrin, Chlordanes, Mirex, Endosulfans, among others (UNEP, 2009). Figure 2.11 depicts Passive Air Sampling kits (bearing treated Polyurethane media), being installed during one of the campaigns.



Figure 2. 12: Passive Air Sampling kits being mounted

Table 2.10 shows concentrations of individual OCP, with their corresponding total concentrations in various samples analysed.

Table 2. 9: Concentrations ($\mu\text{g}/\text{PUF}$) of OCPs in the Nigerian Air Samples Analysed

COMPONENTS	UNEP/NIG4-11(1)	UNEP/NIG 3-11(3)	UNEP/NIG 3-1(5)	UNEP/NIG-4-11(7)	UNEP/NT L-4 IV(9)	UNEP/NIG-4-1(11)	UNEP/NIG3-11(13)	UNEP/NTL3/IV(15)	UNEP/FISH(21)	UNEP/SS-NTL(17)	UNEP/SD-(19)
Hexachlorobenzene	5.4137	9.8431	10.9699	10.9267	8.8378	10.5867	12.0973	9.7498	29.7650	20.0201	18.5211
α -HCH	25.0453	20.2697	29.3697	23.2354	16.6382	5.2746	6.0489	12.2633	23.2448	20.8594	36.1731
β -HCH	11.9333	35.3085	13.9210	18.2957	18.9384	5.7760	6.2043	11.7202	82.5090	92.6039	35.0705
Lindane	10.6889	33.8204	26.3330	24.5638	48.4612	8.6579	18.6859	15.9011	30.4412	45.9952	39.0402
γ -HCH	13.0841	27.0370	14.3918	30.5908	43.4383	9.3181	14.9202	26.0760	47.3640	16.2291	35.1474
Heptachlor	44.8637	13.1119	9.9729	18.3510	51.6998	5.0819	43.8126	15.6344	32.6442	36.6845	37.8556
Aldrin	5.2452	15.3777	21.0866	21.9233	25.8430	7.6087	13.9726	14.7504	29.1150	21.4152	14.8226
Heptachlor-epoxide	11.6538	19.0272	27.8710	24.1341	33.4176	7.5750	13.0329	18.5918	52.8179	29.6322	22.5474
o,p'-DDE	21.3165	34.2350	16.2548	36.4433	46.4019	17.0848	23.7878	23.9777	38.4704	38.7068	50.8568
Dieldrin	22.2091	38.9498	12.5648	29.9379	40.7821	11.8156	14.4417	22.5910	32.5811	33.5419	37.8114
p,p'-DDE	32.5953	45.4847	23.0953	51.1835	50.1216	14.6603	28.6661	30.1656	24.7673	70.9741	38.7221
Endrin	11.4463	40.0439	44.9676	36.5145	37.9856	14.8261	24.3687	26.8136	22.7942	42.2833	38.3298
o,p'-DDD	16.4549	36.4004	38.1759	35.4318	20.9804	15.5199	16.9429	27.9223	32.893636	60.1352	35.4210
p,p'-DDD	15.9916	47.4837	42.9624	46.2861	36.4533	13.9622	21.4621	23.4940	33.8748	32.5322	32.4160
o,p'-DDT	23.7114	45.0206	43.7252	44.1362	14.4833	7.0142	14.9682	22.6363	36.7013	24.8816	37.1927
p,p'-DDT	6.1142	58.7115	50.2838	60.9187	18.0699	8.6223	22.3381	19.5883	17.7576	17.8738	38.7077
p,p'-Methoxychlor	27.2715	41.2475	58.0304	53.9986	38.6391	32.8128	17.3346	28.5687	25.3521	33.7313	51.8563
Mirex	39.0371	33.7921	35.6687	41.8690	20.6210	59.8119	9.9374	16.1409	34.4877	29.8582	35.9325

POPs pesticides (Aldrin, DDT and its metabolites DDD and DDE) have also been detected in fish with residue levels ranging from 0.03 to 0.06ng/g (Ize-Iyamu et al., 2007).

Furthermore, the recent case of deaths of 18 people in Ode-Irele, in Irele Local Government Area (LGA) of Ondo State in April 2015, has been attributed to pesticide poisoning. Those who died suffered from blurred vision and headaches, and then lost consciousness before dying within 24 hours. WHO posited that the “current hypothesis is cause of the event is herbicides” and that “tests done so far are negative for viral and bacterial infection” and the current theory was that the deaths were caused by the herbicide “Weedkiller”. All of those affected started showing symptoms between April 13th and 15th, 2015. The tests were carried out at the Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos.

2.3.1.6 POPs Monitoring Data (environment, food, humans) in Nigeria

Further to POPs monitoring survey referenced in different sub-sections above, it has been observed overtime that the occurrence of POPs, such as POPs-pesticides in our environment, as a result of uncoordinated procurement and their unsound management, have resulted in obsolete stockpiles and waste, thereby, adversely impacting the ecosystems and non-target organisms. Additionally, acute and chronic pesticide poisoning usually results from consumption of contaminated food, water and air, chemical accidents in industries and occupational exposure in agriculture. Pesticides are the major causes of cancer, cardiovascular disease, dermatitis, birth defects, morbidity, impaired immune function, neurobehavioral disorder and allergy sensitization reaction (Erhunmwunse et al., 2012).

Establishing the residue levels of POPs in environmental media provides information on the potential socio-economic, health and environmental impacts of POPs usage in the country over time. Although analytical capability for POPs detection and quantitative analysis is limited in the country, there are however some relevant past and current research in the country conducted by individual workers (Nigeria First NIP, 2009).

Failure to establish a database from past incidents in order to avert future occurrences has posed a huge problem to the society at large. The need for epidemiological data collection from past exposure, development of less toxic pesticides and legal requirement regarding toxicological and ecological effect before the importation of pesticides into the country will further reduce the impact of toxic pesticides on human health in the country (Erhunmwunse et al., 2012a).

Furthermore, Organochlorine insecticide residues of Aldrin, Dieldrin, Heptachlor, Endrin, Chlordane and Endosulfan were detected in all the samples of cowpea and dried yam chips analyzed with highest mean concentration of Aldrin (0.580 ± 0.456 mg/kg) and Heptachlor (0.402 mg/kg ± 0.073) measured in dried yam chips and cowpea respectively. The levels of the residues detected in the cowpea grains and dried yam chips were generally above the EU-MRLs, suggesting that the foodstuffs were not safe for human consumption as bioaccumulation of these residues was likely to pose health risks to the consumers (Olufade et al., 2014).

There is widespread contamination of Nigerian soils with POPs chemicals. The contamination trend in soils in private farms, industrial sites, municipal refuse dumps with refuse dump soils showed that they have highest concentrations of POPs-pesticides. The occurrence and levels of some POPs pesticides and non-POPs pesticides in inland waters, notably Lindane and Endosulfan in water in 17 rivers, 2 lakes and one dam in southern Nigeria had been studied. Fish samples from fresh water sources were found to contain significantly higher concentration of POPs-pesticides than sediments and water.

Therefore, there is an urgent need for continuous monitoring of pesticide residues in food, water and the environment, which will go a long way in facilitating informed interventional actions targeting at curbing illicit activities, hence minimising attendant environmental and public health hazards.

In another survey, a total of 23 Organochlorine pesticides were detected in samples of microlayer water, mixed layer water, epipellic and benthic sediments collected from Agboyi Creek, Lagos including Aldrin, Dieldrin, Endrin, DDT, Heptachlor, HCH, Endosulfan, Chlordane and Methoxychlor. Pesticide residues in the epipellic and benthic sediments were higher than the residues in the micro-layer and mixed layer water and the residue levels were higher during the dry season than the wet season. Also, levels of the residues in the water and sediments were below the maximum permissive residue limits (Williams, 2013).

2.3.2 Assessment of Polychlorinated Biphenyls (Annex A, Part II Chemicals)

2.3.2.1 Historical Initiatives on PCBs

In 2008, the Nigerian Government undertook an initial PCBs evaluation in some electrical power generating, transmission and distribution facilities spread across 10 states in the country with financial support in the amount of USD 250,000 from the World Bank's executed Canadian POPs Trust Fund. It was estimated that the project captured about 10% of potentially contaminated electrical equipment in the power sector.

As a follow up to this study, the Canadian Trust Fund on POPs financed another study in 2009 which was called "Location and Assessment of the Status of PCBs and PCBs containing equipment in all Power Holding Company of Nigeria (PHCN) facilities". This study focused primarily on locating and quantifying disused equipment and oils potentially contaminated with PCBs.

Subsequently, UNIDO in collaboration with the FMEnv in 2010 implemented the Regional POPs Management project (Nigeria-Ghana), which focused on the development of a toolkit for stepwise methods for identifying POPs contaminated sites and selection criteria for cost-effective environmentally sound remediation options for POPs contaminated sites. The study also involved preliminary and detailed site investigations for PCBs contamination at the broken-down Ijora Power Station B, in Lagos State. The "African Stockpiles Project for Obsolete pesticides" was also another major attempt to the management of POPs in the country.

2.3.2.2 Nigeria PCBs Management Project

At the national level, the project is intended to strengthen the Government's capacity to manage, monitor, control and, ultimately, phase out the use of PCBs. The project design includes provision for a comprehensive review of current hazardous waste management regulations, and the development and incorporation of a new regulatory framework that will specifically address POPs in general, and PCBs in particular. It will also develop a baseline national inventory of PCBs and PCBs-containing equipment and a national PCBs management plan.

The project will support implementation of the following: -

- National Implementation Plan (NIP) for POPs;
- National Strategy for Environmental Protection;
- Federal Government's vision 20:2020 with special attention to pollution prevention, abatement, remediation and management themes;
- It will also contribute to ongoing interventional efforts at reducing the risks to human health and ecosystem integrity from industrial pollution; and
- Strengthening national capacity and performance in Solid and Hazardous Waste Management.

At the global level, the project is expected to assist Nigeria in meeting its obligations under the Stockholm Convention and contribute to global efforts to control toxic chemicals in general, eliminate/reduce POPs releases to the environment, and manage PCBs waste and PCBs-contaminated equipment in an Environmentally Sound Manner.

The assessment of Polychlorinated Biphenyls (PCBs) was mainly done in the power sector of the national economy, which has the largest collection of PCBs-containing line equipment in the country. The sector has infrastructures located in all 36 states of the federation, including the Federal Capital Territory (FCT), with about 250 transmission transformers, 34800 distribution transformers and over 2000 power transformers.

During this assessment, fifteen (15) states were covered and the main equipment considered were: transformers, capacitors and oils from transformers and capacitors. The states covered were **North West:** Kaduna, Kano & Sokoto; **North East:** Bauchi, **North Central:** Abuja, Benue, Niger; **South West:** Lagos, Ogun, Oyo; **South-South:** Delta, Rivers; **South East:** Abia, Anambra, Enugu.

2.3.2.3 Institutional framework for the Nigerian Power Sector

The statutory organization empowered by law to oversee the power sector in Nigeria is the Federal Ministry of Power. Electricity supply in-country is driven through three (3) tiers of operations, which include: Generation, anchored by Generation Companies (GENCOs), privately owned; Transmission, by Transmission Company of Nigeria (TCN), public sector; and Distribution, done by Distribution Companies (DISCOs) also privately owned.

Electricity Generation Companies – Structure and Organization

Generation companies mainly own generation, power, voltage and current transformers, and also oil filtration machines which are significant equipment considered under the national baseline inventory of PCBs. Following privatization, there are currently 7 successor Generation Companies (GENCOs) in Nigeria. Table 2.11 shows the list of electricity generating facilities in Nigeria.

Table 2. 10: Power Generation Companies

S/N	Generation Company	Brief Description	Plant type
1.	Afam Power Plc (1-V)	Afam Power Station has an installed capacity of 776MW, The plant was commissioned in phases. During the Initial phase, 1962-1963, gas turbine units 1-4 were commissioned. During the second phase, 1976 to 1978, gas turbine units 5 to 12 were commissioned. Gas turbine units 13 to 18 were commissioned in 1982. Two gas turbine units were added in 2001 during the final phase of the Afam Power Station extension.	Thermal
2.	Egbin Power Plc	The Egbin Thermal Power Plant is a gas-fired plant with six 220MW independent boiler turbine units. The first unit of the plant was commissioned in July 1985, while the last was commissioned in September 1986.	Thermal
3.	Kainji Hydro Electric Plc	Kainji began operation as Nigeria's first hydro power plant in 1968. Kainji generates 760 MW, drawing its water supply from the Niger River.	Hydro
4.	Jebba Hydro Electric Plc	Jebba was commissioned in 1985 and generates 570 MW effectively. Jebba is the smallest of the three operating hydro Power plants in Nigeria and also draws its water supply from the Niger River.	Hydro
5.	Sapele Power Plc	Sapele Power Plant is a Thermal generating station located in Nigeria's gas- rich Delta State. Sapele has an installed capacity of 1,020 MW Sapele Power's six 120 MW steam turbines generate a daily average of 86.72 MWI.j/H or approximately 2,500GW/H annually Sapele. Power currently operates at a peak capacity of 972MW. Sapele Power is strategically located in the Niger Delta region, close to sources of both natural gas feedstock and a river for cooling its steam turbine generators. Sapele Power began operations in 1978.	Thermal

6.	Shiroro Hydro Electric Plc	Shiroro Power Plant was commissioned in 1990; it has an installed capacity of 600 MW, It currently runs at full capacity, generating 2,100 GWh of electricity annually. The plant is situated in the Shiroro Gorge on the Kaduna River, approximately 60km from Minna, capital of Niger State, in close proximity to Abuja, Nigeria’s Federal Capital.	Hydro
7.	Transcorp Ughelli Power Plc	Ughelli Power Plc operates a gas-fired thermal plant located in the Niger Delta region. Ughelli Power is one of the largest thermal generating power stations in Nigeria. The plant has a peak capacity of 972 MW; it can generate 2,500 GWh of electricity annually. The plant meets current world specifications for plants of its type, and includes an updated control room, a switchgear room, a staff training school and recreational facilities. Ughelli began operations	Thermal

Transmission Company of Nigeria (TCN)

The Transmission Company of Nigeria (TCN) is a successor company of PHCN, following the unbundling of the sector, and is currently being managed by a Management Contractor, Manitoba Hydro International (Canada). The TCN is made up of two major departments: System Operations and Market Operations. The Market Operations (MO) is a department under TCN charged with the responsibility of administering the wholesale electricity market, promoting efficiency and where possible, competition. The System Operations (SO) is focused on system planning, administration and grid discipline.

Structure & Organization

At the national level, TCN is managed by a Managing Director (MD) or Chief Executive Officer (CEO) who is assisted by a deputy, General Managers (GMs) and other tiers of management staff. The TCN structure is not state-based but rather region-based, which implies that a particular TCN region is responsible for electricity transmission in its coverage states. Each region consists of sub-regions and/or work centres, which supervise smaller transmission substations. Table 2.12 presents existing TCN regions with emphasis on those covered in this PCBs inventory.

Table 2. 11: Regions, Sub-regions and Work-centres

S/N	REGION	SUB-REGION/WORK-CENTRES
1.	Bauchi	Gombe, Jos, Yola
2.	Benin	Ajaokuta, Benin, Sapele
3.	Enugu	New Haven, Onitsha, Makurdi
4.	Kaduna	Kaduna, Kano
5.	Lagos	Akangba, Aja, Ijora, Ikeja West, Papalanto
6.	Oshogbo	Ayede, Oshogbo
7.	Port Harcourt	Port Harcourt Mains, Alaoji, Calabar
8.	Shiroro	Abuja, Benin Kebbi, Jebba, Shiroro,

Distribution Companies – Structure and Organization

The Distribution Companies or DISCOs are engaged in the business of power distribution and marketing to the general public. There are currently eleven (11) Electricity Distribution Companies (DISCOs) in the country (fig. 2.13). Each of the eleven DISCOs is managed by an MD or CEO. All DISCOs are subdivided into Districts or Business Units for marketing and customer services purposes.



Figure 2. 13: DISCO's catchment areas

Independent Power Producers (IPPs)

IPPs are power plants owned and managed by the private sector. Although there have been IPPs existing in Nigeria prior to the privatization process, the Nigerian Electricity Regulatory Commission (NERC) has recently issued about 70 licenses to Independent Power Producers in order to improve the power situation in the country. The existing IPPs include Shell – Afam VI (642MW), Agip – Okpai (480MW) and AES Barges (270MW).

National Integrated Power Projects (NIPP)

The National Integrated Power Project (NIPP) was conceived in 2004 as a major fast-track initiative to add significant new generation capacity to Nigeria's electricity supply industry. The generation projects are accompanied by supporting transmission, distribution and gas transport infrastructure projects.

2.3.2.4 Facilities visited during the PCBs inventory activities

Facilities visited during the inventory include; Afam Power Plc, Sapele Power Plant, Transcorp Ughelli Power Plant, Ijora Electric Power Station, Egbin Thermal Power Station, Jebba Power Station, Kainji Hydro-Power Plant, Enugu Transmission Region, Port Harcourt Transmission Region, Lagos Transmission Region, Oshogbo Transmission Region, Benin Transmission Region, Shiroro Transmission Region, Bauchi Transmission Region, Kaduna Transmission Region, Apo Transmission Region, Eko Electricity Distribution Company (EKEDC), Ikeja Electricity Distribution Company (IKEDC), Ibadan Electricity Distribution Company (IBEDC), Kano Electricity Distribution Company (KEDCO), Benin Electricity Distribution company (BEDC), Kaduna Electricity Distribution Company (KEDC), Jos Electricity Distribution Plc (JED), Enugu Electricity Distribution Company (EEDC), Port Harcourt Electricity Distribution Company (PHEDC) and Abuja Electricity Distribution Company (AEDC).

During the inventory exercise, information obtained from NCS revealed that a total of 1,254,716kg of Endrin/HCBs and PCBs/HBB/PeCBs was imported into Nigeria between 2011 and 2014 and originated from countries including Denmark, India, China, Netherlands, Belgium and Spain. In the power sector of Nigeria, a total number of 1,590 equipment were inventoried from Generation, Transmission, Distribution facilities which included 1,157 transformers, 250 capacitors, 26 reactors, 45 ring main units, 79 oil circuit breakers and 33 oil filtration Machines. Figure 2.14 shows a drum of PCBs oil observed and an on-line transformer on site.



Figure 2. 14: A drum of PCBs oil observed and an on-line transformer on site

The total weights of PCBs-containing oil and equipment inventoried per state are as computed in Table 2.13.

Table 2. 12: Weights of PCB- containing oil and equipment inventoried

S/N	State	Weight of PCB Containing oil (Tonnes)	Weight of PCB Containing Equipment (Tonnes)
1	Lagos	263.29	1026.50
2	Oyo	49.36	242.32
3	Ogun	54.22	202.67
4	Delta	436.41	1169.55
5	Rivers	1.5	4.8
6	Enugu	66.88	240.23
7	Anambra	48.66	165.24
8	Abia	15.74	66.64
9	Sokoto	32.57	127.84
10	Kaduna	205.94	891.75
11	Kano	121.82	427.57
12	Bauchi	21.83	85.42
13	Benue	93.62	305.52
14	Niger	94.75	498.60
15	Abuja	182.66	683.06
	Total	1,689.25	6,137.71

2.3.2.5 Sample Collection and Onsite Testing

- i. Oil samples were extracted from electrical equipment by facility personnel (installation technicians)
- ii. Oil samples were collected from drums (stored oil and in use oil)
- iii. Oil samples were collected in primary containers and labelled
- iv. Clor-N-50 test kit was used to test oil samples onsite for the presence of Chlorine and or PCBs concentration above 50ppm; the test confirms PCBs above 50ppm.
- v. Samples that test positive for PCBs were collected and stored for further laboratory quantitative analysis of PCBs presence.

The Clor-N-50 test kit was used to detect PCBs above 50ppm samples drawn on the field, the kit detects presence of Chlorine in the samples. Oil samples which indicated PCBs concentration above 50ppm were marked and recorded in field data forms. The equipment from which the PCBs contaminated oil sample was collected is labelled with an inscription “This Equipment Contains

Polychlorinated Biphenyls (PCBs)”. Some samples that indicated PCBs concentrations above 50ppm with Clor-N-50 were subjected to definitive analysis using L2000DX Analyser and Gas Chromatography for confirmatory test for PCBs in the samples.

The L2000DX Chloride Analyzer is a quantitative PCBs analyzer suitable for a wide variety of chlorinated organic compounds in various matrices such as oil, soil and water. The basic principle is to measure the (i) total organic chlorine content, (ii) convert organic chlorine into inorganic chloride and (iii) quantification of the resulting chloride.

Gas Chromatography/Mass Spectrometry is an extremely useful analytical procedure essential for separating and analyzing different compounds in mixtures. Separation is based on volatility. The major stages involved are (i) Injection of the analyte into an inert carrier gas (mobile phase) (ii) Separation of its components in the gas column (stationary phase) (iii) Detection of the target analyte by a flame detector (Mass Spectrometer).

Interpretation of PCB Inventory Data

Based on the analysis, it is evident that older states like Oyo (89.4%), Kaduna (43.1%), Lagos (30.1%) and Niger (39.6%) had higher values of PCBs containing equipment due to the presence of older transformers in those states that were produced pre 1980’s (the year PCBs came into enforcement), hence these transformers were operated using PCBs containing oil which contaminated the transformers. Delta also had a high value of PCBs (56.4%) due to the presence of old transformers in old Local Government Areas (LGAs) of the states like Sapele and Ughelli.

Table 2. 13: Summary of PCBs Inventory Data

National Baseline Inventory - PCBs Contaminated Oil	1,629,749.81kg
National Baseline Inventory - PCBs Contaminated Equipment	6,398,395.72kg
Nigerian Custom Data – Imports (Endrin/ HCBs & PCBs/ HBB/PeCB)	1,254,716kg
TOTAL	9,282,861.53Kg

2.3.3 Assessment of Polybrominated Diphenyl Ethers (PBDEs)

Polybrominated Diphenyl Ethers (PBDEs) are a class of industrial aromatic Organobromine chemicals whose first commercial production was in the 1970s as additive flame retardants in a wide range of mainly consumer products (Centers for Disease Control). These additive PBDEs are the highest produced group of Brominated Flame Retardants (BFR). PBDEs were produced with three different degrees of Bromination and marketed as outlined below:-

- a. Commercial Pentabromodiphenyl Ether (c-PentaBDE)
- b. Commercial Octabromodiphenyl Ether (c-OctaBDE)
- c. Commercial Decabromodiphenyl Ether (c-DecaBDE)

Production of C-PentaBDE and C-OctaBDE stopped in 2004, while that of (c-DecaBDE) is still produced (Alaee et al., 2003; Prevedourous et al., 2004; SFT, 2009). DecaBDE is the most widely used PBDE globally.

Similar to other Brominated Flame Retardants, PBDEs have been known to be used in a wide group of products, including building materials, electronics, furnishings, motor vehicles, airplanes, plastics, polyurethane foams, and textiles. They are structurally similar to PCBs and other poly-halogenated compounds, consisting of two halogenated aromatic rings.

There are no known natural sources of PBDEs and PBBs, except for a few marine organisms that produce some forms of PBDEs. PBDEs may enter the environment through emissions from manufacturing processes, volatilization from various products that contain PBDEs, recycling wastes and Leachate from waste disposal sites.

PBDE is primarily used as flame retardant in a wide variety of finished products, providing protection from heat or fire by slowing the rate of combustion. In this process, bromine atoms are released from the PBDE molecule to displace oxygen, decreasing the rate of burning. Commercial use of PBDEs is divided into 3 types; Penta, Octa, and Deca-BDEs. Penta-BDE was commonly used in upholstered furniture padding and rigid insulation. Octa-BDE was extensively used in high impact plastics such as electronics and appliances. Deca-BDE was commonly used in textiles and electrical insulations.

The inventory covered mainly transport sector (automobiles) and Electrical and Electronic Equipments (EEEs). The chemical is used in PUR foams (automotive seating, head rests; car ceilings, acoustic systems, back-coating of textiles), plastic parts (steering wheels, dashboards, door panels, bumpers), electronic casings, etc.. Information on national statistics was obtained from relevant stakeholder, which was used to update inventories of the POPs under review. Statistical data showed that the following basic formula was used to calculate the POPs-PBDE content of vehicles:

Amount of POPs-PBDEs (Vehicle category) = Number of vehicles category (manufactured 1975 to 2004) x amount POPs-PBDEs category x Fregional

Where:

- a) Number of vehicles category is the number of vehicles (manufactured 1975-2004) present in a category (car, bus or truck) calculated for the different life cycle stages.
- b) Amount POPs-PBDEs category is the amount of POPs-PBDEs in an individual car, truck or bus treated with POPs-PBDEs.
- c) the regional factor of estimated percentage of POPs-PBDE impacted vehicles produced in a region (1975 to 2004).

The figure below is a handheld X-ray fluorescence (XRF) Spectrophotometer, which is used to detect the level of PBDE in articles. It works on the principle of fluorescence and is configured with windows systems software. The cycle time to complete one sample analysis is 100s. It displays the quantity of the elements detected on the screen.



Figure 2. 15: Handheld XRF spectrophotometer

2.3.3.1 Rationale for Samples Selection

Electronic and Electrical Sector

Large quantities of PBDEs is found in Electronic and Electrical Equipment (EEE) in developing countries like Nigeria because of the previous usage of these chemicals (PBDEs) in the manufacture of these products as flame retardants. In Nigeria, second hand EEE are found in various sectors including homes, communication, entertainment, education, health care, among others.

Electronics produced before 2005 may be flame retarded with c-OctaBDE. The main appliances are televisions and computer CRT monitors. Large quantities of old EEE and WEEE are imported from industrial countries/regions (e.g. United States, Europe and Japan) to developing countries for reuse. Primitive recycling technologies for WEEE have resulted in large contaminated areas in developing countries and exposure of recyclers and the general population (Wong et al., 2007; UNEP, 2010a, 2010b).

The sampling locations selected were (1) Abuja Computer Village, Zone 3, FCT and (2) Area 10 Printing Complex, FCT. Sampling of EEE was basically done at locations where businesses listed below are major hub for all forms of electronic trading.

- Sales of new and second hand EEE (computers, CPUs, printers etc.)
- Repairs of EEE
- Sales of EEE accessories etc..

Osibanjo, et al (2010) estimated POP-PBDE in various waste streams in the Nigerian at 2.8×10^5 kg, which are assumed to be accumulated/stockpiled due to inherent capacity gaps in managing the special waste in BAT/BEP-compliant manner. With increasing consumerism in various sectors of the

economy and associated co-mingled waste streams, POP-PBDE has continued to be an issue of serious concern, due to increased accumulation, abandonment and stockpiles.

The inventory conducted, under NIP Review and Update project implementation has estimated POPs PBDE in the EEE sector at **9.579x10⁵kg** (Table 2.15). In addition, statistical data on the import of PBDEs obtained from the Nigerian Customs Service (NCS) confirmed **164,730kg** of tetra PBDE was imported into Nigeria between 2011 and 2014 by different importers (Annex X). Most of them were from Asian countries including Hong Kong, China and Taiwan.

Similarly, Bromine content discovered in CRT Monitors, CPU, Printers, Laptops, Saloon Cars, Buses, Vans, and Polyurethane Foams in Cooling Vans & Containers was analysed using the handheld x-ray fluorescence scanner and found to be **4,716,427 ppm**.

Table 2. 14: Commercial OctaBDE and related POPs-PBDE (hexaBDE and heptaBDE) in EEE, WEEE

Homologues	Distribution homologues c-OctaBDE	POPs-BDEs in import for inventory year 2010	POPs-BDEs in stocks for inventory year 2010	POPs-BDEs entering the waste stream (WEEE) for inventory year	POPs-BDEs in recycled polymers for inventory year 2010	Total POPs PBDE in EEE Sector
Total inventoried c-OctaBDE*		9.9 x 10 ³	9.05 x 10 ⁵	3.8 x 10 ⁴	5.0 x 10 ³	9.579x10⁵
HexaBDE	11%	1.1 x 10 ³	9.95 x 10 ⁴	4.18 x 10 ³	5.5 x 10 ²	
Hepta BDE	43%	4.23 x 10 ³	3.8 x 10 ⁵	1.6 x 10 ⁴	2.15 x 10 ³	

*C-OctaBDE contains PBDEs listed (hexa- and heptaBDE) and not listed as POPs (octa-, nona-, and decaBDE), and therefore the sum of hexaBDE and heptaBDE do not correspond to 100% of c-OctaBDE.

Transport Sector

one of the critical sectors of the economy is Transport, in terms of its significance in the conveyance of goods, industrial inputs, machinery, services and human populations. For the purpose of the NIP Update Project and considering national circumstance, the POPs inventory in the sector has been focussed on vehicles on Nigerian roads, some of which components may contain BFRs, depending on when and where they were produced or imported from.

Due to economic circumstance, many middle-level earners and small/medium entrepreneurs are unable to afford brand new vehicles, hence, resort to buying used vehicles (also known also second- or Tokunbo' vehicles) imported from America, Europe and Asia. Factually, a large percentage of the transport fleet from 1970 to 2004 (cars, buses and possibly trains) containing c-PentaBDE is still in operation today. It is therefore tenable to assume that the transport sector (cars, trucks, buses, trains, ship, and planes) has large stockpile of c-PentaBDE in Nigeria. According to Information obtained from National Bureau of Statistics (NBS), there are 925,434 registered vehicles in Nigeria from the period from 2004 to 2010 (see Annex XI).

Car parts tested with handheld XRF scanner (Model No.....); were the plastic and foam containing components such as dash boards, door mats, floor mats, bumpers, seats, steering wheels, etc. Sampling locations selected were:

(1) Apo Mechanic Village, Abuja, FCT and (2) Zuba Mechanic Village, Kaduna Road, Kaduna State

The POPs-PBDE inventory data covering imports, use/stocks, end-of-life and historical deposits is shown in Table 2.17. POPs-PBDE in inventoried vehicles (cars, busses, trucks, etc.) in import, use/stocks, end-of-life and landfills/dumpsites in Nigeria in 2010 was estimated at **2.8 x10⁵kg**. In the inventory year 2014 in the transport sector, the amount of POPs PBDE was estimated at **3.15x10⁵kg** (Table 3.17). Estimated data from field work of PBDE in Nigeria is **4,716,427ppm** (Br content) and imports data from the Nigerian Custom Service was put at **164,730kg**. Sampling of EEE was basically done at locations where the below listed businesses are major hub for all forms of electronic trading.

- Sales of new and second hand EEE (computers, CPUs, printers etc.)
- Repairs of EEE
- Sales of EEE accessories etc.

Table 2. 15: POPs-PBDE (in kg) in inventoried vehicles

	Distribution Homologues c-PentaBDE	POPs-BDDE in current Transport	POPs-BDE in imports (2010)	POPs-BDE in end of life vehicles (2010)	POPs-BDE already deposited	POPs-BDE recycled in 2010	Total PBDE transport	POPs in
c-PentaBDE		2.2×10^5	2.1×10^3	1.9×10^3	5.8×10^4	-	2.8×10^5	
TetraBDE	32%	7.0×10^4	6.8×10^2	6.1×10^2	2.4×10^4	-	9.1×10^4	
PentaBDE	56%	1.2×10^5	1.2×10^3	1.1×10^3	3.7×10^4	-	1.6×10^5	
HexaBDE	9%	2.0×10^4	1.9×10^2	1.7×10^2	6.0×10^3	-	2.6×10^4	
HeptaBDE	0.5%	1.1×10^3	1.1×10	9.5	2.9×10^2	-	1.4×10^3	

Source: PBDE Inventory in the Transport Sector of Nigeria – A Step for Stockholm Convention Implementation (Osibanjo *et al.*, 2012)

Polyurethane Foam (PUF): Cooling Van and Portacabins (containers): PUF padding is used as padding in the interior walls of cooling vans and cabins/transport containers. PBDE was used as a flame retardant in the padding of these vans and containers to ensure that contents are protected from fire.

Cooling vans are used to transport seafood from one country/ state to another. In Nigeria cooling vans are used to import seafood and other fisheries. The containers are used to import goods to the country e.g. furniture, used clothes, cars etc. The foam paddings are a likely source for PBDE and were thus considered for the inventory from imported source. The sampling location was Utako Berger Yard, FCT. Field work Data from this location estimated PBDE in PUF at 10235ppm (Br Content).

Tools/methodology for Detection of PBDEs: The technique deployed for the field inventory of PBDEs was:

Qualitative Method: As part of the general POPs inventory methodology, concise and target-specific questionnaires (Annex IX) were administered. These include the PBDEs inventory form with special focus on PBDEs in industrial, consumer goods and transport sector. Data collated include the following:-

- Type of equipment/vehicle
- Country of Manufacture
- Year of manufacture
- Average monthly/yearly totals within locations
- Disposal practices

Quantitative Method: the quantitative determination of PBDEs was conducted using handheld XRF scanner. It is a handheld portable equipment that detects the quantities of some halogens and heavy

metals. It operates on Microsoft windows software and works by exposing the material to an X-ray beam. This causes the individual elements of the material to emit light with characteristic wavelengths, thereby making it possible to determine the elemental composition based on the intensity of the individual wavelengths of the emitted light. The "depth" of the measurement depends on the light dispersal in the material.



Figure 2. 16: PBDE inventory in electronic equipment and vehicles

2.3.3.2 Summary of PBDEs Inventory Data

Data on PBDE inventory is summarised according to each sector.

Table 2. 16: Summary of PBDEs inventory data

Description	Quantity
Transport - Statistical Data (Import, Use, End of Life)	3.15 x 10 ⁵ kg
Nigerian Custom Service imports (Tetra BDE)	164,730kg
Electronic & Electrical (EEE) statistical data	9.579 x 10 ⁵ kg
Polyurethane foam field work	10235ppm

2.3.3.3 Interpretation of PBDEs inventory data

Analysis of the PBDE result for EEE in the country shows larger quantities of POPs-PBDE in items manufactured in the earlier years, and a reduction in trend with the more modern era as depicted in the figure below. Items manufactured 1993-1999 had very high quantities of POPs-PBDE

(1,881,536ppm), items manufactured from 2000-2003 also had significant quantities of POPs-PBDE (849.819ppm) in contrast with items manufactured 2004 – 2007 i.e. post ban of PBDE (4,046ppm).

This also shows that there is compliance to the ban on the use of PBDEs in articles as illustrated in the reduction in quantities of PBDEs in articles manufactured post ban (2004).

The inventory results show that articles manufactured in countries like Japan and China contains the highest quantities of POPs-PBDE in the locations inventoried during the field work (Table 2.18).

Table 2. 17: Articles with highest PBDEs, emanating from Asia

Location	Highest Value	Country of Manufacture	Year of Manufacture
Abuja Computer Village	989,600	Japan	1980
Area 10 Printing Complex	972,400	Japan	1999
Apo Mechanic Village	4,220	Japan	1996

2.3.4 Perfluorooctane Sulphonic Acid & Salts (PFOS) Inventory

Perfluorooctane Sulphonic Acid (PFOS), its salts and Perfluorooctane Sulfonyl Fluoride (PFOSF) are listed in Annex B of the Stockholm Convention in 2009. Parties to the Convention are recommended to develop an action plan for PFOS and its related substances as part of their updated NIP. This objective is aimed to achieve by developing a national inventory of: products and articles; production, use, and disposal of waste containing PFOS; landfills, stockpiles and contaminated sites in Nigeria.

PFOS are widely used in the manufacture of synthetic carpets to provide stain protection. Use of PFOS in synthetic carpets is of concern because of the possible direct exposure of small children and babies. The washing of synthetic carpets can be a source of the releases of PFOS into water. The levels in house dust and indoor air can be a result of releases from synthetic carpets, among other sources in the home environment. Synthetic carpets remain in use for several years, and will eventually be deposited in landfills (Fricke et al., 2004).

Similarly, PFOS is used in the manufacture of articles, this includes textiles, furniture, synthetic carpets, clothes, leather apparel, food packaging, etc. Information on the application of PFOS-related substances in 2000 indicated that over 75% of total PFOS consumption was in consumer articles (3M Company, 2000).

The inventory of PFOS included a pilot testing of PFOS in some of the major sources of PFOS in the country. These sources are consumer articles, namely: Synthetic Carpets, Fire Fighting Foams and Hydraulic Oil.

2.3.4.1 Synthetic carpets

Synthetic carpets have usually being treated with PFOS which is not the case for natural fibre carpets. Chemical recycling of carpets involves breakdown of the nylon fibre to be reprocessed into new carpet

fibre. Recycling and reuse for synthetic carpets containing PFOS and its related substances are banned by the Stockholm Convention, and many of the products produced from recycled synthetic carpets represent a direct exposure of the environment and humans.

A lot of households and offices in Nigeria utilise synthetic carpets because of its aesthetic and warming properties, as a result it is a comfortable and well patronized article. Lucky Fibres PLC based in Nigeria, is the largest manufacturer of Carpets and Rugs in Nigeria. It is one of the most patronized carpet manufacturers in Nigeria and thus was selected as a suitable article for the inventory.

2.3.4.2 Fire Fighting Foams

Fire-fighting foams with Fluorosurfactants are used for extinguishing liquid fuel fires, and are normally used to suppress fires in flammable liquids like oil, petrol, other non-water-soluble hydrocarbons, and flammable water soluble liquids like alcohols, acetone. Firefighting foams containing PFOS are of focus due to the dispersive and extensive use and risk of high releases to the environment. Fire drills and leakage from stockpiles of firefighting foams have led to contamination of groundwater and soil (Moody et al., 2003; Herzke et al., 2007). Fire fighting foams in Nigeria is used by a number of organisations like: airports, fire fighting organisations, petrochemical industries etc.

2.3.4.3 Hydraulic Oil

Hydraulic oils containing PFOS have been used as an anti-erosion additive in civil and military airplanes since the 1970s to prevent evaporation, fires and corrosion (UNEP, 2010b). PFOS is added to inhibit erosion (and to control damages) of mechanical parts of hydraulic systems such as valves that are used in aircrafts. Hydraulic oil are used in excavators and backhoes, hydraulic brakes, power steering systems, transmissions, garbage trucks, aircraft flight control systems, lifts and industrial machinery.

The inventory of PFOS covered several sectors, which include: carpet industries like Lucky Fibres Company, Federal Airport Authority of Nigeria (FAAN), Federal and State Fire Services, and Nigerian Custom Service (NCS), among others.

Results

The results obtained from the inventory of PFOS are summarized, thus:

- Data obtained from NCS gave a total of 2,983,641kg of PFOs entered into Nigeria between 2011 and 2014 by various importers, and originating from a variety of countries including China, India, Singapore, United State of America, United Kingdom, Belgium, Germany, and United Arab Emirates.
- Gombe State Fire Service confirmed the available stockpile of 10.0tons of AFFF which was previously used in the states before it was banned as firefighting foam. However, in recent times alternatives are been used (specifically Dry chemical powder and CO2 gas) in the sector.
- The NNPC also have about 2,000kg of AFFF stockpiled in drums for destruction in an Environmentally Sound Manner while the corporation is currently using Flouroprotein as alternative to AFFF.

- Oyo State Fire Service confirmed presence of PFOs compound (Flouoroprotein concentrate foam compound) used for firefighting operations available in about 3,400 liters safeguarded in plastic drums.

Table 2. 18: Summary of PFOS Inventory

Description	Quantity
Nigeria Custom Service Data	2,983,641kg
Synthetic carpets - Field Work	TBD
Gombe Satate Fire Service	10,000kg
NNPC (AFFF)	2,000kg
TOTAL	2,995,641kg

2.3.4.4 Interpretation of PFOS Inventory Data

Statistical data obtained from NCS shows high importation of PFOS (2,983,641kg) into the country between 2001-2004. Similarly, stockpiles of PFOS were also discovered in NNPC and Gombe State Fire Service. Therefore, there is a need to strengthen enforcement and compliance to phase out PFOS and other band chemicals and also embark on regular monitoring to enable the nation meet up her obligations under the convention.

2.3.5 Assessment of Unintentionally Produced Persistent Organic Pollutants (UPOPs)

Polychlorinated Dibenzo-P-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs), commonly known as Dioxins and Furans are listed in Annex C of the Stockholm Convention on POPs. They are unintentionally formed and released into environmental media (air, land, water) from thermal processes involving organic matter and chlorine as a result of incomplete combustion or chemical reactions and are commonly named “by-products”. They are also referred to as “UPOPs”. Besides being formed as unintentional by-products of manufacturing or disposal processes, PCDDs and PCDFs may also be introduced into processes as contaminants in raw materials.

Similarly, Polychlorinated Biphenyls (PCBs), Pentachlorobenzene (PeCB), are also produced unintentionally and emitted in the atmosphere during thermal processes involving organic matter and Chlorine, as a result of incomplete combustion or chemical reactions, from various industrial installations, non-industrial point sources as well as the uncontrolled burnings, such as the open burning of municipal and agricultural waste (UNDP, 2010). All POPs listed in Annex C require “continuing minimization and, where feasible, ultimate elimination” (Stockholm Convention, 2001).

Nigeria generates approximately 20 million tonnes of municipal waste annually, which is deposited in unmanaged waste dumpsites by private and municipal waste collectors (UNDP, 2010). A conservative

estimate of municipal waste burned through spontaneous combustion and/or intentional fires is about 20%. Approximately 50% of the collected waste is organic providing alternative management opportunities such as composting for biodegradables with other waste categories reused or recycled.

The burning of agricultural stubble and waste in preparation for planting is a common agricultural practice in Nigeria, leading to local air pollution in the form of harmful substances including UPOPs releases. Much of the formed UPOPs are left in the land and make their way into the human food chain through absorption by crops and ingestion by domestic animals. This expert team has referenced the “Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases”, for computing emissions from different sources. Preliminary inventory of UPOPs generation in Nigeria shows that high levels of UPOPs are generated by open burning of municipal and agricultural waste (MAW).

Open burning and uncontrolled incineration of municipal, industrial wastes and hospital/clinical wastes are well known sources of PCDDs/PCDFs. A large amount of accidental and deliberate combustion is taking place continually including the burning of tyres, as well as stripping insulation of copper wires and cables, and leads to dioxins release into the environment. Burning of bush, forests and sugar cane fields, to cut labour costs just before weeding for planting and/or harvest as appropriate also contribute to the formation of dioxins (FRN, 2009).

During this inventory, UNEP’s 2001 Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases as well as the 2005 revised edition of the Toolkit. The protocol used includes the identification of activities capable of generating Dioxins and Furans in different categories, which are divided into sub-categories. For each sub-category the Toolkit gives emission factors, which depend on the technology used in the process. In this inventory direct emission to air, water, soil, residues and products were considered.

The emission factors from the Toolkit were applied and the annual emission of UPOPs is expressed in grams of TEQ, and from the inventory, the total emission of Dioxins and Furans in gTEQ/year was calculated. The following target anthropogenic activities were identified as sources for the release of Dioxins and Furans in the country: incinerators, power generation plants, industries (especially oil and gas, textile, paint, glass, pharmaceutical, pulp and paper, cement, iron and steel) and transport. Emissions of nine main source categories are summed, thus providing the total estimation of the anthropogenic sources of UPOPs emissions from all sources identified in the country.

Some sources of UPOPs that were identified are:

Waste Incineration: Waste incineration is the oxidation of the combustible material contained in the waste. Waste is highly heterogeneous material, consisting of organic substances, minerals, metals and water. The organic substances in the waste burn once they reach the ignition temperature and come into contact with oxygen. The waste incinerator process chain includes waste collection, delivery, storage, pre-treatment, incineration/combustion/energy recovery, flue gas cleaning, solid residue management, and wastewater treatment. The main stages of the incineration process are (a) drying and degassing, (b) pyrolysis and gasification (c) full oxidation. These main stages generally overlap,

meaning that spatial and temporal separation of these stages during incineration is only possible to a limited extent.

Ferrous and Non-Ferrous Metal Production: These include primary metallurgical processes that produce metals from their original ores through concentration, smelting, reduction and refining processes as well as secondary metallurgical processes which utilize scrap metals or slags and fly ashes from metallurgical or other processes as raw materials. Some of the components or operations may lead to the formation and release of dioxins and furans. Besides the furnaces used to produce the metal, some pre-treatment steps have potential to generate PCDDs and PCDFs.

Heat and Power Generation: The generation of power from fossil fuels generally involves the combustion of natural gas, crude oil or petroleum derivatives of various types or coals. Natural gas consists mostly of Methane and Ethane while crude oil contains a wide variety of gaseous, liquid and solid hydrocarbons starting with Propane and continuing with an increasing Carbon to Hydrogen (C/H) ratio. The amount of Greenhouse Gases (GHGs) emitted from fossil fuels increases as the C/H-ratio increases. All combustion processes used for power generation from fossil fuels are generally designed to maximize combustion efficiency while minimizing fuel consumption. Because of incomplete combustion, such plant releases UPOPs to the environment. Other source of generators that release UPOPs include one stroke engine such as motorcycles (popularly known as okada), small generators (known as I pass my neighbour), among others.

Table 2.20 gives a summary of estimated PCDDs/PCDFs emissions in Nigeria from the nine major source categories. Total emission of Dioxins and Furans into the air is 2,783.98g TEQ/annum. Uncontrolled combustion processes are the major source category with 5,273.21g TEQ/a contributing 98.84% of the total emissions; followed in descending order by production of mineral products with 10.72 g TEQ/a (0.38%); transportation with 8.75 g TEQ/a (0.31%); ferrous and non-ferrous metal production with 8.20g TEQ/a (0.29%); waste incineration with 4.30g TEQ/a (0.15%); heat and power generation with 0.22g TEQ/a (0.008%); production and use of chemicals and consumer goods - specifically gas flaring from petroleum production with 0.007 g TEQ/a (0.0003%); and lastly miscellaneous (tobacco smoking) with 0.0009 g TEQ/a. For release of dioxin and furan unto land, uncontrolled combustion processes are the singular source 2,521.4 g TEQ/a (100%). In the residue, the total emission released is 34.42 g TEQ/a. The sources in descending order of magnitude are waste incineration with 15.85 g TEQ/a (46.05%), ferrous and non-ferrous metal production with 12.01 g TEQ/a (35.02%) and heat and power generation with 6.51 g TEQ/a (18.91%). The total dioxins and furans released in all vectors is 5,339.86g TEQ/a. Table 2.20 shows the Inventory of Annual Releases of UPOPs in Nigeria.

Table 2. 19: Inventory of Annual Releases of UPOPs in Nigeria

Cat	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Products	Residue
1	Waste Incineration	4.301	0.000	0.000	0.000	15.852
2	Ferrous and Non-Ferrous Metal Production	8.201	0.000	0.000	0.000	12.055
3	Power Generation and Heating	0.223	0.000	0.000	0.000	6.510
4	Production of Mineral Products	10.717	0.000	0.000	0.000	0.000
5	Transportation	8.750	0.000	0.000	0.000	0.000
6	Uncontrolled Combustion Processes	2,751.783	0.000	0.000	2,521.427	0.000
7	Production of Chemicals and Consumer Goods	0.007	0.000	0.000	0.000	0.000
8	Miscellaneous	0.001	0.000	0.000	0.000	0.000
9	Disposal/Landfilling	0.000	0.034	0.000	0.000	0.000
10	Identification of Potential Hot-Spots				0.000	0.000
	Total	2,783.984	0.034	2,521.427	0.000	34.417
	Grand Total	5,339.862				

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

2.3.7.1 Obsolete POPs-pesticide stockpiles

In May 2010, CropLife Nigeria (representing pesticides importers in Nigeria) in collaboration with CropLife International (representing international pesticides manufacturers) and NAFDAC undertook a pilot project under the name CleanFarms to identify obsolete pesticides and empty containers in five pilot states, namely: Benue, FCT, Kaduna, Nasarawa, and Niger state.

During the exercise, six (6) metric tons of obsolete pesticides and seventy-two thousand, one hundred and ninety-two (72,192) pesticide containers were reportedly inventoried in the 5 pilot States.

Products included Pirimiphose methel, Propanil, Endosulphan, Glyphosate, Lambda, Cypermethrine, Orizo Plus, 24-D, Pendimethalin, Chlorocyrissos, Atrazine, Diuron, Propanil, Chlorocyrissos, and Butachlor. The identified obsolete pesticides were stockpiled due to dearth of national capacity for their sound disposal and destruction.

Consequently, collaborative efforts with Croplife are being made to facilitate the transport of the safeguarded stockpiles outside the country for the sound disposal of the safeguarded POPs pesticides.

2.3.7.2 POPs-Contaminated Sites

In 2006, the International POPs Elimination Project (IPEP) which was developed by the International POPs Elimination Network (IPEN) in conjunction with UNIDO and UNEP reported the presence of 10-12 POPs contaminated sites in Lagos. These confirmed sites were predominantly contaminated by industrial POPs and were identified from sixteen (16) hotspots within 16 Local Government Areas (LGAs) in Lagos State. The identified contaminated sites are based in Ojo, Ikorodu, Ikeja, Oshodi, Isolo, Surulere, Epe, Ifako, Ojota, Iddo, Lagoon and Odofin. Additionally, the National PCBs Management Framework Project identified PCBs contamination at the Ijora Power Station B in Lagos.

In order to facilitate the effective management of POPs-contaminated sites, a comprehensive Toolkit focused on the 'dirty dozen,' was developed by UNIDO Expert Group on POPs to aid developing countries with the identification, classification and prioritization of POPs-contaminated sites, and development of land remediation technologies in line with BATs/BEPs. The toolkit was first adopted in Nigeria and Ghana and is used in Nigeria by the relevant agencies as a manual and training tool for the identification and management of POPs-contaminated sites.

2.3.7.3 Stockpiles of wastes electrical and electronic equipment

Wastes electrical and electronic equipment (WEEE) or E-wastes are a growing concern globally, with Cathode Ray Tube monitors (in TVs and computers) containing over 50% of total POPs-BDE in EEEs. These EEEs are often imported into Nigeria in fairly used conditions where the equipments are approaching end-of-life. The state of these EEEs thus facilitates the release of the POPs contained within them into the environment.

The biggest West African market for new and used electric and electronic equipment is located in Lagos, with a large percentage of imported goods channelled through the Tincan Island and Apapa Ports. These imported e-wastes are predominantly sold after refurbishment in Alaba Market, Westminster Market, Ikeja Computer Village and Lawanson Market in Lagos.

The 2012 National Policy on e-Waste was developed for the regulation of the electrical and electronic sector to control pollution in the Nigerian environment. The policy provided guidelines for the importation of used Electrical and Electronics Equipment (EEE), which enables the confiscation of unserviceable e-wastes at the ports within the country. Such confiscated e-wastes accumulate over

time and are often stockpiled due to dearth of national capacity for sound disposal. Thus, there is urgent need to build national capacity for the sound disposal and destruction of POPs-containing waste materials.

Several institutional frameworks have been developed by the Government to address the generation, transportation, treatment, storage and disposal of the aforementioned wastes such as the Pesticides Registration Regulation (2005), The Blueprint on Handbook on Waste Management (2001), Guidelines on Hazardous Chemicals Management (2001), Guidelines on Pesticide Management Handbook: Safe and Effective Use of Pesticides (2000), National Policy on Chemicals Management, National Policy on e-Waste, and Comprehensive Strategy for the Sound Management of POPs-BDEs, among others.

2.3.8 Summary of future production, use and releases of POPs - requirements for exemption

Currently, Nigeria has no plan to produce POPs-chemicals in the near future. However, the use of POPs-containing pesticides and industrial chemicals is bound to cease over time, as most of the identified POPs are currently in phase-out stage. The capacity for safe disposal or destruction of these POPs needs be strengthened, as Nigeria currently has dearth of appropriate infrastructure for POPs destruction.

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

The capacity to establish comprehensive national programme for POPs monitoring is still being developed in Nigeria. As such, present data on POPs were mainly those obtained through participation in the Global Monitoring Plan (GMP) and/or locally researched activities.

The pilot GMP, also known as 'The MONET Africa Pilot Project', was introduced in 2008, in which Nigeria alongside 14 other African participated in ambient air monitoring and human milk programmes.

During the exercise, the first ambient air sampling was carried out from January-June 2008 at the Produce Coordinating Unit, Sheda, FCT (a rural site located on 8^o 53'S and 7^o 3' E, altitude 210), while human milk samples were taken from volunteer-mothers at Garki, Maitama, Wuse and Nyanya General Hospitals. The second campaign ran from January 2010 - January 2011 and the last (January, 2011 - 30th June, 2012). Samples collected were shipped for analyses at the Recetox Centre, Masaryk University in Czech Republic.

The Analysis Report for samples was recorded by UNEP in its report of 2009, 2011 and 2015. These reports indicated traces of Dieldrin (UNEP, 2011), Oxy-Chlordanes (UNEP 2015) and higher levels of Endosulfans (UNEP, 2009), Cis-Chlordane (UNEP 2015), Gamma HCH, DDTs, PCBs, Dioxins & Furans (UNEP, 2015).

2.3.9.1 Summary of findings of POP chemicals at Sheda, Abuja site under UNEP-GMP Programme (2010 - 2012)- UNEP report, 2015

Table 2. 20: Summary of POPs monitoring data obtained under UNEP/GMP

SN	POP-Chemical	Quantity (pg.m ⁻³)	Remark
1	Endosulfan	179.25	Recorded in 2010
2	Cis-chlordane	2.81	Recorded in 2012
3	Oxy-chlordane	6.24	Recorded in 2012
4	Dieldrin	2.08	Recorded in 2011
5	Endrin	36.65	Recorded in 2010, Significantly reduced in 2011 and 2012
6	Heptachlor	1.32	Recorded in 2012
7	PBDE	10.97	Recorded in 2011

Subsequent to successful implementation of GMP Phase I, Nigeria was again selected as one of the fourteen (14) countries to participate in the programme for ‘Continued Regional Support for the POPs GMP in the African Region’. The programme is about being implemented and it will last till 2019.

The human milk samples, obtained from volunteers at Maitama Hospital, indicated high levels of some POPs, including Chlordane, Dieldrin, DDT, Toxaphene, PCBs, HBCDs, HCH, and PFOS.

Nigeria has also been involved in Passive Water Sampling Campaign by Monet Africa, where high level of PFOS was recorded. The concentration of PFOS from the sample site was 1,390pg/L, indicating adverse environmental condition in the country.

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

2.3.10.1 Current Level of Public Awareness and Education

In Nigeria, the level of awareness on POPs issues varies depending on the target demographic. A 2007 survey conducted by Pesticides Action Network (PAN) Nigeria reported that knowledge of safe handling and management of POPs-pesticides was higher in regulatory stakeholders than farmers and pesticide retailers who often come in contact with these pesticides.

In farmers, this lower knowledge level was attributed to low formal education in the demographic, as about 58% of the surveyed farmers had no formal education. For the retailers, although 90% of those surveyed had secondary education, poor knowledge level was identified in terms of technical names of the pesticide substances (most of the respondents were only cognizant with the trade names of the

pesticides), with only about 32% of the survey respondents acknowledging awareness of POPs-pesticides. Generally, of the surveyed respondents, about 70% indicated awareness that the accumulation of POPs has deleterious effects on the environment and human health. It is however important to note that majority of the survey respondents were male (about 75%), considering that farmers and retailers of pesticides are mainly male.

Generally, the level of awareness varied according to level of education and urbanization of the surveyed locations, with access to information on POPs from regulatory agencies more available in urban cities. The higher knowledge level in regulatory stakeholders was attributed to their comparatively higher education than the other surveyed target groups (farmers and retailers). Law enforcement agents at the border however recorded low awareness level of POPs-pesticides.

The existence of cooperative groups and some form of media activities among the less knowledgeable target groups was found to facilitate increase in knowledge level among pesticide users such as the farmers. This indicates the benefits of comprehensive sensitization programmes targeted at such cooperative groups (such as Farmers Associations), among other relevant groups.

2.3.10.2 Information Management Capacity

Each Party is obligated by Article 9 of the Convention to facilitate or undertake the exchange of information relevant inter alia to the reduction or elimination of the production, use and release of POPs, and alternatives to POPs, including information relating to their risk as well as their economic and social costs. Article 10 of the Convention also requests each Party, within its capabilities, to promote and facilitate inter alia, awareness among its policy and decision makers with regard to POPs pollutants, as well as the provision to the public of all available information on POPs taking into account paragraph 5 of Article 9.

The existence of an interactive and integrated mechanism in information generation, storage, management and dissemination is critical to the successful implementation of the Stockholm Convention, as outlined in Articles 9 and 15 of the Convention which requires Parties to devise mechanisms for the exchange of information. This was the main driving force behind the development of the Chemicals Information Exchange Network (CIEN) website (www.estis.net/sites/cien_ng) for the dissemination and exchange of information relevant to chemicals management between stakeholders and the general public. It is a network which links to international databases on chemicals management such as United Nations Environment Programme (UNEP) Chemicals, UNEP Regional Office for Africa and WHO Chemicals Safety Network, thereby promoting active information exchange among agencies. CIEN was developed in a joint venture with UNEP and the United States Environmental Protection Agency (USEPA) to strengthen national capacity on chemical information management using electronic sources. The CIEN also serves to:-

- Create a framework for access to and exchange of vital chemical information to support national decision making;

- Promote successful implementation of Multilateral Environmental Agreement (MEAs) such as the Basel, Rotterdam and the Stockholm Conventions, through the use of the network's knowledge base;
- Enable exchange of information with the convention secretariats, the Conference of Parties and other relevant stakeholders;
- Facilitate public awareness and research activities; and
- Provide coordination of national activities to ensure a more effective use of resources.

The CIEN Nigeria project started in 2000, with training workshops undertaken in 2006 and 2007 to build infrastructural capacity and provide Chemical Management Officials and relevant stakeholders with tools and knowledge with which to access information via the Internet. Considering the crucial services provided by the CIEN, adequate fiscal and budgetary provisions for the network should be provided to ensure its sustainability.

The use of social media to disseminate POPs-related information to the public has also been established in the country, with the creation of a Twitter account for the CIEN (@CIEN_Nigeria). The Twitter account is used to interact with stakeholders and the general public on POPs and chemicals-related issues and data. This was exemplified by the posting of tweets on enabling activities conducted for the Review and Update of the NIP for Stockholm Convention.

Public awareness raising for POPs management projects has also been conducted using Information, Education and Communication (IEC) materials distributed during sensitization campaigns involving road shows, workshops, town-hall meetings, and news media campaigns such as radio and TV advertisements. Some of these POPs management projects include the:

- Less Burnt for a Cleaner Earth project which released training manuals and conducted practical demonstrations on safer alternatives to agricultural residue burning in order to minimize the release of UPOPs;
- PCBs Management project executed a public involvement program to facilitate the incorporation of public input in the planning and implementation of the project. This involved the use of project newsletters, workshop, website, news media advertisements, press releases and IECs; and
- African Stockpile Programme (ASP) involved local Non-Governmental Organizations (NGOs) in public sensitization campaigns on safe handling of the pesticide stocks. This engagement of local stakeholders facilitated stockpile inventory and government take-over of privately-held obsolete stocks, as these stakeholders provided local information and knowledge to the public using questionnaires, training workshops, news media and IECs, among others.

The Federal Ministry of Environment is responsible for initiating activities for providing public awareness and general information on POPs in partnership with NGOs, and this responsibility is recognized and incorporated into every programme and project conducted by the Ministry.

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

Article 15 of the Stockholm Convention requires the Parties to report to the Conference of the Parties on the measures they have taken to implement the provisions of the Convention and the effectiveness of such measures in meeting the objectives of the Convention. The reporting of POPs information is an important instrument of public safety and precaution against avoidable chemical exposure and risks, such that future development activities would not occur in POPs/toxic chemicals contaminated sites from anthropogenic activities. The importance of information reporting is to provide to the Secretariat statistical data on total quantities of production, import and export of each of the chemicals listed in Annex A and B of the Convention or a reasonable estimate of such data; and a list of the states from which each of such substances was imported; and the states to which each of such substances was exported.

The Federal Ministry of Environment (FMEnv) is the Designated National Focal Point for the Stockholm convention and is responsible for information reporting on POPs to the Secretariat. Although there are often inter-ministerial meetings and other consultations on POPs, specific legal provisions do not exist in the country for inter-institutional reporting of POPs issues to the Focal Point of the Convention. The same results in poor inter-institutional reporting on POPs in the country due to the weak inter-institutional linkages, with resultant gaps in data reported to the Secretariat.

Furthermore, the lack of POPs-specific environmental regulations on monitoring and unavailability of legal requirements to disclose or report findings to third parties limit information exchange with other Parties of the Convention. The CIEN, however, bridges this gap with its facilitation of electronic information dissemination and exchange between stakeholders, Party members and the general public.

Therefore, the Information and Communication Technology (ICT) and infrastructural capacity of the relevant governmental and non-governmental organisations have to be developed and strengthened to facilitate their integration into CIEN and enable them to perform the functions of appropriate information generation, storage, retrieval and dissemination. This will further strengthen the inter-institutional reporting within the country, and thus improve reporting to the Stockholm Convention Secretariat by the National Focal Point of the Convention.

2.3.12 Relevant activities of non-governmental stakeholders

Mass media in Nigeria is very interested in environmental problems and also workshops of public awareness are been established about the environment, including POPs. The Federal Ministry of Environment is interested in creating a great advantage on raising awareness to the public about dangers of POPs.

Non-governmental organizations have a great role raising awareness of public about POPs in Nigeria. Specifically, the NGOs which serve as umbrella organizations have provided a major contribution to effective information sharing with its members on activities related to POPs. In addition, some non-governmental organizations work for providing inventory information, helping candidate foundations to apply as well as many other activities.

The vital role of NGOs in the successful implementation of the Convention is recognised in its Article (10.d.), which prescribes public participation as essential in addressing POPs and their health and environmental impacts among others. Civil society organisations including NGOs and CBOs are closer to the grass roots and as such are people oriented and valuable bridges of communicating government actions and plans and mobilising appropriate responses from the masses.

The non-governmental environmental organisations have several types of activities directed towards the public. For their members they produce periodicals and other types of information.

There are a number of environmental NGOs in Nigeria with a few that are active in the area of chemicals management, especially POPs. The Nigerian Environmental Society (NES), Friends of the Environment (FOTE), and the Nigerian Environmental Study Team (NEST) have been active on POPs and involved in public awareness and advocacy by organising awareness workshops on POPs. They have also spearheaded the establishment of a Network Coalition of Nigerian NGOs on POPs as well as carried out projects on POPs. For example the Nigerian Environmental Society (NES) carried out a project in Lagos in 2006 on the identification of POPs contaminated sites in Lagos, Southwest Nigeria, under the auspices of the International POPs Elimination Project (IPEP). These NGOs are also working closely with women's groups and children and are engaged in health promotion.

Government agencies and other institutions in the field of occupational safety and health offer education to various specialists (physicians, nurses, safety controllers) working with occupational safety and health. They also produce and distribute written information on important issues.

Also government agencies and the municipalities produce and distribute information to the public inter alia in the form of newsletters, periodicals, booklets and brochures. At the public libraries in each municipality more comprehensive information is available to everyone. The libraries of agencies and other public institutions are open to the public as well.

The Federal Ministry of Environment (FMENV) is responsible for initiating activities for providing public awareness and general information on POPs in partnership with NGOs, nonetheless there is no ongoing activity in this regard presently.

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

Nigeria has both human and infrastructural capacities for POPs assessment, measurement and analysis. There are also experts in the Academia with requisite experience and skills in the area of POPs analysis, who can be pooled as part of human resource base for POPs evaluation in the country.

Below are some Laboratories in the country, which are accredited by the Federal Ministry of Environment to carry out POPs analysis:

- i. Geo-Environmental Research Centre (GRC): this Laboratory has both human and infrastructural capacity for POPs assessment and monitoring; the centre which the lab is domiciled has the capacity in carrying out capacity building training on POPs;

- ii. Environmental Laboratory, University of Lagos; and
- iii. University of Nigeria Nsukka.

Proposed International Programmes /Projects where Nigeria could participate in order to strengthen human and infrastructural capacity for POPs analyses include the UNEP/GEF project titled, *Continuing Regional Support for the POPs Global Monitoring Plan (GMP) under the Stockholm Convention in the African Region (GMP II)*. Nigeria is among the fifteen (15) participating countries and The global project objective is to strengthen the capacity for implementation of the updated POPs GMP, and create the conditions for sustainable monitoring of the 23 POPs in each participating region. Each regional project is expected to:-

- build capacity and generate data on analyses of core abiotic and biotic matrices (air & water; human milk)
- assess existing analytical capacities and reinforce national POPs monitoring; and
- secure conditions for sustainable POPs monitoring.

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

Various results from the POPs monitoring and assessment of Dioxin releases gave different level of concentrations with the releases of POPs at different locations; those with much higher concentrations above international threshold limits are consider to be heavily contaminated in relation to others.

Research on the toxicity of POPs has shown that people working within and around dumpsites (refuse collectors, labourers in dumpsites and scavengers) face high rate of health hazards and diseases from occupational exposure to POPs. Rapid urbanization and scarcity of land has caused people to build residential houses close to hazardous waste dumpsites or right on reclaimed dumpsites.

People and especially children living in the vicinity of dumpsites are at risk of exposure to POPs and may suffer causative illnesses. Further studies on mother's breast milk confirmed the contamination of the breast milk with POPs. Toxic environmental contaminants can be transferred from mother to infant via breastfeeding. Persistent organic pollutants (POPs) are a family of lipophilic stable chemicals that bioaccumulate in adipose tissue and create a lasting toxic body burden.

Breastfeeding provides a significant source of exposure to POPs early in human life, the effects of which are unknown, and is the subject of a growing body of research. Despite the possibility of harm from environmental contaminants in breast milk, breastfeeding is still recommended as the best infant feeding method. The lack of any epidemiological studies makes it difficult to discover the health impact of POPs. This highlights the importance of health impact studies on POPs in the six geopolitical zones across the nation.

2.3.15 Details of relevant system for the assessment of and listing of new Chemicals

Nigeria is not a producer of any POPs-chemical candidate, several studies have shown that only very few chemicals were produced in Nigeria in the past. They include Sulphuric Acid and Alum. There is one purely Petrochemical plant at Eleme in Portharcourt, Rivers State and three petrochemical Refineries at Kaduna, Port Harcourt, and Warri which also produce linear Alkyl Benzene Solvents, Carbon Black and Propylene.

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

Imported Chemicals are tested for compliance at borders (land and sea) of the country before being transmitted to the local producer, dealer or other end user by Regulatory Agencies such as NCS, NESREA and NAFDAC. Points of action that will need to be reviewed for better effectiveness include notification to licensing authority; classification and labelling for purposes of hazard communication whether by the worker in the factory or use by the consumer etc.. NESREA is responsible to monitor and regulate the use of banned chemicals and other related products in market within the country.

3.0 Strategy and action plan elements of the National Implementation Plan

This section documents the Policy Statement by the Government of Federal Republic of Nigeria, expressly demonstrating its robust commitment towards minimising/eliminating POPs and associated challenges in Nigeria and fostering international cooperation and coordination towards actualising the Objective of Stockholm Convention.

It also outlines the strategy for implementing measures and actions targeted at holistically addressing existing and emerging POPs-issues of national priority, as well as associated public health and environmental burdens.

3.1 Policy Statement

Section 19 of the Constitution of Federal Republic of Nigeria states that the foreign policy objectives shall, inter alia, be promotion of international cooperation and respect for international law and treaty obligations, while section 20 thereof solemnly declares that the State shall protect and improve the environment and safeguard the water, air and land, forest and wild life. Furthermore, the National Agenda 21 on Sustainable Development and National Policy on Environment, are veritable frameworks for enshrining environmental governance in Nigeria.

As a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs) and other international treaties under the Chemicals and Wastes Synergy is committed to the realisation of their set objectives.

Consequent upon the foregoing, the Government of Federal Republic of Nigeria is:

- (a) *Conscious* of the need to entrench core management infrastructures, strengthen policy instruments to meet emerging chemical-risk challenges and deploy interventional investments to concertedly address multi-faceted issues pertaining to POPs and other chemicals of similar characteristics;
- (b) *Recognizes* that Stockholm Convention and other international agreements in the field of trade and the environment are mutually supportive;
- (c) *Reiterates* her commitment to implement the Stockholm Convention and other related Conventions as well as international processes on chemicals management such as SAICM in order to safeguard the health of its people and the environment;
- (d) *Commits* to undertake review of her policies and legislative framework relevant to the implementation of the Stockholm Convention and the related conventions and international processes on chemicals and wastes management;
- (e) *Recognises* the need to engage a wide range of stakeholders in the Development, Review and Update of National Implementation Plan for Stockholm Convention and internalization of the related conventions and international processes on chemicals and wastes management;
- (f) *Resolves* to reduce or eliminate releases of POPs and other pollutants as soon as practicable by implementing the Updated NIP;

- (g) *Determines to achieve the milestones set in the Updated National Implementation Plan including those agreed at national, sub-regional, regional and international levels on specific issues of POPs releases;*
- (h) *Conscious of the limited financial capacity of the country hence, the updated NIP will be implemented according to earmarked priorities;*
- (i) *Agrees to cooperate with the international community in dealing with issues of POPs and other pollutants of concern in areas such as development of safer alternatives, monitoring releases of various pollutants, sharing of knowledge and experiences on issues of POPs and other toxic substances and wastes; and information exchange on management of POPs and other toxic chemical substances;*
- (j) *Decides that the updated NIP will be synchronized with other global treaties such as SAICM, the Basel, Rotterdam and Minamata Conventions, with a view to achieving sound chemicals management, in line with synergy decisions of Conferences of the Parties to Conventions under the Chemicals and Waste Cluster.*
- (k) *Commits itself to mainstreaming the NIP and general SMC priorities into national development planning and budgetary processes;*
- (l) *Calls for international support to bridge the financial gaps in order to accelerate implementation of prioritised actions.*

The Federal Republic of Nigeria hereby expresses her appreciation for the collective efforts, cooperation of the international community, especially GEF and UNIDO, in the development and endorsement of the Updated NIP, which is tailored towards achieving human and environmental health protection against POPs.

3.2 Implementation Strategy

3.2.1 Policies

In response to the global environmental issues, the Government of Nigeria has shown commitment by taking concrete steps and measures to achieve sustainable environmental protection and economic development. One of these measures is the development of National Environmental Policy in 1989, revised in 1995. The policy addresses the improvement of the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. The goal of the Policy is to achieve sustainable development in Nigeria and, in particular to:

- Secure for all Nigerians a quality environment that is adequate for their health and well-being.
- Conserve and use the environment and natural resources for the benefit of present and future generations.
- Restore, maintain and enhance ecosystems and ecological processes essential for the functioning of the biosphere and for the preservation of biological diversity and to adopt the principle of optimum sustainable yield in the use of living natural resources and ecosystems.

- Raise public awareness and promote understanding of essential linkages between environment and development and to encourage individual and community participation in environmental improvement efforts.
- Integrate environmental concerns into major decision making process.
- Build environmental remediation costs into major development projects.
- Co-operate in good faith with other countries, international organizations and agencies to achieve optimal use of trans-boundary natural resources and effective prevention or abatement of trans-boundary environmental pollution such as POPs and POPs-waste.

Nigeria also placed total Ban on the use of DDT and other POPs pesticides in 1999. The country is committed to the development of safer alternatives towards the reduction and elimination of POPs. Safer alternatives being promoted include chemically impregnated nets, Integrated Pest Management approach, and use of biopesticide alternatives such as Neem-derived Biopesticide. The country has also developed the industrial policy, which promotes, among others, the reduction of toxic chemicals in form of discharges or emissions including POPs such as PCBs, Pentachlorobenzene, PCDD and PCDF from industrial processes.

In addition, specific policies and action plans have also been put in place. These include:

- National Policy on Erosion, Flood Control and Coastal Zone Management;
- National Environmental Sanitation Policy;
- National Environmental Sanitation Action Plan;
- National Policy Guidelines on (a) Solid Waste Management, (b) Market and Abattoir Sanitation, (c) Excreta and Sewage Management, (d) Sanitary Inspection Premises and (e) Pests and Vector Control;
- National Healthcare Waste Management Policy/Action Plan and Guidelines; and
- State of the Environment Report of 2008.

In cognisance of the importance of the Stockholm Convention, the Government of Nigeria intends to review all relevant policies and laws in order to provide comprehensive guidance on the minimization or elimination of POPs releases consistent with the requirements of this Convention.

3.2.2 NIP Policy Basis

3.2.2.1 Overview of hazardous chemicals management in Nigeria

The Earth Summit, through its Agenda 21, acknowledged that the use of chemicals and their effects influence a range of sectors of society in relation to the development process and, called for a global commitment to an international strategy for sound management of chemicals. Furthermore Principle 10 of Rio Declaration stipulates that Environmental issues (including chemicals management) are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have the opportunity to participate in decision-making processes.

During the Inception of the International Conference on Chemicals Management (ICCM-1) held in Dubai 2006 government and stakeholders present adopted a global policy on the Strategic Approach to International Chemicals Management (SAICM). The objective of the Strategic Approach is to change how chemicals are produced and used in order to minimize harmful effects on human health and the environment. This policy is in line with Agenda 21 of the Earth Summit.

In 2001, the government collaborated with Global Environment Facility (GEF) to carry out the Enabling Activities that led to the preparation of its National Implementation Plan (NIP) on the Stockholm Convention. As required by the Stockholm Convention (SC), Nigeria prepared the mandatory National Implementation Plan (NIP) for the Dirty Dozens and was submitted in April 2009. Considering the fact that SC Parties are obligated to undertake assessment tasks to update their NIPs, Nigeria undertook initial assessment of the Nasty Nine chemicals in 2011 and subsequently embarked on the Update and Development of her second NIP in 2014, in line with Article 7 of the convention. The NIP Update will include the nasty nine of 2009, Endosulfan of 2011 and the HexaBromocyclododecane (HBCD) of 2013. Nigeria sought and got assistance from GEF through UNIDO to carry out this Update of the NIP.

The Nigerian Government, taking the issues of environmental degradation seriously, has put in place various national efforts at all levels of governance to promote environmental sustainability in the context of national sustainable development and also recognize that effective environmental governance is critical for sustainable development.

3.2.2.2 Mandates for implementation of NIP

The mandate for implementation of the National Implementation Plan (NIP) lies with the Honourable Minister of Environment whose ministry is the National Focal Point (NFP) for Stockholm Convention and has overall mandate for the protection of the environment and natural resources conservation. The Department of Pollution Control and Environmental Health prepares and oversees the implementation of the NIP for the Ministry. The mandate for implementation further requires all sector ministries and local authorities to mainstream respective parts of the NIP into their policies, legislation, plans and programmes, and submit annual reports to the Honourable Minister of Environment.

3.2.2.3 The Nigeria Government's commitment towards addressing POPs issues

Nigeria is committed to implementing the Stockholm Convention on Persistent Organic Pollutants along with other MEAs on chemicals and wastes, in order to safeguard the environment and health of its people, for the present and future generations. This is within the context of Chapter 19 of Agenda 21, the 2002 Johannesburg Plan of Action on the Strategic Approach to Integrated Chemicals Management, the NEPAD Environment Initiative and in line with the vision and goals of the National Policy on Environment.

The implementation will involve, among others, the review of related policies and legislations and the strengthening of institutional framework, coordination and active stakeholders' participation.

Moreover, the Government is committed to strengthening regional and international cooperation (either through opportunities proffered by IDAs and South-South Cooperation), to facilitate sharing of knowledge and experiences on POPs issues, including the available feasible alternative technology, substitutes and other POPs mitigation initiatives and approaches.

The country had undertaken activities in the past that foster sound management of POPs and other toxic chemicals. The preparation of the National Profile of Chemicals in Nigeria in 1999 was a practical first step towards ensuring sound management of chemicals. The document provides a comprehensive assessment of existing infrastructure as it relates to the institutional, legal, administrative, technical and commercial aspects of chemicals management, as an essential step towards strengthening national capabilities to manage chemicals. The profile was reviewed in 2004 and would be further updated to integrate issues on POPs.

The Government's goal is to eliminate POPs as soon as practicable by implementing the NIP. Since management of POPs involves an array of stakeholders, the Government has established a National Steering Committee chaired by the Permanent Secretary, Federal Ministry of Environment. Recognising the limitations and constraints of budgetary provision from the Government, the successful implementation of most of the activities planned will depend on the availability of international funding assistance from bilateral and multilateral sources.

3.2.2.4 Endorsement of the NIP

NIP development process involved the active participation of an array of relevant stakeholders, including government ministries, departments and agencies; research institutions and universities; non-governmental organizations (including women's and youth rights activists), community based organizations; and the media. The NIP has been reviewed, commented upon and endorsed by the appropriate stakeholders.

3.2.2.5 Objectives of the NIP

The overall objective of the Updated National Implementation Plan, as indicated earlier, is to protect human health and the environment from impacts that are associated with the release of Persistent Organic Pollutants (POPs) through reduction in use and eventual elimination.

The NIP is intended to achieve the following specific objectives:

- i) To demonstrate the commitment of the Government to the objectives of the Stockholm Convention and to achieve compliance with the obligations assumed as a Party to it;
- ii) To present the information base and associated analysis supporting the development and implementation of an effective Action Plan and Strategies to achieve reduction and elimination of newly-listed POPs with associated improvement of environmental quality and human health;

- iii) To provide the basis for monitoring the country's progress in addressing newly-listed POPs issue chemicals, and specifically the effectiveness of the actions it has committed to in reducing or eliminating old POPs use and release to the environment;
- iv) To facilitate public awareness, education and participation in respect of the POPs issue and overall improvement in environmental and public health protection;
- v) To provide the operational and institutional framework for attraction of international assistance such as might be provided under the Stockholm Convention's permanent financial mechanism for actions on POPs; and
- vi) To promote synergies with other related Conventions and international processes on chemicals management.

3.2.2.6 Coordination Mechanism of the Action Plan

The NIP implementation arrangement will be put in place once the NIP has been approved and the post-NIP project prepared. The Federal Ministry of Environment (FMENV) will be the coordinating Ministry for the implementation of all facets of the action plan. The National Steering Committee for the Plan will be multi-stakeholder in composition involving relevant ministries of government, private sector, civil society organisations including NGOs and CBOs. The National Steering Committee shall serve as the think-tank and clearing house for all policy issues and decisions; and the consideration of the road map for the action plan implementation arrangements based on life cycle analysis approach. All segments of governance encompassing national, state and local governments shall be active participants in the implementation arrangements and activities thereby ensuring sustainability of the programme.

National Coordination will look at the macro-management of the NIP in a holistic and integrated manner consistent with national development plans. The National Coordinator shall have over sight functions on the activities of Programme Officers. A Programme Officer may be responsible for the management of a sectoral programme or clusters of programmes towards ensuring the overall success of the NIP. Each action plan shall have its monitoring and evaluation unit. Financial reporting and Technical evaluation will be used to monitor and evaluate the success of NIP implementation projects.

The coordination of Action Plans implementation at the state level will take into consideration distinctive governance structures, within the larger picture of the macro framework, that will be amenable to socio-political circumstances in each of the states. Nevertheless, such arrangements shall embed full use of the skills, experience and knowledge of a wide range of appropriate government entities, NGOs (including gender-groups), community groups, private sector, local governments and academic institutions in the implementation and review of the Project activities and state policy directives on POPs elimination.

About 15% of the total Updated NIP cost will be devoted to overall management of post-NIP projects. The detail financial plan will be elaborated when implementation starts. Financial resources for Updated NIP implementation would be drawn from various sources, including budgetary allocations,

ecological fund, bilateral and multilateral donors' assistance, industry, as well as private sector participation.

3.2.2.7 Implementation principles of the NIP

Result-oriented implementation of Reviewed and Updated NIP shall be guided by articulated principles as adopted by stakeholders at different fora:

- Integrative stakeholders' participation: effectiveness and sustainability of reviewed and updated NIP depend practically, in part, on the commitment of sectoral stakeholders in Government, Industry, labour, Civil Society Organisation, Gender Group, among others;
- Coordinating mechanism: implementation of reviewed and updated NIP requires that an effective project planning and management structure be put in place, incorporating FMENV as lead organization and core stakeholders;
- Observation of internationally recognized criteria, standards and guidelines that are amenable to Nigeria's national circumstances;
- Coherent integration of POPs issues within the overall environmental management, chemicals management and sustainable development policies;
- Fostering cooperation, coordination, robust policy coherence, improved public confidence in projecting Nigeria's collective commitment towards minimising/eliminating POPs and associated challenges;
- Timely implementation of obligations will help to avoid the introduction of special exemptions;
- Adherence to and use of BATs and BEPs for the reduction of POPs releases;
- The precautionary principle which requires that where there is risk of serious irreversible adverse effects occurring, a lack of scientific certainty should not prevent or impair the taking of precautionary measures to protect the environment;
- The polluter pays principle, which requires that any person causing adverse effect on the environment shall be required to pay in full social and environmental costs of avoiding, mitigating, and/or remediating those adverse effects. The right to a clean and healthy environment shall include right for access by any citizen to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes;
- Transparency in information sharing and exchange particularly related to monitoring and reporting on implementation activities; and
- Access to environmental information, which enables citizens/residents to make informed personal choices and encourages improved performance by industry and Government, shall be promoted.

3.2.2.8 POPs-issues of national priority

The following cross-cutting priorities have been identified during the Inventory Data Validation and Priority setting Workshop held in Abuja 16 – 17th September 2015, which formed strong basis for the Action Plans on POPs:

- i. Developing legislative and regulatory frameworks by relevant Stakeholders for effective management of POPs and other related chemical and waste cluster, aimed at ensuring the protection of human health and the environment in Nigeria.
- ii. Increasing institutional capacity of government departments/agencies and other institutions involved in implementation of the Rotterdam, Stockholm and other related Conventions and international processes on chemicals and wastes management.
- iii. Strengthening enforcement of relevant legislation and capacity of institutions responsible for POPs management.
- iv. Ensuring that FMENV and relevant stakeholders synergise and implement the action plan and management strategies for tackling identified POPs issues in Nigeria.
- v. Developing and implementing with relevant MDAs life cycle management approach for transportation of hazardous chemicals including POPs within the country.
- vi. Developing programmes and regulations on monitoring of POPs chemicals.
- vii. Developing mechanisms to promote proper management of stockpiles of POPs pesticides and PBDE, wastes and contaminated sites.
- viii. Establishing a coordination mechanism pertaining to POPs management.
- ix. Legacy obsolete POPs stockpiles in public and private stores, e.g. POP-pesticides in the agricultural sector, currently out of use and in deplorable technical condition, which might lead to serious accidents and pollution incidences.
- x. Opportunity for developing and maintaining simple, accessible and interactive database through sustained collaborative information sharing among stakeholders.
- xi. Section 12 (1) of the Nigerian Constitution stipulates that: No treaty shall have the force of law except the treaty has been enacted into law by the National Assembly. This constitutional provision has created capacity-gaps in the actionability and operationalisation of MEAs, vis-a-vis meeting their political and environmental objectives.
- xii. Mainstreaming thematic concepts of the treaties into national development plans is exigent, in line with global best practices in environmental governance.
- xiii. With respect to unintentional POPs, the country is very much on a learning curve and needs capacity building to assess the real baseline for these POPs and take appropriate actions. High levels of UPOPs are generated by open burning of Municipal and Agricultural Waste (MAW); gas flaring in the oil and gas sector; singeing of animal skins and hides to make 'ponmo', using cheap and accessible fuels such as firewood, scrap

tyres, spent oils, used plastic materials, among others. These common practices levy heavy tolls on public health and the environment.

- xiv. A study conducted in Nigeria titled "Exporting Reuse and Abuse to Africa" reported an annual importation of about 5 million Personal Computer units, with a weight estimated at 60,000 metric tons, a large percentage of which are unserviceable. These items contain over 1,000 different substances, many of which are toxic and create serious pollution upon unsound disposal.
- xv. The Global Best Environmental Practice is the acknowledgement and integration of gender dynamics vis-à-vis POPs management within policies and work places. This is in line with the 1985 Fourth International Women's Conference and Principle 20 of the Rio Declaration on Environment and Development (1992), which made efforts to recognize and incorporate gender perspectives into environmental and sustainable development deliberations.

3.2.3.9 Conditionality for implementing updated NIP

This NIP implementation can only be achieved under the following conditions, among others:

- Government fund, human resources, logistic and technical infrastructures are provided as elaborated in the action plan and management strategies;
- International assistance is provided as elaborated in the NIP action plan;
- Effective integration of Public-Private-Partnership; and
- Adoption of global best practices by the Industry.

3.3 Activities, Strategies and Time Frame

This section outlines strategies and actions to be undertaken by Nigeria, with the view to actualising effective and efficient implementation of the National Implementation Plan as well as ensuring that all identified POPs issues and concerns are addressed and integrated into the national development process, in fulfilment of Nigeria's obligations under the Stockholm Convention. These activities are based on Nigeria's situation verified in various inventory exercises as well as at the intervention priorities that were determined during the Priority Setting Workshop.

The Updated NIP, with the support of National Council on Environment, will as much as possible be mainstreamed into National Strategic Plans, the National Medium Term Expenditure Framework and the National Development Process starting with vision 20:2020.

The tabulated implementation matrix capture information about the status of specific planned activity, responsible institution(s) and stakeholders for implementing this Plan, implementation timeframe, funding mechanism, required assistance (technical, logistic, etc.), performance indicators, detailed attendant costs and potential sources of enabling resources.

The following Measures and Action Plans are covered in the Updated NIP:

- Measures to strengthen the national institutional capacity and the legal framework for POPs management;
- Action Plan for Production, import and export, use, stockpiles, and wastes of Annex A POPs pesticides (Annex A, Part I chemicals);
- Action Plan for Production, import and export, use, stockpiles, and wastes of POPs of Industrial use;
- Measures to reduce releases from unintentional production (Article 5);
- Action Plan for Identification of contaminated sites (Annex A, B, and C Chemicals) and remediation in an Environmentally Sound Manner;
- Action Plan for Facilitating or undertaking information exchange and stakeholder involvement;
- Measure to increase Public awareness, information and education (Article 10);
- Action Plan for Effectiveness evaluation (Article 16);
- Action Plan for Research, development and monitoring (Article 11); and
- Action plan for Technical and financial assistance (Articles 12 and 13).

3.3.1 Activity: Institutional and Regulatory Strengthening Measures

Action Plan	Activities	Priority Ranking	Outcomes / Outputs	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Coordination of NIP Implementation	Establish the inter-agency coordination group	3	Effective implementation of NIP	Coordination group established	Federal Ministry of Environment (FMENV) together with other relevant MDAs.	Finance, Logistics	100,000	Government, multilateral and bilateral donors	2016-2017
(2) Development of the legislative framework in compliance with Stockholm, Basel and Rotterdam Conventions and with the <i>Acquis Communautaire</i>	<ul style="list-style-type: none"> • Domestication of BRS Conventions and other relevant treaties. • Review of the existing national legislative framework and analysis on deficiencies. • Develop new legislation or improve the existing one to properly reflect 	5	<p>Legislative deficiencies identified the strategy for legislation improvement developed</p> <p>Legislation improved and harmonised with the <i>Acquis Communautaire</i></p>	<p>BRS Convention domesticated</p> <p>Legislation reflecting POPs issues developed</p>	<p>FMEnv, Federal Ministry of Agriculture & rural development (FMA&RD), Federal Ministry of Labour and Employment (FML&E), Federal Ministry of Health (FMoH),</p>	Financial and Technical support	1,800,000	European assistance "Twining", Government, other multilateral and bilateral donors	2016-2018

	<p>POPs issues and in accordance with the <i>Acquis Communautaire</i></p> <ul style="list-style-type: none"> Identify enforcement needs and mechanisms for implementation of the developed legislation. 				Federal Ministry of Finance (FMF) and Non-Governmental Organisation (NGO)				
(3) Development of the regulatory frameworks for registration of Pesticides within the country as precursor to complying with annex D of the Stockholm Convention	<p>Development of guidelines for pesticide registration.</p> <p>Establishment of pesticides and other allied chemical registration body and registration points.</p> <p>Identify enforcement needs and mechanisms for implementation</p>	4	Safer coordination of pesticide trade sector	<p>Regulation on Pesticide management developed</p> <p>Registration body established</p> <p>Enforcement need developed</p>	FMEnv, FMF, FMA&RD, and Federal Ministry of Justice (FMJ), NAFDAC, SON and other relevant MDAs	Financial and Technical support.	300,000	Government multilateral and bilateral donors	2016 - 2018

	of the developed regulation.								
(4) Development of the National Pollutant Release and Transfer Registers	Develop the National Pollutant Release and Transfer Registers in accordance with international classifications	4	Created the database of the chemicals in accordance with the international classifications (IUPAC, CAS, HS)	Database created	FMEEnv, FMF, FMA&RD, NAFDAC and National Bureau of Statistics (NBS)	Financial and Technical support, Server and computer hardware	100,000	Government multilateral and bilateral donors	2017-2019
(5) Development of the National Waste Management Action Plan including POPs	Development of the Waste Management Action Plan taking into consideration the technical, organizational, environmental, economic and financial implications	5	Waste management action plan developed	Waste management Action Plan developed	FMEEnv, Universities and Research Institutes, and other relevant stakeholders	Financial and Technical support	100,000	Government multilateral and bilateral donors	2016-2018
(6) Professional development of regulatory	Accredited capacity	4	Competent and productive personnel	Capacity of regulatory Officers and	FMEEnv, FMF, FMA&RD, FFS	Financial and	200,000	Budgetary allocation,	2016-2017

officers and emergency responder dealing with hazardous chemicals and waste	enhancement programmes		Effective service delivery	emergency responders enhanced	and other Institutions	Technical support		Donor support	
(7) To monitor compliance and enforce regulations on POPs	Build capacity of regulatory agencies through training Programmes. Development of National standards for POPs regulation in Nigeria. Build capacity of enforcement officers and regulatory Agencies.	5	Reduction in POPs exposure	Relevant monitoring Officers Trained. Standards for POPs regulation established. Enforcement and Compliance.	FEnv, Nigeria Customs Service (NCS), NESREA, FFS, State Ministries of Environment	Financial and Technical Support	100,000	Budgetary allocation, Donor support	2017-2018

3.3.2 Activity: Production, Import and Export, Use, Stockpiles and Wastes of Annex A POPs pesticides (Annex A, Part I chemicals)

Action Plans	Activities	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Public Education, Awareness, Information and Enlightenment	<p>a. Develop mechanisms for awareness among stakeholders.</p> <p>b. Conduct public enlightenment campaign on POPs at national, state and local government levels.</p> <p>c. Print educative leaflets.</p> <p>d. Electronic and print media advertisements.</p> <p>e. Workshops in all the geopolitical zones.</p>	5	Improved public awareness on POPs	<p>Mechanism for awareness raising developed</p> <p>Public enlightenment campaign conducted</p> <p>POPs-leaflets printed</p> <p>Workshop undertaken in geo-political zones</p>	<p>Federal Ministry of Environment (FMEnv), Federal Ministry of Education (FME), Federal Ministry of Information (FMI), National Orientation Agency (NOA), Relevant NGOs, Industries and other relevant stakeholders</p>	Financial and Technical support	400,000	Bilateral Donors Counterpart Funds	2017 - 2018
(2) Raising Awareness and Capacity	Strengthen national capacities of government	5	All stakeholders fully aware of POPs issues	Capacity Strengthened	FMEnv, FMA&RD, FMoH,	Financial and	600,000	Budgetary Allocation,	2016 - 2017

Building of all Stakeholders	institutions and local authorities, including NGOs				Nigeria Customs Service (NCS), NGOs, all stakeholders	Logistic support		Multinational Donors, GEF	
(3) Strengthening Institutional Capacities for POPs Management and Planning	<ul style="list-style-type: none"> a. National legal framework b. Strengthen laboratories c. Establish synergy between Stockholm, Basel, Rotterdam and Minamata Conventions d. Strengthen Customs control capacity e. Monitor and evaluate POPs management f. Mainstream POPs management into National Development Plan g. Draft/review/endorse NIP h. Coordinate NIP implementation 	3	Availability of National Waste Management Action Plan including POPs and professional development of civil servants dealing with POPs	<p>Legal frameworks developed.</p> <p>Laboratory strengthened for POPs analysis.</p> <p>Synergy between BRS and Minamata established.</p>	FMEnv, FMA&RD, FMOH, Universities, Customs, NGOs	Financial Legislative and Technical support	1,000,000	GEF, AfDB, Ecological Fund, UNIDO	2016 - 2019

	i. Develop database of existing chemicals									
(4) Nationwide Inventory of POPs in Nigeria	a. Inventory of POP-pesticides in all the six geopolitical zones	4	Inventory Data for POP-pesticides emission results for informed policy decision making	POP-pesticide inventory database.	FMEnv, FMA&RD, FMoH, and State Ministries	Financial, Logistic and Technical support	500,000	GEF, USAID, Budgetary,	2016 – 2017	
	b. Emissions Inventory of UPOPs in all the six geopolitical zones						800,000			2016 - 2018
	c. Use optimal technology where necessary									
(5) Identification of all POPs Contaminated Hotspots	a. Analyse extent of pollution b. Develop of site specific action plan and strategy c. Carry out digital mapping of all the hotspots	3	Quantified site specific data with digital map	Site plan and strategy developed GIS map of all hotspots developed.	FMEnv, FMA&RD, FMoH, FMST, and States' Ministries	Financial and Technical support	1,500,000	Budgetary, Ecological Fund, GEF, Other Donors	2016 - 2017	
(6) Enhancement of occupational health and safety capacity programme	a. Organize occupational health and safety training seminars b. Develop occupational health and safety policies framework	5	Improved professional corporate occupational health and safety policies	Occupational health and safety policies frameworks developed.	FMEnv, FMA&RD, FMoH, FMST, Federal Ministry of Labour & Employment	Financial and Technical support	600,000	Budgetary, DANIDA, JICA, Other Donors	2017 - 2018	

	c. Demonstrate appropriate PPEs use while working with pesticides d. Legal framework for accident-free POPs work areas			Legal framework for accident free POPs work area developed.	t (FML&E), and States' Ministries of Health and Environment				
(8) Implementation of Good Agricultural Practices	a. Set up demonstration trials b. Prepare manuals for different crops and animals c. Train personnel for plant protection d. Introduce agro-environmental measures	5	Effective and safe use of POPs in agriculture to increase productivity and protect the environment	Manuals developed. Personnel trained on plant protection mechanism. Agro-environmental measures developed.	FME, FMA&RD, Universities, NGOs, CropLife, FAO	Financial and Technical support	850,000	FAO, World Bank, AfDB, Ecological Fund	2016 – 2019
(9) Improvement of National Technical and Analytical Capacity	a. Establish a laboratory in each geopolitical zone b. Capacity building for the analytical professionals c. Provision of the laboratory equipment needed for sampling and analysis of POPs	4	Availability of facility for POPs analysis in Nigeria and database management for effectiveness evaluation	Functional Laboratories established. Capacity of analytical professionals built.	FME, FMA&RD, FMoH, FMST, Federal Ministry of Education (FME), NCS, World Bank, Universities	Financial and Technical support	15,000,000	Budgetary, Bilateral Donors, Multinationals,	2016 - 2020

	<p>d. Training of laboratory staff</p> <p>e. Introduction of specific methods for different POPs analysis</p> <p>f. Accreditation of laboratories</p> <p>g. Develop sustainability plan</p> <p>h. Train key stakeholders on POPs monitoring</p> <p>i. Develop database of existing POPs</p> <p>j. Train data management personnel</p> <p>k. Create POPs information management system</p>								
(10) Environmentally Sound management of POP-waste	<p>Monitoring of stockpiles of POPs and its final disposal.</p> <p>Development of best approach to management and final disposal of E-waste stockpiles.</p>	4	Minimisation of POPs-contamination incidences.	<p>Stockpiles Monitored.</p> <p>Final disposal approach developed.</p>	<p>FMEEnv, FMoH, FMA&RD.</p> <p>State ADP Offices</p>	<p>Financial, Logistics and Technical support</p>	500,000	Budgetary, Bilateral and multilateral Donors.	2016 - 2018

(11) Establishment of Eco-Bio Monitoring System	a. Assess risk of various diseases and compare the effects in individuals who are in direct contact with POPs b. Screen for the most common diseases c. Monitor number of hospitalizations d. Assess risk of disease in the population living near the site where these POPs are found	2	Achieve higher level of health culture and education in the protection against possible harmful effects of POPs on human health	Risk of contracting diseases assessed.	FMEnv, FMOH, FMA&RD, NAFDAC, Universities and Research Institutes.	Financial and Technical support	500,000	Budgetary, UNICEF, AfDB, USAID, GEF	2016 - 2020
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3.3.3 Activity: Production, import and export, use, stockpiles, and wastes of POPs of Industrial use (Article 6)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Full inventory of PBDEs country-wide	Conduct a robust inventory of PBDEs in the country using optimal technology	3	Data obtained from PBDEs inventory for informed policy decision making	PBDEs database established	FMEnv, Partners: UNIDO, World Bank,	Financial, Logistics and Technical support	1,500,000	GEF OEMs Part-financing through budgetar	2016 – 2017

			Record of PBDEs-emission sources Updated Strategy for sound management of PBDEs		OEMs and FFS			y appropriation European Union UNDP	
(2) Evaluation of PBDEs contaminated sites	1. Analysis of extent of pollution of POPs (PBDEs) sites 2. Development of site specific action plan and strategy for management of PBDEs	3	Quantified site specific data Action plan for site specific management of POPs -PBDEs National Strategy for PBDEs management	Site analysed Site specific action plan developed	FMEnv, FMOH and other relevant stakeholders Partners: UNIDO and OEMs.	Financial and Technical support	500,000	GEF AfDB Ecological Fund other donors	2016 - 2017
(3) Provision of interim storage facilities for POPs prior to treatment and ultimate disposal	1. Construct interim storage facilities for PBDEs contaminated equipment	4	Best practice interim storage facilities for PBDEs contaminated equipment.	Functional facility constructed	FMEnv	Financial, Logistic and Technical support	4,000,000	GEF Ecological Fund other donors	2016 - 2017

	2. Construct interim storage facilities for PCBs contaminated equipment		Best Practice interim storage facilities for PCBs contaminated equipment						
(4) Training of stakeholders on analytical detection of POPs	Conduct training for key stakeholders on detection of POPs (PCBs and PBDEs) in-situ; specifically on importation and in-use equipment and oil	5	Stakeholders capacity to detect POPs	Training conducted	FMEnv, NCSs Partner: UNIDO	Financial and Technical support	200,000	GEF, Bilateral donors	2017
(5) Development of a harmonised database and clearing-house on POPs management chemicals in the country	Develop the database of existing POPs in the country in accordance with international classifications Create POPs Information Management System	4	Database of POPs in accordance with the international classifications (IUPAC, CAS, HS) Competent data management personnel	Database created	FMEnv, Federal Ministry of Communications (FMoC)	Financial and Technical support	180,000	World Bank Counterpart fund UNIDO	2016 - 2017

	Training programme for Data management personnel								
(6) Occupational Health and Safety Capacity enhancement of programme for personnel involved in contact with management of POPs and other hazardous chemicals	Organization of occupational health and safety training courses and seminars for management of POPs Development of Occupational Health and Safety Policies framework for management of POPs	5	Improved professional capacity Corporate Occupational Health and Safety Policies framework for management of hazardous chemicals, including POPs	Safety training courses and seminars organised	FMEEnv, FML&E, FMA&RD and FMOH	Financial and Technical support	400,000	Bilateral donors	2016 - 2017

3.3.4 Action plan: Measures to reduce releases from unintentional production (Article 5)

Action Plans	Activities	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Nationwide Inventory of	a. Emissions Inventory of UPOPs in all the	4	Inventory Data for UPOPs emission results	Functional Database for UPOPs	FMEEnv, FMA&RD, FMOH and	Computer hardware	800,000	GEF, USAID,	2016 - 2017

<p>POPs in Nigeria</p>	<p>six geopolitical zones</p> <p>b. Use optimal technology where necessary</p> <p>c. Development of strategies for periodic review and updating of the inventory for each source category.</p>		<p>for informed policy decision making</p>	<p>emission inventory</p>	<p>States' Ministries of Environment</p>	<p>and software, Financial and Logistic support.</p>		<p>Budgetary,</p>	
<p>(2) Prevention of Uncontrolled Burning of Waste in Dumpsites</p>	<p>a. Raising awareness in all the 774 LGAs and with personnel involved managing waste in all the LGAs.</p> <p>b. Undertake technical activities for prevention and control of fires</p>	<p>3</p>	<p>Reduce UPOPs Emissions</p>	<p>Structure for enforcement control established,</p> <p>Awareness raising in 774 Local Govt. Areas</p>	<p>FMEnv, States and LGAs</p>	<p>Financial, Logistic and Technical supports</p>	<p>1,350,000</p>	<p>Ecological Fund, GEF, UNDP, World Bank, Bilateral Donors</p>	<p>2017 - 2018</p>

	<p>c. Review of laws and Policies covering activities that lead to generation of U-POPs and where necessary, introduce new ones.</p> <p>d. Enhanced enforcement control with communal enterprises (PSP) involved in managing dumpsites</p> <p>e. Measures to discourage open burning using effective restriction and regulations by Federal, States and Local governments.</p>								
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	<p>f. Plans for closure of waste dumps</p> <p>g. Surveillance and monitoring of UPOPs emission sources.</p> <p>Development of schemes for the use of carbonaceous waste to clean fuels, for cooking purposes (eg. Harvested typha grass to briquette) ,</p>								
(3) Sensitisation of Public and Private institutions and public awareness raising to	a. Education, training and awareness-raising of the risks of U-POPs and their management incorporated in	4	Knowledge about UPOPs raised in public and private institutions	UPOPs management incorporated into school curriculum.	FMEEnv, NUC, FME, NOA, NGO and other relevant MDAs	Computer hardware and software , National assembly	200,000	TETFund, GEF, UNDP, World Bank, Bilateral Donors	2015 - 2017

increase knowledge on U-POPs impacts, its health and environment effects, sources of U-POPs releases and general measures for their reduction/elimination.	education curriculum.					Advocacy, Logistic and financial support, Technical support.	450,000		
	b. Organisation of Town hall meetings, workshops, development of dissemination materials in three key Nigerian languages (Yoruba, Hausa and Igbo).			Workshop and town hall meetings organised with distribution of dissemination materials (fliers, etc.) produced in 3 major Nigerian languages			250,000		
	c. Establishment of period workshop and training courses for Private and Public			Periodic workshop undertaken.					

	institutions to implement UPOPs-reduction/elimination actions.								
(4) Legal and Institutional capacity building for reduction/elimination of UPOPs emission	a. Development of legislation, guidelines and practices of handling waste.	5	BATs/BEPs ensured in the handling of POPs and other hazardous waste	Operative Regulations and Guidelines developed	FMENV, NESREA, NPC, FMJ	Financial and Technical Support	150,000	Nigerian Govt., GEF, Multilateral and Bilateral donors	2015 - 2017
	b. Enforcement of regulations that ensure that hazardous waste is handled in the proper manner and by qualified personnel.			Effective monitoring and enforcement mechanisms in place			250,000		
	Strengthening institution for promotion and enforcement of such standards, guidelines and practices of handling waste.			Institutions strengthened			100,000		

(5) Effectiveness evaluation of the Efficiency of strategy adopted for minimising UPOPs- releases.	Develop mechanism for monitoring and reporting of efficiency of measures adopted for UPOPs and revising such where necessary.	4	Reduction in UPOPs emission nationwide	Mechanism for monitoring efficiency in place.	FMENV, TCN, States Ministry of environme nt and other relevant agencies	Logistic and Financial support	150,000	Nigerian Govt., GEF, Multilate ral and Bilateral donors.	2016 - 2019
(6) Management approach for POP- chemicals and related chemicals within Nigeria	Development and implementation of life cycle management approach for transportation of POPs- chemicals and related hazardous chemicals within Nigeria Environment.	4	Minimisation of exposure rate of POPs and other related hazardous chemicals nationwide	Managem ent approach developed	FMENV, FRSC, NCS, Police	Financial and Technical support	400,000	Budgetar y allocatio n, GEF, Multilate ral and Bilateral donors.	2016 - 2018

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

Action Plans	Activities	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Proper Management of POPs Contaminated Sites	a. Assess remediation technology options	3	Contaminated sites remediated and cleaned up for a more sustainable environment with reduced health risks for effectiveness evaluation	Clean up technology for contaminated site selected.	FMEnv, FMA&RD, FMST, Federal Ministry of Works, Power and Housing (FMWP&H) and TCN.	Financial and Technical support	5,000,000	GEF, Budgetary, World Bank, AfDB, Bilateral Donors	2017 - 2022
	b. Select appropriate approach			Prevention strategy developed.					
	c. Carry out pilot remediation tests								
	d. Evaluate effectiveness of selected clean-up technology								
	e. Develop prevention strategy, sustainability and replication plan								

(2) Evaluation of PBDEs contaminated sites	<ol style="list-style-type: none"> 1. Contaminated site characterisation using developed toolkit 2. Analysis of extent of pollution of POPs (PBDEs) sites 3. Development of site specific action plan for management of PBDEs 	3	Reduction in POPs contamination	<p>Quantified site specific data</p> <p>Action plan for site specific management of POPs - PBDEs</p>	<p>FMEnv, FMOH,</p> <p>Partner: UNIDO</p>	Financial and Logistic support	500,000	GEF, AfDB Ecological Fund Office and other donors	2016 - 2017
(3) Evaluation of the PCBs “hotspots” sites	<ol style="list-style-type: none"> 1. Analysis of extent of pollution of PCBs hotspots sites 2. Development of site specific action plan for management 	3	Reduction in POPs contamination	<p>Quantified site specific data</p> <p>Action plan for site specific management of PCBs contamination</p>	<p>FMEnv, Nigerian Electricity Regulatory Commission (NERC), TCN</p>	Financial and Logistic support	1,000,000	GEF, World Bank, AfDB	2016

	of hotspots sites								
(4) Contamination of PBDEs, PFOS and their derivatives	<p>(1) Assessment of levels of contamination of Polybrominated Diphenyl, its ethers, from consumer products.</p> <p>(2) Assessment of PFOS contamination from Fire fighting and related sectors.</p>	4	Level of PBDEs and PFOS contamination for informed decision making.	<p>Personnel trained.</p> <p>Monitoring equipment and test kits procured.</p> <p>Database for level of assessed contamination level.</p>	FMENV, FMST, FMOH, other Relevant MDAs	Financial, Technical and Logistic support	400,000 400,000	GEF World Bank, Government budget, Multilateral and Bilateral	2015 - 2018
(5) Pilot site remediation for clean-up of contaminated sites	<p>1. Assessment of technology options for remediation of POPs contaminated sites</p> <p>2. Evaluation and selection of the remediation</p>	4	Remediated land available for other industrial activities	<p>Selected remediation technology</p> <p>Contaminated sites remediated</p>	FMEnv, TCN	Financial and Logistic support	1,500,000	GEF, World Bank, AfDB, Other donors	2016 - 2017

	<p>technology to be employed</p> <p>3. Pilot remediation of 2 hotspots sites using chosen/ approved remediation technology option</p>								
(6) Promote technical training for management of POPs contaminated sites	<p>a. Undertake courses, workshops and seminars on management and reclamation of contaminated sites.</p> <p>b. Development and circulation of a guide on good practices and experiences for management of POPs contaminated sites.</p>	3	More Reclaimed land available for other developmental activities	<p>Seminars, workshops and courses organised.</p> <p>Guide developed</p>	FMENV, TCN	Financial and technical support.	<p>300,000</p> <p>300,000</p>	Nigerian Govt., Multilateral and Bilateral donors	2016 - 2020

3.3.6 Activity: Facilitating or undertaking information exchange and stakeholder involvement (Article 9)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line	Performance Indicator	Responsible Institutions
(1) Synergy assurance and information exchange among stakeholders	a. Strengthening of the Chemical Information Exchange Network (CIEN) for awareness and information sharing for all chemical and waste associated projects.	4	Increased awareness of hazardous chemicals and waste cluster.	Activities	FMENV and other relevant MDAs	Financial and Technical support	100,000	Nigerian Govt., GEF, UNEP, Bilateral donors	2017 - 2018	Public enlightenment campaign conducted	FMEnv Partner FMI, Relevant NGOs, other relevant stakeholders
	b. Development of Annual nationwide POPs Monitoring report	4	Increased Public access to information on annual POP-pollution from industrial and other sources in each locality and/or nationwide released into air, discharged into rivers or	(1) Strengthen the national public awareness programme on POPs	FMENV and other relevant MDAs	Financial and Technical support	150,000	Nigeria Govt., GEF, UNEP, Bilateral donors	2016 - 2020	Educative leaflets printed and circulated Workshop in geopolitical zones conducted	

			transferred off site as waste.									
				(2) Raising Awareness and Capacity Building of all Stakeholders							Capacity of govt. institutions, local authorities and NGOs strengthened	FMENV, FMI, FMoC, TCN, NGO and other relevant stakeholders
											Executive and National Assembly members sensitised	FMENV, FMI, other relevant stakeholders
				(3) Raising national public awareness							Environmentally safe approaches for meat	FMENV, FMoH, NGO and other

				awareness programme						processing established.	relevant stakeholders
				(4) Promote training courses on the Stockholm Convention and POPs management Educational Institutions						Safer technology introduced.	
										Report of training Programme on POPs-Chemicals.	FMENV, FMI, FMoC, NGO and Other relevant stakeholders
										Report of Seminars and training Workshop	
										Educative leaflets printed and circulated	

				Functional and Populated Website					
				Annual report document					
(2) To strengthen the national capacity to collect and use multi-sectoral information	Identify the resource persons. Carry out a needs assessment	4	Improved collection and usage of multi sectoral information	Resource persons Identified Needs assessment Report Training materials	FMENV, NAFDAC, NESREA, FMA&RD, NGOs, CBOs, FMI, State government	Financial and Technical Support	150,000	Nigerian Govt., Bilateral & Multilateral donors	2016 - 2018

	Develop training materials and Programmes			Developed					
	Carry out training			Training organised					

3.3.7 Activity: Public awareness, Information and Education (Article 10)

3.3.8 Activity: Effectiveness Evaluation (Article 16)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Strengthening of National Capacity for POPs Monitoring.	Establishment of at least two Passive Air Monitoring sites in each of the 6 geo-political zones.	5	National Database of POPs in Nigeria Environment.	Functional Monitoring Stations.	FMENV	Financial and Technical support	1,500,000	Nigerian Govt., GEF, Multilateral and Bilateral donors.	2016 – 2018
	Establishing periodic Bio-monitoring programmes (Terrestrial and Aquatic) for POPs based on the international commitments of Nigeria.	5	National Database of POPs in Nigeria Environment.	Functional Monitoring Station and Efficient Database	FMENV, NBS	Technical Support	3,000,000	GEF, Bilateral donors	2016 – 2020
	Support public reference laboratories	5	Enhanced Reference Lab capacity for	Improved reference Labs.	FMENV, Geo-Labs, other	Financial and Technical support	1,500.000	GEF, Multilateral and	2016-2020

	for monitoring POPs, particularly U-POPs.		POPs Analysis in the Country		stakeholders			Bilateral donors.	
(2) Checking current hazards of POPs on Health.	Risk Assessment analysis for foods and industrial chemicals.	4	Risk Assessment report	POPs Risk of food Profiled	FMENV, FMOH, FMA&RD, NAFDAC, TCN	Financial and Technical support	1,000,000	National Govt., GEF, Multilateral and Bilateral donors.	2016 - 2018

3.3.9 Activity: Research, development and monitoring (Article 11)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Improvement of National Technical and Analytical Capacity	a. Establish a laboratory in each geopolitical zone b. Capacity building for the analytical professionals c. Provision of the laboratory equipment needed for	5	Availability of facility for POPs analysis in Nigeria and database management for effectiveness evaluation. Effective, Accurate and Efficient POPs Analysis.	Functional Laboratory. Well Kitted lab Personnel.	FMEnv, FMA&RD, FMOH, FMST, Federal Ministry of Education (FME), NCS, Partner: World Bank,	Financial and Technical support	15,000,000	Nigerian Govt., GEF, World Bank, Bilateral Donors and Multinational Company.	2016 - 2020

	<p>sampling and analysis of POPs d. Training of laboratory staff e. Introduction of specific methods for different POPs analysis f. Accreditation of laboratories g. Develop sustainability plan h. Train key stakeholders on detection of POPs i. Develop database of existing POPs j. Train data management personnel k. Create POPs information management system</p>				Universities.				
Development of researches on the		4	Accurate and up-to-date	Measurement method developed	FMENV, NESREA, FMF,	Financial and	1,500,000	Nigerian Govt., GEF,	2016 - 2020

(2) Enhancing researches on POPs and their alternatives.	measurement methods of POPs releases from transportation sector.		measurement method		FMST, Universities, National Research Institutes (NRI)	Technical support		Bilateral & Multilateral Donors, and Multinationals	
	Promote Research on the health implications of exposure to POPs-chemicals from degradation of car materials as a result of harsh weather condition in Nigeria	4	Reduced POPs exposure from degraded car materials	Toolkit for measuring car degradation developed	FMENV, FMST, NRI	Financial and Technical support	2,000,000	Nigerian Govt., GEF, Bilateral & Multilateral Donors and Multinationals	2016 - 2020
(3) Promote research, development and innovation on	Establish support/incentives mechanism for cleaner and POPs-free technologies.	4	Reduced POPs exposure due to increase use of Cleaner and POP-free Technologies in the Country.	Novel cleaner technologies developed	FMENV, FMST, NARICT, other research institutions	Financial and Technical support	3,500,000	Nigerian Govt., GEF, Bilateral Donors, & Multinationals	2016 - 2020

POPs and their alternatives.	Development of study on existing technologies to dispose of POPs.	4	Appropriate BATs/BEPs to dispose of POPs in different sector identified.	BATs/BEPs Disposal options established	FMENV, FMST, NARICT, other research institutions	Financial and Technical support	500,000	Nigerian Govt., GEF, Bilateral Donors, & Multinationals	2016 - 2018
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3.3.10 Activity: Technical and financial assistance (Articles 12 and 13)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Participation in international assessments of POPs	Rendering timely and appropriate technical assistance in response to requests from developing country Parties and Parties with economies in transition.	4	Improved technologies of beneficiary economy	Feasible Technological transfer to developing economies	FMENV, other relevant institutions	Technical Support	500,000	Nigerian Govt., GEF, Bilateral Donors, & Multinationals	2018 - 2020
(2) Regional and bilateral	Assisting developing	4	Improved National	Mainstreamed Sound Chemicals	FMENV, Other relevant	Financial and	500,000	Nigerian Govt., GEF,	2016 - 2018

development assistance	countries to mainstream sound management of chemicals including POPs in their National developmental strategies		Chemicals Management	Management in National Development Plan	institutions	Technical Support		Bilateral Donors, & Multinationals	
(3) Sourcing for financial assistance towards the successful implementation of the Convention	Financial needs assessment.	5	Adequate Funding Support for the Convention Implementation	Documents showing financial needs	FMENV, FMF, Ministry of Foreign Affairs (MFA)	Financial Support	5,000	Nigerian Govt., Bilateral donors	2016 - 2018
	Identify sources of Financial assistance.			List of potential Donors identified			2,000		
	Requisition for financial assistance through proposal Writing.			Number of proposals prepared and submitted			3,000		

3.3.11 Activity: Mainstreaming Gender Perspective

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Sensitisation and Awareness raising among women to increase knowledge on POPs-exposure, its health and environment effects	Advocacy for women farmers on minimising exposure to Agricultural Pesticides	4	Improved women farmers Support for Agricultural Pesticides exposure minimisation	Sensitised women farmers. Report of Workshop/ Town-hall meeting.	FMEEnv, FMI, FME,FMA &RD, Federal Ministry of Women Affairs (FMWA) and NGO	Financial Support	300,000	Nigerian Govt., GEF, Bilateral & Multilateral Donors, and Multinationals	2016 - 2018
	Sensitisation of rural Women on traditional practices that could lead to POPs exposure e.g. Using of tyre scraps for cooking and land clearance; and Open Burning; fossil fuel and firewood.	4	Reduced POPs exposure among rural women	Rural women sensitised on risk of POPs exposure through traditional practices	FMEEnv, FMI, FMA&RD, FMWA and NGO.	Financial Support	500,000	Nigerian Govt., Bilateral and Multilateral donors	2016 - 2019

	Identification of Best Practicable Environmental Options (BPEOs) for domestic chores e.g. use of cleaner energy	5	Reduce POPs-related health conditions	Practicable Cleaner technology identified for domestic chores	FMEnv, FMST, Energy Commission of Nigeria (ECN)	Financial Support	300,000	Nigerian Govt., Bilateral and Multilateral donors	2016 - 2018
(2) Bio-monitoring of POPs exposure among rural women	Bio-monitoring for POPs exposure among rural women using biotic measures. (Human Milk and Blood Samples)	4	Statistics on POPs exposure among rural women.	POPs exposure among rural women monitored	FMEnv, FMOH, FMWA	Financial Support	250,000	Nigeria Govt., Bilateral donors	2016 - 2018

3.3.12 Activity: BAT and BEP assurance in POP Management (Article 5(b-f) and Annex C Part V)

Activities	Action Plans	Priority Ranking	Outcomes/Output	Performance Indicator	Responsible Institutions	Resource and needs	Cost Estimate (USD)	Funding Sources	Time Line
(1) Promotion of BATs/BEPs for sound POPs-Disposal or Destruction	Establishment of pilot cleaners production centre for the promotion of BATs/BEPs	5	Reduce POPs Exposure using safer technology	Safer technology identified and itemised	FMEnv, FMST, FMOH	Financial and Technical Support	6,000,000	Nigerian Govt., GEF, Bilateral and Multilateral	2018 - 2021

				Functional Centre				ral donors	
	Establishment of BATs/BEPs Centre for environmentally safe disposal of potentially hazardous consumer products and industrial wastes	5	Reduce Industrial POPs Exposure using safer technology	Safer technology identified and itemised Functional Centre	FMEEnv, FMST, FMIT&I, FMOH	Financial and Technical Support	6,000,000	Nigeria Govt., Bilateral and Multilateral donors	2018 - 2021
	Introduction of BATs and BEPs methodology to demonstrate reduction or elimination of Unintentionally-produced POPs releases from Mining, Cement, Petroleum (Gas Flaring) and related Industries in response to the Stockholm Convention on POPs.	4	Reduce U-POPs related health conditions	Practicable Cleaner technology identified for mining, petroleum, cement and related industries.	FMENV, FMITI, Federal Ministry of Mines and Steel Development (FMM&SD), Federal Ministry of Petroleum (FMP)	Financial and Technical support	3,000,000	Nigerian Govt., Bilateral and Multilateral donors	2018 - 2021

	Development of safer alternatives to POPs-Pesticide.	5	Reduce incidences of POPs-pesticide exposure	Report of identified safer alternatives	FMEEnv, FMST, FMA&RD NABDA, NARICT,	Financial and Technical Support	500,000	Nigerian Govt., Bilateral and Multilateral donors	2016 - 2018
	Development and demonstration of Best Environmental Options in the management of contaminated pesticide containers.	4	Reduce incidences of POPs exposure from unsound use of empty pesticide containers	Best Environmental Options Identified	FMEEnv, FMA&RD, FMST, FMOH	Financial and Technical Support	600,000	Nigerian Govt., Bilateral and Multilateral donors	2016 - 2019
	Demonstration of Best Available Techniques/Best Environmental Practices (BATs/BEsP) in the management of industrial chemicals	5	Reduce Industrial POPs Exposure through use of safer technology	Best Strategy for sound management of Industrial chemicals	FMEEnv, FMST, FMIT&I	Financial and Technical support	1,500,000	Nigerian Govt., Bilateral and Multilateral donors	2017 - 2019
	Pilot Project for the upgrade of existing HealthCare	4	Reduced cases of health issues arising from	Upgraded HCW Facilities	FMEEnv, FMST, FMIT&I	Financial and Technical support	2,500,000	Nigerian Govt., Bilateral and	2017 - 2021

	Waste (HCW) Incineration Facilities for Improved Removal & Destruction Efficiency.		exposure to HCW					Multilateral donors	
	Demonstration of non-combustion technologies in medical waste management cycle, as well as other hazardous chemicals and wastes.	5	Reduce incidences of U-POPs emission.	Practicable Non-combustion technologies identified. Report of Pilot technologies.	FMEnv, FMST,	Financial and Technical support	600,000	Nigerian Govt., Bilateral and Multilateral donors	2017 - 2018
	Pilot Project for the upgrading of Toxic Waste Incineration Facilities for Improved Removal & Destruction Efficiency	4	Reduced cases of health issues arising from exposure to HCW	Upgraded HCW Facilities	FMEnv, FMST, FMIT&I	Financial and Technical support	3,200,000	Nigerian Govt., GEF, Bilateral and Multilateral donors	2017 - 2021
(2) BATs/BEPs demonstration	Demonstration of BATs and BEPs in the	4	Reduced Lead Acid exposure	Practicable Management	FMEnv, FMST	Technical and	500,000	GEF, Nigerian Govt.,	2016 - 2018

	management of Used Lead Acid Battery (U-LAB)			Options identified		Financial Support			
(3) Promotion of ECO Products and Articles	Strengthening National capacity for promotion of National ECO-labelling in Products and Articles	3	Reduction in cost of waste treatment.	National ECO Stamps in products	FMEEnv, FMIT&I, CPC, Customs , NAFDAC , MAN, NGO	Financial and Technical support	500,000	Nigeria Govt., Bilateral and Multilateral donors	2017 - 2018
	Enabling Activity for joining the Global Ecolabelling Network (GEN)	3	Improved environmental health	Membership of the GEN. Report of stakeholders Commitment workshop on implementing GEN Obligations	FMEEnv, FMIT&I, NPC, CPC, NCS, MAN	Financial Support	500,000	Nigeria Govt., Bilateral and Multilateral donors	2018 - 2019
(4) Promotion of BATs and	Pilot Project for reduction of Vehicular Exhaust Emission	4	Reduced Health effects arising from exhaust emissions	Reduction System identified. Report of reduction strategy.	FMEEnv, FMS&T, National Automotive Council (NAC), FRSC,	Financial Support	500,000	Nigeria Govt., Bilateral and Multilateral donors	2017 - 2018

BEPs sector for sound management of emissions in the transport sector					DRTS, NATA				
	Pilot Project for upgrading MOT testing facility, incorporating Modern Exhaust gas Emission Equipment	4	Reduced Health Incidences arising from exhaust emissions	Functional Modern MOT testing facility with Up-to-date Exhaust Emission Monitoring Equipment	FMEnv, DRTS, FRSC.	Technical & Financial Support	350,000	Nigerian, Govt., GEF, Bilateral donor	2017 - 2018
	Capacity Building for monitoring of Vehicular Exhaust Emissions nationwide	4	Reduced Health Incidences arising from exhaust emissions	Capacity for nationwide Exhaust Emission Monitoring built. Data of Continuous Nationwide monitoring	FMEnv, FRSC, FCT & States DRTS,	Technical & Financial Support	1,000,000	Nigeria Govt., Bilateral and Multilateral donors	2017 - 2019
Management of End-of-Life Vehicles	5	Reduced environmental impact of ELVs	Functional Car crushing facilities in Six Geo-political zones. Metal Recycling Facilities.	FMEnv, FMST, FMT, DRTS, NATA	Technical & Financial Support	10,000,000	Nigeria Govt., GEF, EU, Car Manufacturing Companies (Toyota,	2018 - 2022	

				Pilot car accessories recycling facility.				Ford, BMW, M. Benz, Peugeot etc.) other Bilateral and Multilateral donors	
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Annexes

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Annex III: Communiqué Issued at the Validation Workshop

COMMUNIQUE

NATIONAL STAKEHOLDERS WORKSHOP ON THE PERSISTENT ORGANIC POLLUTANTS(POPs) INVENTORY DATA VALIDATION AND PRIORITY SETTING IN RE : ENABLING ACTIVITIES TO REVIEW AND UPDATE THE NATIONAL IMPLEMENTATION PLAN (NIP) FOR STOCKHOLM CONVENTION (POPs) PROJECT IN NIGERIA

INTRODUCTION

The National Inventory Data Validation and Priority-Setting Workshop for the enabling activities to review and update the National Implementation plan (NIP) for POPs in Nigeria was held at Veterinary Council of Nigeria, Maitama Abuja from 16th - 17th September, 2015. The Workshop was organized by the Federal Ministry of Environment in collaboration with United Nations Industrial Development Organization (UNIDO) and Global Environmental Facility (GEF).

2. The Objectives of the Workshop were, among others, to:-
 - review and update proposed action plan and management strategies for tackling identified POPs issues in the experts' reports;
 - review the experts' reports with a view to identifying gaps in the inventory data, legal regime and shortfalls in infrastructure capacity;
 - develop country-specific criteria for prioritizing POPs-issues;
 - define specific objectives for the country to address identified priority POPs issues, aligned with the national development plans;
 - formulate national priorities (ranking, timeframe, performance indicator, responsible organization, capacity & resource needs) for identified POPs issues;
3. The workshop was declared open by the Permanent Secretary of the Federal Ministry of Environment Mrs. Nana Fatima Mede represented by Director, forestry; Mr. Phillips Bankole. The Forum was attended by diverse stakeholders from both the public & private sectors and members of International agencies such as UNIDO, Federal Ministries of Agriculture & Rural Development, Health, Transport, Justice, Science & Technology, Industry Trade & Investment, Information, Labour & Productivity. Other government agencies includes Nigeria Customs Service, National Bureau of Statistics, Federal Road Safety Corps (FRSC), National Environmental Standards Regulations and Enforcement Agency (NESREA), Abuja Environmental Protective Board (AEPB), Nigerian African Stockpile Implementation Programme (NASPIN), Hospitalaire Consultaire, National Food and Drug Administration Control (NAFDAC), National Oil Spill Detection and Response Agency (NOSDRA), National Planning Commission (NPC), National Biotechnology Development Agency (NABDA), Directorate of Road Traffic Service (DRTS), Cocoa Research Institute of Nigeria (CRIN), Consumer Protection Council (CPC), State representatives such as Lagos State Environmental Protection Agency (LASEPA), Gombe State Fire Service, the Academia, Basel Convention regional Coordinating Centre for African region (BCRCC), Organized Private Sector, Professional bodies such as Institute of Chartered Chemists of Nigeria (ICCN), National Automotive Council of Nigeria, North Central Agro Input Dealers Association (NOCAIDA), Manufacturers Association of Nigeria, All farmers Association of Nigeria (AFAN), West Africa Agricultural Productivity Programme (WAPP) and the media.

4. The workshop was held in three segments which includes Opening, Technical and Closing sessions. The working groups reported to the closing plenary session after critical and intellectual deliberations and the workshop notes as follows:

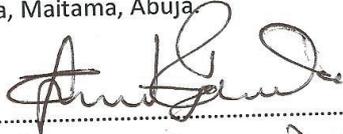
- I. There is the need for sustainable, predictable and adequate funding of Priority Projects identified in the POPs assessment reports, as amended and updated by stakeholders.
- II. There is dearth of information sharing and harmonization of data on chemicals management among relevant regulatory bodies.
- III. There is the need for strengthening Legal and infrastructural capacities for the regulation of chemical imports and merchandise in Nigeria.
- IV. There is need for collaborative financing of priority project on crosscutting chemicals management issues, for joint ownership and convergence of policy actions.
- V. There is need to develop National standards for POPs regulation in Nigeria.
- VI. There is need to develop holistic regulatory framework for management of POPs in Nigeria.
- VII. There is need to expand scope of inventory to other sectors such as Oil and Gas, Banking in subsequent inventory studies in POPs.
- VIII. There is need for improve awareness creation on POPs to the public.
- IX. The Federal Ministry of Environment should ensure the monitoring of stockpiles of POPs and its final disposal.
- X. A window should be created under the Chemical Information Exchange Network (CIEN) for awareness and information sharing for all chemical and waste associated projects.
- XI. Validated and adopted the POPs preliminary inventory data, set national priorities and action plan & management strategies for tackling identified POP issues.

and Agreed:

- To develop legislative and regulatory frameworks for the management of POPs, aimed at ensuring the protection of human health and the environment in Nigeria.
- To synergise and implement the action plan and management strategies for tackling identified POPs issues in Nigeria.

5. The forum expressed profound appreciation to UNIDO, GEF, all national partners for their continued support. The forum thanked the Permanent Secretary, Federal Ministry of Environment, Mrs. Nana Fatima Mede for her support in organising the workshop. The organisers also expressed appreciation to all the participants for the commitment, support and cooperation demonstrated during workshop and also pledged to include the valuable inputs of all stakeholders in the reviewed NIP on POPs in Nigeria.

6. This Communique was adopted on the 17th September, 2015 at Veterinary Council of Nigeria, Maitama, Abuja.

Sign: 
Name: DR OLUWAFEMI DADA

17/9/15
(Chairman, Communique drafting committee)

Sign: 
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Annex V: Statement of Commitment at Endorsement Workshop

STAKEHOLDERS STATEMENT OF COMMITMENT AT THE NATIONAL STAKEHOLDERS WORKSHOP FOR THE ENDORSEMENT OF REVIEWED AND UPDATED NATIONAL IMPLEMENTATION PLAN FOR THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

WE, the representatives of Ministries, Departments, and Agencies (MDAs) of the Federal and State Governments of Nigeria, professionals and academia Research Institute, private sector, civil society organizations, participating in the **National Stakeholders Workshop for the Endorsement of the Reviewed and Updated National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in Abuja, Nigeria from 17 to 18 May, 2016**;

RECALLING the Stockholm Convention on Persistent Organic Pollutants of 22 May, 2001 and its amendments as well as the Paris Climate Agreement and in particular Nigeria's Nationally Determined Contributions (NDCs) and other such relevant international instruments on chemical risk management;

GUIDED BY the provisions of Article 7 of the Stockholm Convention on the active participation of all relevant stakeholders at all stages of the development of the updated national Implementation Plan;

AWARE of the dangerous and long-time effects of Persistent Organic Pollutants on the ecosystem and general wellbeing of fauna and flora as well as the need to urgently tackle this menace;

CONSCIOUS of the need for national inter-agency cooperation among all relevant stakeholders in implementing the Stockholm Convention and strengthening policy instruments to meet emerging chemical-risk challenges;

RECOGNIZING the milestones of the initial National Implementation plan submitted to the Stockholm Convention Secretariat in 2009, and the need for the review and update;

APPRECIATING the efforts of the Federal Government of Nigeria through the Project Coordinating Unit, and the support of technical and development partners in updating the 2009 National Implementation Plan;

HEREBY:

DECIDE to adopt and endorse the updated National Implementation Plan, including the action plans and strategies formulated therein, to reduce or eliminate releases of POPs and other pollutants in-country;

Reiterate our commitment to the implementation of the Stockholm Convention and other related Conventions as well as international instruments on chemicals management in order to safeguard the health of people and the environment;

COMMIT to undertake review of Nigeria's policies and legislative frameworks relevant to the implementation of the Stockholm Convention and the related conventions and international processes on chemicals and wastes management;

RESOLVE to collaborate with all relevant MDAs, Civil Society Organisations, the private sector and technical and development partners to reduce or eliminate releases of POPs and other pollutants within the timeframe of the updated National Implementation Plan;

FURTHER COMMIT to cooperate with relevant regional and international organisations in mainstreaming the updated National Implementation Plan with the general Sound Management of Chemical (SMC) priorities into national development planning & budgetary processes as well as in the way of life of all Nigerians.

Annex VI: List of Stakeholders at NIP Document Endorsement Workshop

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Annex VII: Data on Pilot Inventory of National HealthCare Waste

ANALYSIS OF FIELD DATA ON THE NATIONAL INVENTORY OF HCW IN NIGERIA

There were figures available for 48 out of the 53 hospitals visited.

Table 1 shows the zonal breakdown of hospitals visited.

TABLE 1: NUMBER AND TYPES OF HOSPITALS VISITED IN EACH ZONE

ZONE	FEDERAL HOSPITALS	TEACHING HOSPITALS	SPECIALIST HOSPITALS	STATE/GEN. HOSPITAL	PRIVATE	TOTAL
North National	3	3	1	2	1	10
North East	3	1	-	-	1	5
South South	1	3	2	4	-	10
South East	2	-	1	3	3	9
South West	-	1	2	1	3	7
North West	1	1	1	4	-	7
Total	10	9	7	14	8	48

The 48 hospitals yielded a total of 14,495 beds.

The analysis is as shown in Table 2

TABLE 2: NUMBER OF BEDS PER ZONE AND PER HOSPITAL TYPE

ZONE	FEDERAL HOSPITALS	TEACHING HOSPITALS	SPECIALIST HOSPITALS	STATE/GEN. HOSPITAL	PRIVATE	TOTAL
North National	595	1561	300	256	34	2746
North East	2010	560	-	-	60	2630
South South	65	1491	243	800	-	2599
South East	575	-	220	748	60	1603
South West	-	1117	700	187	262	2266
North West	1363	300	268	720	-	2651
Total	4,608	5,029	1,731	2,711	416	14,495

The average waste generated per bed in kg/bed/day is shown in Table 3

TABLE 3. AVERAGE WASTE (KG) GENERATED PER BED/DAY

ZONE	FED. HOSP.	TEACH. HOSP.	SPECIAL. HOSP.	STATE/ GEN. HOSP.	PRIVATE	TOTAL	AVERAGE
North National	0.39	0.55	0.15	1.46	0.42	2.97	0.59
North East	0.62	2.87	-	-	0.08	3.57	0.71
South South	1.23	0.08	0.11	0.19	-	1.61	0.32
South East	0.50	-	0.49	0.57	0.57	2.13	0.43
South West	-	1.8	0.04	0.00	0.03	1.87	0.37
North West	0.99	0.58	0.28	0.56	-	2.41	0.48
TOTAL	3.73	5.88	1.07	2.78	1.10		
AVERAGE	0.62	0.98	0.18	0.46	0.18		

The teaching hospitals had the highest amount of waster per bed – 0.98kg/bed/day. This may be a reflection of the level of care. The Federal Hospitals followed with 0.62kg/bed/day, also probably for the same reason.

The low rate of 0.18kg/bed/day recorded by private hospitals may be a reflection of inadequate records or a lack of awareness.

No further analysis was carried out on the figures because the units of measurement in some cases were not uniform, and other figures were not entered at all. This analysis therefore was just a rough guideline.

Table 4. Number of Hospital Beds in Nigeria

Description	2000	2001	2002	2003	2004
Medical Institutions					
Number of Hospitals	23,596	23,601	23,607	23,618	23,622
Number of Health Centers & Dispensaries	20,273	20,570	20,580	20,610	20,653
Number of Hospital Beds	71,520	71,930	72,600	73,230	73,680

Source: Federal Ministry of Health, State statistical Agencies, Federal Office of Statistics

Source Document: The Nigerian Statistical Fact Sheets on Economic & Social Development, National Bureau of Statistics, 2005.

Annex VIII: Inventory Data from CleanFarms Project

THE CLEANFARMS PROJECT NIGERIA

Background

In May 2010, CropLife Nigeria (representing pesticides importers in Nigeria) in collaboration with CropLife International¹ (representing international pesticides manufacturers) and NAFDAC undertook a pilot project under the name CleanFarms to identify obsolete pesticides and empty containers in five states: Benue, FCT, Kaduna, Nasarawa, and Niger state. All project activities are being paid by CropLife International.

PHASE 1: Inventory

The first step of the project was to take inventory of any obsolete pesticides and empty pesticides containers in the five states. During this phase, the project succeeded in:

1. Training of 158 Extension Officers of the Agricultural Development Project (ADP) in the five states in taking inventory and the hazardous of obsolete pesticides (Jun-Jul 2010).
2. Taking inventory of obsolete pesticides and empty containers held in the private sector in the five states (Jul-Oct 2010).
3. Organizing a stakeholders' meeting in Abuja in which the results of the inventory were presented to all stakeholders including the Ministry of Environment, Health, and Agriculture, farmers' organisations, NGOs and technical partners (Apr 2011).



PHASE 2: Analysis of the identified stocks

A total of 9.9 tonnes of obsolete pesticides and 72,000 empty containers were identified. Of the identified obsolete stocks, 10% were leaking or highly toxic. A bit over 20% was manufactured by CropLife International members, while 79% manufactured by other producers (of which 90% in China).

PHASE 3: Safeguarding

Because only 21% of the identified obsolete pesticides were manufactured by CropLife International members, funds were made available to safeguard only in one state. Niger was

¹ Members of CropLife International are BASF, Bayer, Dow, DuPont, FMC, Monsanto, Sumitomo, and Syngenta.

selected because of the high percentage of leaking products and the good collaboration with ADP.

During this phase, the following has been achieved:

1. Upgrading of ADP storage facilities in Minna to be capable to store safeguarded products (Jun-Sep 2011).
2. Shipping of a container from Europe with safeguarding equipment (May-Oct 2011).
3. Training of 14 people from importing companies, ADP Niger state, Ministry of Environment, NAFDAC and NOCAIDA in safeguarding, facilitated by Veolia International (Nov 2011).
4. Safeguarding obsolete pesticides in Niger state (Dec 2011).
5. Safeguarded products stored in ADP Minna.
6. Organizing a feedback meeting in Minna in which the results of the inventory were presented to all stakeholders including the Ministry of Environment, Health, and Agriculture, farmers' organisations, NGOs, ADP and NOCAIDA (January 2012).



Storage facility in Minna

Safeguarded products

Almost 6 tonnes were safeguarded in Minna, Suleja, Bida and Kontagora. Products included Pirimiphose methel, Propanil, Endosulphan, Glyphosate, Lambda, Cypermethrine, Orizo Plus, 24-D, Pendimethalin, Chlorocycrisos, Atrazine, Diuron, Propanil, Chlorocycrisos, and Butachlor. In addition, 32 tonnes of DDVP 100% was identified in a store in Suleja. Only the leaking bottles could be safeguarded because of lack of equipment. The remaining DDVP was incinerated in Port Harcourt by the importing company.



Safeguarding activities

At the moment CropLife Nigeria is looking for possibilities to incinerate the safeguarded pesticides in a safe way.

Annex IX: POPs Inventory Questionnaires

QUESTIONNAIRES ON POLYBROMINATED DIPHENYLEETHERS (PBDEs) IN ELECTRICAL/ELECTRONIC PRODUCTS

Kindly note that this survey is required for developing integrated action plans for addressing POPs challenges in Nigeria and not for the purpose of regulatory sanctions. Therefore your cooperation in completing the questionnaire would be appreciated.

Five (5) principal types of questionnaire on PBDEs have been designed by the Federal Ministry of Environment (FMEnv), for data collation purposes. The questionnaires were designed with different content and format depending on the respondent group.

The types of questionnaires are as follows:

- Household
- Business Entities and Institutions
- Importers and Exporters
- Collectors
- Repair Shops, Second-hand Shops, Dismantlers and Processors

QUESTIONNAIRE FOR HOUSEHOLDS

Date		
Interviewer		
Respondent	Name	
	Address	
		Postcode

Household Information

1.1 How many family members are living in your house? []

Age group	Number of person
(a) 0 to 3 (Baby)	
(b) 4 to 12 (Child)	
(c) 13 to 19 (Teenager)	

(d) 20 to 59 (Adult)	
(e) 60 and over (Senior)	
<i>Total</i>	

1.2 Into which category does your monthly income (as a total household) fall? (please select one):

a) Low income b) Middle income c) Upper middle income d) High income

Electrical and Electronic Equipment in Your House

2.1 Television Sets

Q1 Do you have television sets in your house?

1) Yes → Please answer Q1-1 and Q1-2 and then go to Q2

2) No → Please go to Q2

Q1-1 How many **Television Sets (TVs)** did you discard during the past five years and how many TVs do you currently have in your house?

1) TVs discarded during the past five years []

2) TVs currently in your house []

Q1-2 Please answer the following questions for each TV that you discarded during the past five years or currently have in your house. If you had/have more than three TVs in total, please answer about only three TVs that you discarded and/or have had for a longer term.

	Question	TV#1	TV#2	TV#3
1-2-1	Did you discard the TV during the past five years or do you currently have it?	1) Currently have a) Yes b) No 2) Discarded When? []	1) Currently have a) Yes b) No 2) Discarded When? []	1) Currently have a) Yes b) No 2) Discarded When? []
1-2-2	What type of TV is it?	1) Colour CRT 2) LCD	1) Colour CRT 2) LCD	1) Colour CRT 2) LCD
1-2-3	Who is the maker of the TV?			
1-2-4	In which year did you get the TV?			

1-2-5	How did you get the TV?	1) Bought 2) Given 3) Other	1) Bought 2) Given 3) Other	1) Bought 2) Given 3) Other
1-2-6	Was the TV brand-new or second-hand when you got it?	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand
1-2-7	How did you discard the TV? Please answer 'Yes' or 'No'.	1) Discard together with the other wastes for municipal waste collection? 2) Give / sell to the collectors? → Collector's name and location/contact [] 3) Pay to the collector? → Collector's name and location/contact [] 4) Give / sell to friends or relatives? 5) Bring to the recycling station / centre etc.? → Station's name and location/contact [] 6) Others [e.g. keep at home]		

2.2 Personal Computers

Q2 Do you or did you have personal computers in your house?

- 1) Yes → Please answer Q2-1 and Q2-2 and then go to Q3
- 2) No → Please go to Q3

Q2-1 How many **Personal Computers (PCs)** did you discard during the past five years and how many PCs do you currently have in your house?

PCs discarded during the past five years []

PCs currently in your house []

Q2-2 Please answer the following questions for each PC that you discarded during the past five years or currently have in your house. If you had/have more than three PCs in total, please answer about only three PCs that you discarded and/or have had for a longer term.

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2.3 Mobile Phones

Q3 Do your family members or did your family members have mobile phones?

- 1) Yes → Please answer Q3-1 and Q3-2 and then go to Q4
- 2) No → Please go to Q4

Q3-1 How many **Mobile Phones (MPs)** did your family members discard during the past five years and how many MPs do your family members currently have?

MPs discarded during the past five years []
 MPs that your family members currently have []

Q3-2 Please answer the following questions for each MP that your family members discarded during the past five years or currently have. If your family members had/have more than three MPs in total, please answer about only three MPs that your family members discarded and/or have had for a longer term.

	Question		MP#1		MP #2		MP #3
3-2-1	Did your family member discard the MP during the past five years or does s/he currently have it?	1)	Do you still use it as MP? a) Yes b) No	1)	Do you still use it as MP? a) Yes b) No	1)	Do you still use it as MP? b) Yes b) No
		2)	Discarded When? []	2)	Discarded When? []	2)	Discarded When? []
3-2-2	Who is the maker of the MP?						
3-2-3	In which year did s/he get the MP?						
3-2-4	How did s/he get the MP?	1)	Bought	1)	Bought	1)	Bought
		2)	Given	2)	Given	2)	Given
		3)	Other	3)	Other	3)	Other
3-2-5	Was the MP brand-new or second-hand when s/he got it?	1)	Brand-new	1)	Brand-new	1)	Brand-new
		2)	Second-hand	2)	Second-hand	2)	Second-hand

3-2-6	How did s/he discard the MP? Please answer 'Yes' or 'No'.	1) Discard together with the other wastes for municipal waste collection? 2) Give / sell to the collectors? → Collector's name and location/contact [] 3) Pay to the collector? → Collector's name and location/contact [] 4) Give / sell to friends or relatives? 5) Bring to the recycling station / centre etc.? → Station's name and location/contact [] 6) Others [Pls. specify] []
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2.4 Refrigerators

Q4 Do you or did you have refrigerators in your house?

- 1) Yes → Please answer Q4-1 and Q4-2 and then go to Q5
- 2) No → Please go to Q5

Q4-1 How many refrigerators did you discard during the past five years and how many refrigerators do you currently have in your house?

Refrigerators discarded during the past five years []
Refrigerators currently in your house []

Q4-2 Please answer the following questions for each refrigerator (fridge) that you discarded during the past five years or currently have. If you had/have more than three fridges in total, please answer about only three fridges that you discarded and/or have had for a longer term.

- 1) Yes → Please answer Q5-1 and Q5-2 and then go to Q6
- 2) No → Please go to Q6

Q5-1 How many **Air Conditioners (ACs)** did you discard during the past five years and how many ACs do you currently have in your house?

ACs discarded during the past five years []
 ACs currently in your house []

Q5-2 Please answer the following questions for each AC that you discarded during the past five years or currently have. If you had/have more than three ACs in total, please answer about only three ACs that you discarded and/or have had for a longer term.

	Question		AC#1		AC#2		AC #3
5-2-1	Did you discard the AC during the past five years or do you currently have it?	1) 2)	Do you still use it as AC? a) Yes b) No Discarded When? []	1) 2)	Do you still use it as AC? a) Yes b) No Discarded When? []	1)	Do you still use it as AC? a) Yes b) No 2)Discarded When? []
5-2-2	Who is the maker of the AC?						
5-2-3	In which year did you get the AC?						
5-2-4	How did you get the AC?	1) 2) 3)	Bought Given Other	1) 2) 3)	Bought Given Other	1) 2) 3)	Bought Given Other
5-2-5	Was the AC brand-new or second-hand when you got it?	1) 2)	Brand-new Second-hand	1) 2)	Brand-new Second-hand	1) 2)	Brand-new Second-hand

5-2-6	How did you discard the AC? Please answer 'Yes' or 'No'.	1) Discard together with the other wastes for municipal waste collection? 2) Give / sell to the collectors? → Collector's name and location/contact [] 3) Pay to the collector? → Collector's name and location/contact [] 4) Give / sell to friends or relatives? 5) Bring to the recycling station / centre etc.? → Station's name and location/contact [] 6) Others [Pls. specify] []
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2.6 Washing Machines

Q6 Do you or did you have washing machines in your house?

- 1) Yes →Please answer Q6-1 and Q6-2 and then go to Q7
- 2) No →Please go to Q7

Q6-1 How many washing machines (WMs) did you discard during the past five years and how many WMs do you currently have in your house?

WMs discarded during the past five years []
WMs currently in your house []

Q6-2 Please answer the following questions for each WM that you discarded during the past five years or currently have. If you had/have more than three WMs in total, please answer about only three WMs that you discarded and/or have had for a longer term.

	Question	WM#1	WM#2	WM #3
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- 1) Yes → Please answer Q7-1
- 2) No

Q7-1 How did you handle the mobile phone batteries that you do not use as battery anymore?

- 1) Discard together with the other wastes for municipal waste collection
- 2) Give / sell to the collectors
→ Collector's name and location/contact
[]
- 3) Pay to the collector for disposal
→ Collector's name and location/contact
[]
- 4) Bring to the recycling station / centre etc.
→ Station's name and location/contact
[]
- 5) Others [Pls. specify]

Thank you for your kind cooperation.
Please return the Questionnaire to:
The Director, Pollution Control and Environmental Health Department,
Federal Ministry of Environment,
No 14, Aguiyi Ironsi Street, Maitama, Abuja.
For Clarification Please Call: +2348030643008
Email: tbadul@yahoo.com
QUESTIONNAIRE FOR BUSINESS ENTITIES & INSTITUTIONS

COMPANY PROFILE:

Date	
Name of Company / Institution	
Type of Business / Institution	

		→ Station's name and location/contact []
		6) Others [Pls. specify] []

Personal Computers

Q2 Does or did your company/institution have personal computers on the premises?

- 1) Yes → Please answer Q2-1 and Q2-2 and then go to Q3
- 2) No → Please go to Q3

Q2-1 How many personal computers (PCs) did your company/institution discard during the past five years, and how many PCs does it currently have on the premises?

PCs discarded during the past five years []
PCs currently on the premises []

Q2-2 Please group the PCs by similar characteristics (age of PCs, discarded or currently held), and then answer the following questions for each group of PCs. If there are more than three groups, please answer about only three groups of the PCs that your company/institution discarded and/or has had for a longer term.

	Question	PC Group#1	PC Group#2	PC Group#3
2-2-1	About how many PCs are in the group?			
2-2-2	Did your company/institution discard the PCs during the past five years or does it currently have them?	1) Currently use a) Yes b) No 2) Discarded when? []	1) Currently use a) Yes b) No 2) Discarded when? []	1) Currently use a) Yes b) No 2) Discarded when? []

2-2-3	What type of PCs are they?	1) Desktop with CRT display 2) Desktop with LC display 3) Notebook	1) Desktop with CRT display 2) Desktop with LC display 3) Notebook	1) Desktop with CRT display 2) Desktop with LC display 3) Notebook
2-2-4	Who is the maker of the PCs?			
2-2-5	In which year did your company/institution get the PCs?			
2-2-6	How did your company/institution get the PCs?	1) Bought 2) By lease 3) Other	1) Bought 2) By lease 3) Other	1) Bought 2) By lease 3) Other
2-2-7	Were the PCs brand-new or second-hand when your company/institution got them?	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand
2-2-8	How did your company/institution discard the PCs? Please answer 'Yes' or 'No'.	1) Discard together with the other wastes for municipal waste collection 2) Give / sell to the collector → Collector's name and location/contact [] 3) Pay to the collector → Collector's name and location/contact [] 4) Donate to schools/other organizations or give away to employees 5) Bring to the recycling station / centre etc. → Station's name and location/contact [] 6) Others [Pls. specify] []		

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Mobile Phones

Q3 Does or did your company/institution provide its employees with mobile phones for business use?

- 1) Yes → Please answer Q3-1 and Q3-2 and then go to Q4
- 2) No → Please go to Q4

Q3-1 How many **Mobile Phones (MPs)** did your company/institution discard during the past five years, and how many MPs does it provide to its employees or have on the premises?

MPs discarded during the past five years []

MPs currently provided to employees or on the premises []

Q3-2 Please group the MPs by similar characteristics (age of MPs, discarded or currently provide/have), and then answer the following questions for each group of MPs. If there are more than three groups, please answer about only three groups of the MPs that your company/institution discarded and/or has provided to employees or had on the premises for a longer term.

	Question	MP Group#1	MP Group#2	MP Group#3
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3-2-1	About how many MP's are in the group?						
3-2-2	Did your company/institution discarded the MP's during the past five years or does it currently provide to employees or have on the premises?	1) 2)	Currently provide/use a) Yes b) No Discarded When? []	1) 2)	Currently provide/use a) Yes b) No Discarded When? []	1) 2)	Currently provide/use a) Yes b) No Discarded When? []
3-2-3	Who is the maker of the MP's?						
3-2-4	In which year did your company/institution get the MP's?						
3-2-5	How did your company/institution get the MP's?	1) 2) 3)	Bought By lease Other	1) 2) 3)	Bought By lease Other	1) 2) 3)	Bought By lease Other
3-2-6	Were the MP brand-new or second-hand when your company/institution got them?	1) 2)	Brand-new Second-hand	1) 2)	Brand-new Second-hand	1) 2)	Brand-new Second-hand

3-2-7	How were the MPs discarded? Please answer 'Yes' or 'No'.	<p>1) Discard together with the other wastes for municipal waste collection</p> <p>2) Give / sell to the collector → Collector's name and location/contact []</p> <p>3) Pay to the collector → Collector's name and location/contact []</p> <p>4) Donate to schools/other organizations or give away to employees</p> <p>5) Bring to the recycling station / centre etc. → Station's name and location/contact []</p> <p>6) Others [Pls. specify] []</p>
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2.4 Refrigerators

Q4 Does or did your company/institution have refrigerators on the premises?

- 1) Yes → Please answer Q4-1 and Q4-2 and then go to Q5
- 2) No → Please go to Q5

Q4-1 How many refrigerators did your company/institution discard during the past five years, and how many refrigerators does it currently have on the premises?

Refrigerators discarded during the past five years []
Refrigerators currently on the premises []

Q4-2 Please group the fridges by similar characteristics (age of fridges, discarded or currently have), and then answer the following questions for each group of fridges. If there are more than three groups, please answer about only three groups of the fridges that your company/institution discarded and/or has had on the premises for a longer term.

5-2-4	In which year did your company/institution get the ACs?			
5-2-5	How did your company/institution get the ACs?	1) Bought 2) By lease 3) Other	1) Bought 2) By lease 3) Other	1) Bought 2) By lease 3) Other
5-2-6	Were the ACs brand-new or second-hand when your company/institution got them?	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand	1) Brand-new 2) Second-hand
5-2-7	How were the ACs discarded? Please answer 'Yes' or 'No'.	1) Discard together with the other wastes for municipal waste collection 2) Give / sell to the collector → Collector's name and location/contact [] 3) Pay to the collector → Collector's name and location/contact [] 4) Donate to schools/other organizations or give away to employees 5) Bring to the recycling station / centre etc. → Station's name and location/contact [] 6) Others [Pls. specify] []		

2.6 Washing Machines (WMs)

Q6	Does or did your company/institution have washing machines on the premises? 1)Yes → Please answer Q6-1 and Q6-2 and then go to Q7 2) No → Please go to Q7
Q6-1	How many washing machines (WMs) did your company/institution discard

6-2-7	How were the WMs discarded? Please answer 'Yes' or 'No'.	<p>1) Discard together with the other wastes for municipal waste collection</p> <p>2) Give / sell to the collector → Collector's name and location/contact []</p> <p>3) Pay to the collector → Collector's name and location/contact []</p> <p>4) Donate to schools/other organizations or give away to employees 5) Bring to the recycling station / centre etc. → Station's name and location/contact []</p> <p>7) Others [Pls. specify] []</p>
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2.7 Waste Batteries

Q7 Has your company/institution ever changed rechargeable batteries in electrical and electronic equipment such as mobile phones, notebook computers, digital cameras, facsimile machines, and video cameras?

- 1) Yes → Please answer Q7-1 and then go to Q8
- 2) No → Please answer Q8

Q7-1 How did your company/institution handle the old rechargeable batteries?

1) Discard together with the other wastes for municipal waste collection

2) Give / sell to the collectors

→ Collector's name and location/contact

[]

3) Pay to the collector for disposal

→ Collector's name and location/contact

[]

4) Bring to the recycling station / centre etc.

→ Station's name and location/contact

[]

5) Others [Pls. specify]

[]

Q8 How does your company/institution usually discard dry cell batteries that you do not use anymore?

1) Discard together with the other wastes for municipal waste collection

2) Give / sell to the collectors

→ Collector's name and location/contact

[]

→ Collector's name and location/contact

[]

→ Station's name and location/contact

[]

3) Pay to the collector for disposal

4) Bring to the recycling station / centre etc.

5) Others [Pls. specify]

[]

Thank you for your kind cooperation.

2. Import of Used Electrical and Electronic Equipment (EEE)

Q1. Please specify the type, quantity, trend of import, and country of origin of used EEE currently imported by your company.

Type of used EEE	1-1 How many units are imported per month on average?	1-2 What is the average increasing /decreasing rate of import during the last 5 years?	1-3 Which country do they come from? Please list major three countries.		
1. Television set		+ -			
1.1. Color CRT		+ -			
1.2 LC		+ -			
2. Computer		+ -			

Type of used EEE	1-1 How many units are imported per month on average?	1-2 What is the average increasing /decreasing rate of import during the last 5 years?	1-3 Which country do they come from? Please list major three countries.		
2.1. Desktop		+ -			
2.2. Notebook		+ -			
2.3. Other ()		+ -			
3. Mobile phone		+ -			
4. Refrigerator		+ -			
5. Air conditioner		+ -			
6. Washing machine		+ -			
7. Other ()		+ -			

Q2. How is the imported used EEE going to be utilized? Please indicate the ratio of the units by destination.

Type of used EEE	Ratio (%) of Units by destination.
------------------	------------------------------------

	Second-hand shops (selling at the market without repair)	Repair shops (mainly for repair for selling at the market)	Dismantlers (mainly for recovering reusable parts and recyclable materials)
1. Television set			
1.1. Color CRT			
1.2. LC			
2. Computer			
2.1. Desktop			
2.2. Notebook			
2.3. Other ()			
3. Mobile phone			
4. Refrigerator			
5. Air conditioner			
6. Washing machine			
7. Other ()			

Q3. Please provide information about your partners by type (second-hand shops, repair shops, and dismantlers).

Type*	Name	Address	Telephone

*Please specify with 1) second-hand shops, 2) repair shops, 3) dismantlers, and 4) other.

3. Export of Used EEE

Q4. Please specify the type, quantity, trend of export, country of destination currently exported by your company.

Type of used EEE	4-1 How many units are exported per month on average?	4-2 What is the average increasing /decreasing rate of export during the last 5 years? 4-3 Which countries do they go to? Please list the three major countries.
1. Television set		+ -

1.1. Colour CRT		+ -		
1.2. LC		+ -		
2. Computer		+ -		
2.1. Desktop		+ -		
2.2. Notebook		+ -		
2.3. Other ()		+ -		
3. Mobile phone		+ -		
4. Refrigerator		+ -		
5. Air conditioner		+ -		
6. Washing machine		+ -		
7. Other ()		+ -		

Thank you for your kind cooperation.
Please return the Questionnaire to:
The Director, Pollution Control and Environmental Health Department,
Federal Ministry of Environment,
No 14, Aguiyi Ironsi Street, Maitama, Abuja.
For Clarification Please Call: +2348030643008
Email: tbadul@yahoo.com

QUESTIONNAIRE FOR COLLECTORS

Date		
Interviewer		
Respondent	Name	
	Position	

Company Profile

Name of Organization			
Type of Business (Multiple Answer)	1) Collection Repair	2) 3) Sales	4) Dismantling
Address		Phone	
		Fax	
		E-mail	
Number of Employees			

NOTE

For television sets (item #1) and computers (item #2), if information for breakdown categories (item #1.1-1.2 or item #2.1-2.2) is not available, please answer televisions or computers as a whole in the item #1 or #2 row.

Collection of Used Electrical and Electronic Equipment (EEE)

Q1-1. Please specify the type, quantity, and source of used EEE currently collected by your company.

Type of used EEE	1-1-1 How many units does your company collect per month?	1-1-2 Where do they come from? Please indicate the ratio (%) of the units.				
		Charity Drives	Household	Office	Leasing company	Hotel/furnished apartment
1. Television set						
1.1. CRT						
1.2. LC						
2. Computer						
2.1. Desktop, Monitor						
2.2. Notebook						

3. Mobile phone						
4. Refrigerator						
5. Air Conditioner						
6. W/Machine						

Q1-2. Please describe the collection route of used EEE from original dischargers such as households and offices to your company. Who are engaged in the collection and what transportation means are used?

Q2. What percentage of collected used EEE is going to repair shops, second-hand shops, dismantlers or exporters? Please indicate the ratio (%) of the units.

Type of used EEE	Ratio (%) of used EEE collected by your company by destination			
	Repair shop (repair used EEE)	Second-hand shop (sell used EEE without repair)	Dismantler (recover reusable parts and recyclable materials)	Exporter
1. Television set				
1.1. CRT				
1.2. LC				
2. Computer				
2.1. Desktop				
2.2. Notebook				
3. Mobile phone				
4. Refrigerator				
5. Air conditioner				
6. Washing machine				

Q3 Please provide information about your partners by type (second-hand shops, repair shops, dismantlers, and exporters).

Type*	Name	Address	Telephone

*Please specify with 1) second-hand shops, 2) repair shops, 3) dismantlers, 4) exporters, and 5) other.

Thank you for your kind cooperation.
Please return the Questionnaire to:
The Director, Pollution Control and Environmental Health Department,
Federal Ministry of Environment,
No 14, Aguiyi Ironsi Street, Maitama, Abuja.
For Clarification Please Call: +2348030643008
Email: tbabdul@yahoo.com

QUESTIONNAIRE FOR REPAIR & SECOND-HAND SHOPS

Date		
Interviewer		
Respondent	Name	
	Position	

Company Profile

Name of Organization			
Type of Business (Multiple Answer)	1) Collection 2) Repair	3) Sales 4) Dismantling	
Address		Phone	
		Fax	
		E-mail	
Number of Employees			

NOTE:

For television sets (item #1) and computers (item #2), if information for breakdown categories (item #1.1-1.2 or item #2.1-2.2) is not available, please answer televisions or computers as a whole in the item #1 or #2 row.

Repair of Used Electrical and Electronic Equipment (EEE)

Q1 Please specify the type, quantity, average weight and source of used EEE currently accepted by your company for repair/reassembling.

Type of used EEE	1-1 How many units do you accept per month?	1-2 How much does one unit weigh? (kg/unit)	1-3 Where do they come from? Please indicate the ratio (%) of the units.		
			Importer	Domestic collector	Directly from discharger (household, office, etc.)
1. Television set					
1.1. CRT					
1.2. LC					
2. Computer					
2.1. Desktop					
2.2. Notebook					
2.3. Other					
3. Mobile phone					
4. Refrigerator					

Type of used EEE	1-1 How many units do you accept per month?	1-2 How much does one unit weigh? (kg/unit)	1-3 Where do they come from? Please indicate the ratio (%) of the units.		
			Importer	Domestic collector	Directly from discharger (household, office, etc.)
5. Air conditioner					
6. Washing machine					

Q2 Please provide information about your partners by type (importers, domestic collectors).

Type*	Name	Address	Telephone

*Please specify with 1) importer, 2) domestic collector, and 3) other.

Q3. Please tell us your repair/reassembling process and required technology/equipment for the process.

Type of used EEE	Repair/reassembling Process (Please specify required technology and equipment)
1. Television set	
1.1. CRT	
1.2. LC	
2. Computer	
2.1. Desktop	
2.2. Notebook	
3. Mobile phone	
4. Refrigerator	
5. Air conditioner	
6. Washing machine	

Q4 Please specify quantity of final products (repaired/reassembled EEE), other sellable items (reusable parts, recyclable materials), and residues (those you cannot sell) generated from the repair/reassembling process.

Type of used EEE	1-1 How many units of repaired/reassembled EEE do you Produce per month?	1-2 What is the ratio (%) of used EEE sold at your shops?		1-3 How old is the majority of used EEE sold at your shops?	1-4 How may kilograms of reusable parts, recyclable materials and residues are generated per 100 units of final products (repaired/reassembled EEE)		
		Imported	Domestically		Reusable	Recyclable	Residues

			collected		parts (kg/100units)	materials (metals, plastics, glass etc.) (kg/100units)	(kg/100units)
1. Television set							
1.1. CRT							
1.2. LC							
2. Computer							
2.1. Desktop							
2.2. Notebook							
3. Mobile phone							
4. Refrigerator							
5. Air conditioner							
6. Washing machine							

Q5 Please provide information about your partners who buy final products (repaired/reassembled EEE), reusable parts and recyclable materials.

Type*	Name	Address	Telephone

*Please specify with those who buy 1) final products (repaired/reassembled EEE), 2) reusable parts, and 3) recyclable materials.

Q6 What and how much residues do you generate from repair/reassembling process per month and how do you dispose of the residue?

Type of Residue	Quantity (kg/month)	Ways of Disposal	Name and Location of Entity that Accepts

			Residue
Plastics		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Metals		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Glass		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Glass with lead (CRT)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Oil		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
CFC (chlorofluorocarbon)		1) Destruct on the premises 2) Pay for disposal 3) Do not collect 4) Other ()	
Rechargeable battery (from notebook computer)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Rechargeable battery (from mobile phone)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Mixture of different types of materials		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Other ()		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	

Other ()	1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()
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QUESTIONNAIRE FOR DISMANTLERS

Date		
Interviewer		
Respondent	Name	
	Position	

Company Profile

Name of Organization			
Type of Business (Multiple Answer)	1)Collection 2) Dismantling 3) Other ()		
Address	Phone		
	Fax		
	E-mail		
Annual Sales (Turnover)		Number of Employees	

NOTE:

For television sets (item #1) and computers (item #2), if information for breakdown categories (item #1.1-1.2 or item #2.1-2.2) is not available, please answer televisions or computers as a whole in the item #1 or #2 row.

Dismantling of Used Electrical and Electronic Equipment (EEE)

Q1 Please specify the type, quantity, and source of used EEE currently dismantled by your company.

Type of used EEE	1-1 How many units do you dismantle per month?	1-2 How much does one unit weigh? (kg/unit)	1-3 Where do they come from? Please indicate the ratio (%) of the units.		
			Importer	Domestic collector	Directly from household/office

1. Television set					
1.1. CRT					
1.2. LC					
2. Computer					
2.1. Desktop					
2.2. Notebook					
3. Mobile phone					
4. Refrigerator					
5. Air conditioner					
6. W/Machine					

Q2 Please provide information about your partners by type (importers and domestic collectors).

Type*	Name	Address	Telephone

*Please specify with 1) importer and 2) domestic collector

Q3 Please tell us your dismantling process and required technology/equipment for the process.

Type of used EEE	Repair/reassembling Process (Please specify required technology and equipment)
1. Television set	
1.1. CRT	
1.2. LC	
2. Computer	
2.1. Desktop	
2.2. Notebook	

3. Mobile phone	
4. Refrigerator	
5. Air conditioner	
6. Washing machine	

Q4 How many kilograms of reusable parts (those you can sell), recyclable materials (those you can sell) and residues (those you cannot sell) do you generate by dismantling 100 units of used EEE?

Type of used EEE	Reusable parts (kg/100units)	Recyclable materials (kg/100units)	Residues (kg/100units)
1. Television set			
1.1. CRT			
1.2. LC			
2. Computer			
2.1. Desktop			
2.2. Notebook			
3. Mobile phone			
4. Refrigerator			
5. Air conditioner			
6. Washing machine			

Q5 Please provide information about your partners who buy reusable parts and recyclable materials.

Type*	Name	Address	Telephone

*Please specify with those who buy 1) reusable parts, and 2) recyclable materials.

Q6 What and how much residues do you generate from dismantling process per month and how do you dispose of the residue?

Type of Residue	Quantity (kg/month)	Way of Disposal	Name and Location of Entity that Accepts Residue

Plastics		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Metals		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Glass		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Glass with lead (CRT)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Oil		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
CFC (chlorofluorocarbon)		1) Destruct on the premises 2) Pay for disposal 3) Do not collect 4) Other ()	
Rechargeable battery (from notebook computer)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Rechargeable battery (from mobile phone)		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Dry cell battery		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Mixture of different types of materials		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	

Other ()		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
Other ()		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	

Thank you for your kind cooperation.
Please return the Questionnaire to:
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For Clarification Please Call: +2348030643008
Email: tbabdul@yahoo.com

QUESTIONNAIRE FOR PROCESSORS

Date	
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Interviewer		
Respondent	Name	
	Position	

Company Profile

Name of Organization			
Type of Business (Multiple Answer)	1) Collection 2) Dismantling 3) Processing of recyclable materials (plastics, metals, glass, etc.) 4) Other ()		
Address		Phone	
		Fax	
		E-mail	
Annual Sales (Turnover)		Number of Employees	

NOTE

For television sets (item #1) and computers (item #2), if information for breakdown categories (item #1.1-1.2 or item #2.1-2.2) is not available, please answer televisions or computers as a whole in the item #1 or #2 row.

Electronic Equipment (EEE)

Q1 Please specify the type, quantity, and source of waste EEE currently processed by your company.

Type of Recyclable Material	Quantity (kg/month)	Source Name		Address, Email	Telephone / Fax
Plastics (case, cover, parts, etc.)		1) 2)	etc.		
Glass		1) 2)	etc.		
Glass with lead (CRT)		1) 2)	etc.		

Metals (electric wire, mother board, case, parts, etc.)		1) 2)	etc.		
Other ()		1) 2)	etc.		
Other ()		1) 2)	etc.		
Etc.		1) 2)	etc		

Q2 What quantity of recyclable materials recovered from used EEE or reject EEE does your company process per month? Please tell us their processing methods and buyers of the processed recyclable materials.

Type of Recyclable Material	Way of Processing	Quantity (kg/month)	Name and Location of Entity that Buys Recyclable Material
Plastics (case, cover, parts, etc.)	1) Washing 2) Crushing 3) Melting 4) Pelletizing 5) Other ()		
Glass	1) Sorting by colour/quality 2) Crushing 3) Melting 4) Other ()		
Glass with lead (CRT)	1) Sorting by quality 2) Crushing 3) Melting 4) Other ()		
Metals (electric wire, mother board, case, parts, etc.)	1) Sorting by metal type 2) Stripping plastic cover 3) Recover metal by burning 4) Recover metal by acidic liquid 5) Other ()		

Other ()				
Other ()				

Q3 What and how much residues do you generate from processing recyclable materials per month and how do you dispose of the residues?

Type of Residue	Quantity (kg/month)	Way of Disposal	Name and Location of Entity that Accepts Residue
		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	
		1) Dispose as municipal waste 2) Pay for disposal 3) Give away 4) Other ()	

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For Clarification Please Call: +2348030643008
Email: tbadul@yahoo.com

QUESTIONNAIRE FOR HEXACHLOROCYCLOHEXANE ISOMERS

Kindly note that this survey is required for developing integrated action plans for addressing POPs challenges in Nigeria and not for the purpose of regulatory sanctions. Therefore your cooperation in completing the questionnaire would be appreciated.

1. Name and address of the organization producing, marketing or using hexachlorocyclohexanes (lindane and isomers)

Name of Organization	Address

2. Name and producer/seller of the chemical, its use and availability (please attach safety data sheet if available)

S/N	Name of the HCH	Producer of the HCH	%Active ingredient	Its use	Availability

3. Names and producers/sellers of the previously used HCH, uses and reasons for not using again (please attach safety data sheet if available)

S/N	Names of previously used HCH stating years used	Producers of the chemicals	Its use	Reason for not using it again

4. Frequency, location and amount of HCH (for the past 20 years)

S/N	Name of HCH Chemical	Number of times used/year	Total amount used/year	location

9. Respondent

Name	
Department	
Position	
Telephone	
Mobile phone	
Email Address	
Signature	
Date	

**Thank you for your kind cooperation.
Please return the Questionnaire to:
The Director, Pollution Control and Environmental Health Department,
Federal Ministry of Environment,
No 14, Aguiyi Ironsi Street, Maitama, Abuja.
For Clarification Please Call: +2348030643008
Email: tbabdul@yahoo.com**

QUESTIONNAIRE FOR PERFLUOROCTANE SULPHONIC ACID (PFOS) AND ITS SALTS

Kindly note that this survey is required for developing integrated action plans for addressing POPs challenges in Nigeria and not for the purpose of regulatory sanctions. Therefore your cooperation in completing the questionnaire would be appreciated.

1. Profile of Organisation

Date			
Name of organisation			
Type of Business / Institution			
Office Address	Contact		
	Phone		
	E-mail		

2. What is the chemical used for in your organisation

- a) Aviation Hydraulic fluids
- b) Fire-fighting foam
- c) Insect baits for control of leaf-cutting ants from *Atta* spp. and *Acromyrex* spp.
- d) Insecticides for control of red imported fire ants and termites

3. Name and producer/seller of PFOS-Chemicals in-use and availability

(Please attach safety data sheet if available)

S/N	Name of the PFOS	Producer of the PFOS	% Active ingredient	Its use	Availability

8. How is the waste generated from application of this chemical managed in your organisation

- a. Deposited on the farm/factory area treatment facility b. Destroyed in a waste
- c. Sent to a landfill (name/location/address) d. Others (please specify)

9. Remarks

10. Respondent

Name	
Department	
Position	
Mobile phone	
Email Address	
Signature	
Date	

Questionnaire for Inventory of PCB-Containing Equipment

Record number:	
Date:	
Inspector:	

A	Information about the company and the site	
1	Name:	
2	Address:	
3	Address of site: (if different from A2)	
4	Phone:	
	Fax:	
	E-mail:	
5	Name/position of contact:	
6	Type of company / industry type / production at specific site:	
7	Public or private company?	
8	Location:	Industrial zone
		Other urban area
		Rural area
9	Number of staff at visited site:	>50
		10-50
		<10
10	Total number of pieces of equipment at site	Transformers
		Capacitors
		Others
		in 1985
		kWh / year

11	Total electricity now consumption at site	kWh / year
12	PCB elimination action plan in place? - action plan intended but not started? - previous disposal activities? - time frame for program?	<i>(Use a separate sheet if necessary)</i>
B	Information related to the potentially PCB-containing equipment <i>(repeat this section on a separate Section B form for each additional piece of equipment)</i>	
1	Name of manufacturer and country of origin	
2	Type (transformer, capacitor, etc.)	
3	Serial number	
4	Power rating (voltage)	
5	Date of fabrication	
6	Weight: Equipment (dry weight in kg)	
	Oil / liquid (L or kg)	
	Total weight (kg)	
	Size of equipment (length, width, height in ft or m)	
7	Name of liquid or insulating oil/coolant, etc.	
8	PCB content of liquid > 10 % PCB	
	> 0.05 % PCB or 500 ppm	
	> 0.005 % or 50 ppm	
	< 0.005 % or 50 ppm	
	No PCBs present in liquid (according to plaque)	
	PCB content not known	
	Equipment emptied of liquid	

9	PCB analysis performed? If yes, which method and when?	
10	Source of the above information (e.g., a plaque or name plate on the equipment)	
11	Operational status of equipment	In use: yes / since
		On stand-by
		Decommissioned
12	Condition of equipment	Leaking?
		Immediate action needed?
		Storage situation (e.g. open air, locked enclosure etc.)
13	Maintenance of equipment	Retrofilled?
		If yes, last retrofill when?
		By which company ?
		With which replacement liquid /insulating oil?
		Name of original liquid / insulating oil, if known
14	Other observations:	<i>(Use a separate sheet if necessary)</i>

C	Information on wastes liable to contain PCB	
1	Nature of the wastes (<i>e.g.</i> , transformer oil in drums or reservoirs)	
2	Estimated quantity	
3	Are containers leak-proof?	
4	Is the place of storage clearly marked to show the presence of PCB?	
5	Have soil or buildings been contaminated by leaking PCB? (indicate magnitude of problem if possible, <i>e.g.</i> tonnes or cubic metres of contaminated soil)	
6	Brief history of any previous remediation efforts, <i>e.g.</i> , removal of PCB-containing equipment and waste PCB for disposal (when, by whom, where to, <i>etc.</i>)	
7	Other relevant information (<i>e.g.</i> , results of any sampling and analysis already undertaken)	<i>(Use a separate sheet if necessary)</i>

D	Record of site visit	
1	Company official(s) involved Name, position, signature, date	
2	Government inspector(s) Name, position, signature, date	

NB: questionnaire adopted from the PCB Inventory Form (first issue) published by UNEP in 2002.

Explanatory Notes:

The Stockholm Convention on Persistent Organic Pollutants, in its Annex A and Article 6, requires Parties to identify, label and remove from use equipment containing polychlorinated biphenyls (PCBs), and to dispose of the waste PCB-containing materials in an environmentally sound manner.

This inventory form should assist countries in the preparation of their first nation-wide PCB inventory for the following purposes:

1. Identification of owners and locations of potentially PCB-containing equipment and wastes (section A);
2. Identification and quantification of potentially PCB-containing equipment such as transformers, capacitors, vacuum pumps, lamp ballast, and electrical cables (section B); and
3. Identification and quantification of waste PCBs or PCB-contaminated sites (section C).

Inventory of PCB-Containing Equipment

Loose copy of Section B.

(Each additional piece of equipment at the site should be recorded on a separate copy of Section B, which should then be attached to the main inventory form for the site.)

This additional Section B report relates to a piece of equipment located at:	
Record number for this site:	

B	Information related to the potentially PCB-containing equipment <i>(repeat this section for each piece of equipment)</i>	
1	Name of manufacturer and country of origin	
2	Type (transformer, capacitor, etc.)	
3	Serial number	
4	Power rating (voltage)	
5	Date of fabrication	
	Weight: Equipment (dry weight in kg)	

6	Oil / liquid (L or kg)	
	Total weight (kg)	
	Size of equipment (length, width, height in ft or m)	
7	Name of liquid or insulating oil/coolant, etc.	

8	PCB content of liquid	> 10 % PCB	
		> 0.05 % PCB or 500 ppm	
		> 0.005 % or 50 ppm	
		< 0.005 % or 50 ppm	
		No PCBs present in liquid (according to plaque)	
		PCB content not known	
		Equipment emptied of liquid	
9	PCB analysis performed? If yes, which method and when?		
10	Source of the above information (e.g., a plaque or name plate on the equipment)		
11	Operational status of equipment	In use: yes / since	
		On stand-by	
		Decommissioned	
12	Condition of equipment	Leaking?	
		Immediate action needed?	
		Storage situation (e.g. open air, locked enclosure etc.)	
13	Maintenance of equipment	Retrofilled?	
		If yes, last retrofill when?	
		By which company ?	
		With which replacement liquid /insulating oil?	
		Name of original liquid / insulating oil, if known	
14	Other observations:	<i>(Use a separate sheet if necessary)</i>	

NB: questionnaire adopted from the PCB Inventory Form (first issue) published by UNEP in 2002.

Questionnaire for POP-Pesticides and Hexachlorobenzene (HCB)

<u>State (or Town/City/Location)</u>	Contact person
--------------------------------------	-----------------------

IMPORTANT : See instructions before filling the form

SECTION 1: POPs IDENTITY

1.1	Substance name (check one of the following substances)	
	<input type="checkbox"/> Aldrin <input type="checkbox"/> Dieldrin <input type="checkbox"/> DDT <input type="checkbox"/> Endrin <input type="checkbox"/> Chlordane	<input type="checkbox"/> Hexachlorobenzene <input type="checkbox"/> Mirex <input type="checkbox"/> Toxaphene <input type="checkbox"/> Heptachlor

1.2	Generic names for product, mixture or formulation used	Percentage of active ingredient in product, mixture or formulation
-----	--	--

Comment:

SECTION 2. PRODUCTION, IMPORT AND EXPORT DATA

		Quantity per year (active ingredient)	Year	Specification
2.1	1. Produced for use	<input type="checkbox"/>		
	2. Produced as by products	<input type="checkbox"/>		
	3. Produced as impurity	<input type="checkbox"/>		
	4. Other	<input type="checkbox"/>		
		Quantity per year (active ingredient)	Year	Specification
2.2	1. Imported for use	<input type="checkbox"/>		
	2. Imported impurity	<input type="checkbox"/>		
	3. Imported for destruction	<input type="checkbox"/>		
	4. Other	<input type="checkbox"/>		

Origins:

Comment:

2.3	1. Exported for <i>use</i> <input type="checkbox"/>			
	2. Exported <i>impurity</i> <input type="checkbox"/>			
	3. Exported for destruction <input type="checkbox"/>			
	4. <i>Other</i> <input type="checkbox"/>			

SECTION 3. LOCAL USE

Use type (see instructions)	Quantity used per year	Quantity reported as: (check one only)	Year	Specific legal restriction to use			
				Yes	No	Description	Year
3.1		Active ingredient <input type="checkbox"/> Formulation <input type="checkbox"/> Mixture <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		

Comments:

--	--	--	--	--

SECTION 4. ALTERNATIVES

Use type (see instructions)	Availability and use	Chemical alternatives name/short description	Non-chemical alternative name/short description	Reasons for not selecting alternative
4.1	Available <input type="checkbox"/> Selected often <input type="checkbox"/> Selected rarely <input type="checkbox"/> Never selected <input type="checkbox"/>			Cost <input type="checkbox"/> Effectiveness <input type="checkbox"/> Other <input type="checkbox"/>
4.2	Available <input type="checkbox"/> Selected often <input type="checkbox"/> Selected rarely <input type="checkbox"/> Never selected <input type="checkbox"/>			Cost <input type="checkbox"/> Effectiveness <input type="checkbox"/> Other <input type="checkbox"/>
4.3	Available <input type="checkbox"/> Selected often <input type="checkbox"/> Selected rarely <input type="checkbox"/> Never selected <input type="checkbox"/>			Cost <input type="checkbox"/> Effectiveness <input type="checkbox"/> Other <input type="checkbox"/>

Comment :

6.2	Water Yes <input type="checkbox"/> No <input type="checkbox"/>	Agricultural pest control <input type="checkbox"/> Non-Agricultural pest control <input type="checkbox"/> Industrial activity <input type="checkbox"/> Waste disposal <input type="checkbox"/> Other <input type="checkbox"/>	_____	_____
6.3	Soil Yes <input type="checkbox"/> No <input type="checkbox"/>	Agricultural pest control <input type="checkbox"/> Non-Agricultural pest control <input type="checkbox"/> Industrial activity <input type="checkbox"/> Waste disposal <input type="checkbox"/> Other <input type="checkbox"/>	_____	_____

SECTION 7. POPULATION EXPOSURE

	Are humans exposed to the POP	Exposure type	Total estimated levels	Comments:
7.1	Yes <input type="checkbox"/> No <input type="checkbox"/>	Occupational <input type="checkbox"/> Consumer <input type="checkbox"/> Residential <input type="checkbox"/> Accident/Poisoning <input type="checkbox"/> Other (please specify) <input type="checkbox"/>	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____

SECTION 8. RELEASE AND EXPOSURE MONITORING

	Monitoring type	Short description (add separate page if needed)		
8.1	Ambient air Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.2	Ground water Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.3	Surface water Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.4	Point air Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.5	Point water Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.6	Soil Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.7	Ecosystem Yes <input type="checkbox"/> No <input type="checkbox"/>			

8.8	Human Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.9	Agricultural commodity Yes <input type="checkbox"/> No <input type="checkbox"/>			
8.10	Food products Yes <input type="checkbox"/> No <input type="checkbox"/>			

Comments

Section 9 REGULATORY ACTIONS TAKEN TO CONTROL THE USE OF THE POP

Action type to control the manufacture, importation distribution in commerce, use or disposal	Short description (add separate page if needed)	Reference
9.1 Public health standards or regulations		
9.2 Occupational standards or regulations		
9.3 Environmental standards or regulations		
9.4 Guidance Document		
9.5 Voluntary programme		
9.6 Other (e.g., Governmental order, international agreements)		
9.7 No action		

Comments:

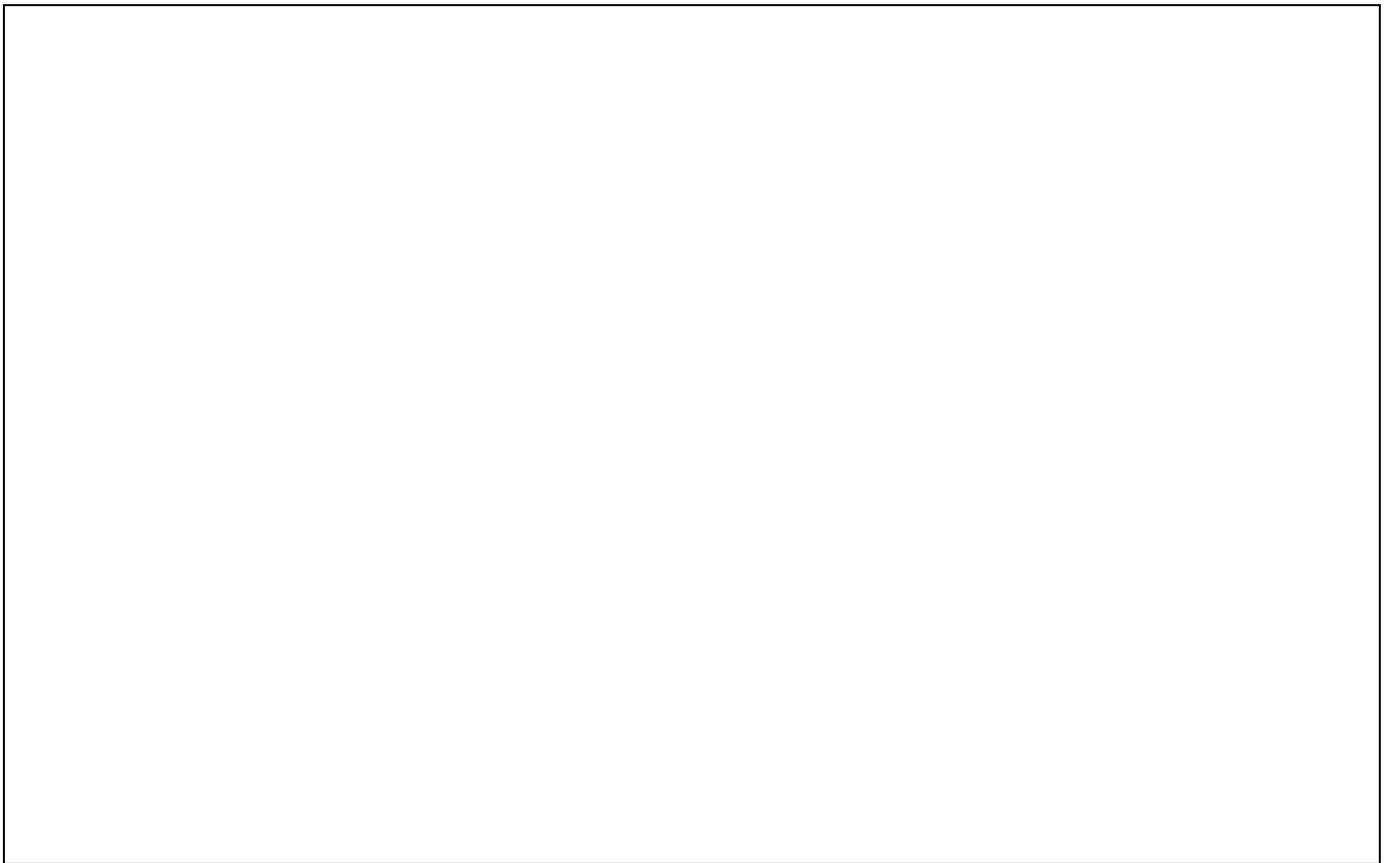
SECTION 10. REPORT ON CASE STUDIES ON POPs-RELATED PROBLEMS IN YOUR COUNTRY
(Please provide a copy of the full report if available)

		Short Description (add separate page if needed)		
10.1	Site location			
10.2	Human activities in which the substance is used or generated			
10.3	Pathways and distribution of POP			
10.4	Environmental Impacts			
10.5	Human health impact			
10.6	Economic value of the activities at the national level, (poverty alleviation, health improvement)			
10.7	Conclusions			

SECTION 11. DO YOU HAVE A NATIONAL ACTION PLAN TO CONTROL THE USE AND RELEASES OF THIS POP?

No Yes Planned Implemented

Please provide a short description (add separate page if needed)



{NATIONAL/REGIONAL ACTION PLANS are programmes designed to control, reduce or eliminate the releases of POPs. They may include regulatory actions and other actions aiming at the phasing out of one or more POPs and/or promoting the use of alternative substances or techniques.

NB: Questionnaire adapted from “Preparation of a National Environmentally Sound Management Plan for PCBs and PCB-Contaminated Equipment”; Training Manual Secretariat of the Basel Convention (2003)

Annex X: Import of PBDEs from Nigeria Customs Services (NCS Data)

TETRA PBDE

	Custom Office	Reg Number	Reg. Date	Importer	Item Nbr	HS Code	HS Description	Mass(KG)	Country of Origin	Country of Supply
	APAPA PORT	C1283	08/01/2014	00421656-0001 - WEST AFRICAN RUBBER PRODUCTS (NIG.)	1\1	2909300000	Aromatic ethers and their halogenated.	34,400	Hong Kong	Hong Kong
	APAPA PORT	C1283	08/01/2014	00421656-0001 - WEST AFRICAN RUBBER PRODUCTS (NIG.)	1\1	2909300000	Aromatic ethers and their halogenated.	34,400	Hong Kong	Hong Kong
	APAPA PORT	C15764	29/03/2012	RC93786 - ANOCHEMICAL COSMETICS INDUSTRIES LTD	1\1	2909300000	Aromatic ethers and their halogenated...	6,187	China	China
	APAPA PORT	C38341	27/06/2013	01480534-0001 - APEX PAINTS LTD.	1\1	2909300000	Aromatic ethers and their halogenated.	19,520	China	China
	KIRIKIRI LIGHTER TERMINAL CMD.	C5658	12/04/2011	RC5394 - CYBELE COMESTICS LTD	1\1	2909300000	Aromatic ethers and their halogenated.	672	China	
	MUHAMMED MURTALA CARGO	C11178	14/05/2012	A01798 - PLATINUM TECH	1\1	2909300000	Aromatic ethers and their halogenated.	31	France	France
	PORT HARCOURT(3) Onne	C23637	04/07/2014	02268331-0001 - LBENERG LIMITED	1\1	2909300000	Aromatic ethers and their halogenated.	32,480	Taiwan, Province of China	Taiwan, Province of China
	PORT HARCOURT(3) Onne	C23637	04/07/2014	02268331-0001 - LBENERG LIMITED	1\1	2909300000	Aromatic ethers and their halogenated.	32,480	Taiwan, Province of China	Taiwan, Province of China
	TIN CAN ISLAND	C69326	16/06/2011	RC93786 - ANOCHEMICAL COSMETICS INDUSTRIES LTD	1\1	2909300000	Aromatic ethers and their halogenated...	4,560	China	China

Annex XI: Number of Registered Vehicles in Nigeria from 2004 to 2010 (NBS Data)

1: NUMBER OF MOTOR VEHICLE REGISTERED BY TYPE, 2004 – 2005

STATE	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle
Abia	3372	2626	177	-	36712	2489	1964	136	-	36773
Adamawa	na	na	na	na	na	na	na	na	na	na
Akwa Ibom	4,556	241	37	22	29,949	4,970	264	114	40	22,124
Anambra	na	na	na	na	na	na	na	na	na	na
Bauchi	na	na	na	na	na	na	na	na	na	na
Bayelsa	450	180	35	38	450	680	300	58	121	700
Benue	na	na	na	na	na	na	na	na	na	na
Borno	na	na	na	na	na	na	na	na	na	na
Cross River	842	na	na	na	3,855	1,037	na	na	na	3,453
Delta	na	na	na	na	na	na	na	na	na	na
Ebonyi	2,174	433	256	94	9,754	967	207	109	53	2,379
Edo	4,560	900	1,080	240	1,216	4,925	1,025	1,136	450	1,354
Ekiti	na	na	na	na	na	na	na	na	na	na
Enugu	na	na	na	na	na	na	na	na	na	na
Gombe	117	77	20	na	282	158	99	48	na	239
Imo	1,733	608	61	60	7,501	1,432	532	45	71	8,736
Jigawa	na	na	na	na	na	na	na	na	na	na
Kaduna	3,312	1,013	-	-	6,505	3,313	402	na	-	1,084

Kano	29,823	0	na	59	na	15,654	na	na	na	na
Katsina	1,449	245	165	125	6,471	1,604	597	173	107	5,981
Kebbi	3,044	2,860	3,219	2,341	16,268	9,570	6,523	3,549	3,021	16,971
Kogi	na	na	na	na	na	na	na	na	na	na
Kwara	3,069	1,417	236	na	4,348	5,457	2,518	420	-	11,730
Lagos	57,826	6,494	1,910	1,146	11,549	70,496	7,150	1,972	1,460	8,022
Nassarawa	na	na	na	na	na	na	na	na	na	na
Niger	1,868	1,468	214	-	2,126	2,210	1,746	302	-	2,472
Ogun	na	na	na	na	na	na	na	na	na	na
Ondo	na	na	na	na	na	na	na	na	na	na
Osun	2,293	408	42	114	1,658	3,355	782	55	83	4,408
Oyo	587	70	85	31	400	1,681	295	54	176	2,596
Plateau	940	496	19	806	2,114	4,832	193	32	135	3,121
Rivers	na	na	na	na	na	na	na	na	na	na
Sokoto	4,661	1,331	1,062	360	14,580	1,217	258	128	274	3,854
Taraba	409	77	9	11	3,161	459	36	11	9	3,019
Yobe	1,350	221	98	177	9,580	1,618	414	80	251	10,210
Zamfara	624	366	307	-	3,756	668	250	134	-	6,465
FCT	na	na	na	na	na	na	na	na	na	na

2: NUMBER OF MOTOR VEHICLE REGISTERED BY TYPE, 2006 – 2007

STATE	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle
Abia	2969	1873	217	-	11895	5681	2890	562	-	46743

Adamawa	na	na	na	na	na	na	na	na	na	na
Akwa Ibom	1,987	207	28	20	10,915	1,459	146	46	22	17,923
Anambra	4,130	5,778	125	173	20,457	7,455	5,029	29	683	30,911
Bauchi	na	na	na	-	na	na	na	na	na	na
Bayelsa	800	500	83	157	1,205	2,000	700	102	270	1,954
Benue	na	na	na	-	na	na	na	na	na	na
Borno	na	na	na	na	na	na	na	na	na	na
Cross River	248	-	-	-	4,604	402	-	-	5,064	-
Delta	na	na	na	-	na	na	na	na	na	na
Ebonyi	316	172	17		4,480	198	80	80		1,747
Edo	6,050	1,050	450	350	1,205	5,855	1,485	225	225	948
Ekiti	1,825	339	-	-	4,257	1,789	213	-	-	4,540
Enugu	na	na	na	-	na	na	na	na	na	na
Gombe	167	84	53	-	648	211	115	68	-	114
Imo	392	111	21	21	3,075	55	169	14	23	3,383
Jigawa	na	na	na	-	na	na	na	na	na	na
Kaduna	1,094	137	-	-	176	1,847	6,376	-	-	6,376
Kano	-	-	-	-	-	5,953	901	-	125	-
Katsina	994	330	64	59	2,412	2,110	128	226	146	4,029
Kebbi	3,941	3,838	1,061	1,218	16,129	3,976	4,872	1,321	1,324	14,561
Kogi	na	na	na	-	na	na	na	na	na	na
Kwara	3,427	1,582	264	-	4,834	2,655	1,226	204	-	3,825
Lagos	118,099	14,775	4,775	3,616	11,846	156,858	17,240	7,195	6,149	18,906
Nassarawa	na	na	na	-	na	na	na	na	na	na
Niger	2,340	1,987	337	-	2,556	2,600	1,727	520	-	3,216
Ogun	2,403	58	27	22	463	2,816	130	63	32	1,892

Ondo	2,260	786	34	107	4,207	3,001	718	81	37	3,133
Osun	2,881	784	11	82	5,100	3,303	887	8	7	8,818
Oyo	1,241	276	31	74	1,671	1,999	522	86	107	2,250
Plateau	5,269	2,115	23	1,631	5,438	5,951	3,009	21	339	7,315
Rivers	na	na	na	-	na	na	na	na	na	na
Sokoto	678	219	86	182	2,061	2,336	389	6	528	6,230
Taraba	na	na	na	-	na	na	na	na	na	na
Yobe	1,801	375	91	140	13,850	1,925	481	112	300	14,260
Zamfara	784	118	74	-	4,306	893	215	108	-	7,634
FCT	na	na	na	-	na	na	na	na	na	na

Source: State Statistical Agencies

Note: - = Nil

3: NUMBER OF MOTOR VEHICLE REGISTERED BY TYPE, 2008

STATE	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle
Abia	na	na	na	na	na
Adamawa	na	na	na	na	na
Akwa Ibom	na	na	na	na	na
Anambra	na	na	na	na	na
Bauchi	3,125	835	265	-	8,231
Bayelsa	na	na	na	na	na
Benue	na	na	na	na	na
Borno	na	na	na	na	na

Cross River	na	na	na	na	na
Delta	na	na	na	na	na
Ebonyi	na	na	na	na	
Edo	na	na	na	na	na
Ekiti	1,516	304	62	157	3,213
Enugu	na	na	na	na	na
Gombe	227	256	63	-	3,745
Imo	na	na	na	na	na
Jigawa	na	na	na	na	na
Kaduna	2,980	98	18	179	951
Kano	na	na	na	na	na
Katsina	5,210	1,050	482	162	15,748
Kebbi	na	na	na	na	na
Kogi	na	na	na	na	na
Kwara	na	na	na	na	na
Lagos	na	na	na	na	na
Nassarawa	na	na	na	na	na
Niger	na	na	na	na	na
Ogun	na	na	na	na	na
Ondo	na	na	na	na	na
Osun	3,440	1,190	16	-	13,760
Oyo	2,125	618	84	115	2,115
Plateau	1,800	365	144	84	768
Rivers	na	na	na	na	na
Sokoto	na	na	na	na	na
Taraba	na	na	na	na	na

Yobe	1,781	333	110	242	7,418
Zamfara	na	na	na	na	na
FCT	na	na	na	na	na

Source: State Statistical Agencies

4: NUMBER OF MOTOR VEHICLE REGISTERED BY TYPE, 2009 – 2010

STATE	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle	Saloon cars	Buses	Lorry/Trailers	Other Vehicles	Motor Cycle
Abia	1,009	1,473	86	159	1,663	862	464	66	182	1,669
Adamawa	na	na	Na	na	na	Na	na	na	na	Na
Akwa Ibom	na	na	Na	na	na	Na	na	na	na	na
Anambra	na	na	Na	na	na	Na	na	na	na	na
Bauchi	2,971	881	369	-	6,559	2,454	900	600	-	9,93
Bayelsa	na	na	Na	na	na	Na	na	na	na	na
Benue	na	na	Na	na	na	Na	na	na	na	Na
Borno	na	na	Na	na	na	Na	na	na	na	Na
Cross River	Na	na	Na	na	na	Na	na	na	na	na
Delta	Na	na	Na	na	na	Na	na	na	na	Na
Ebonyi	na	na	Na	na	na	Na	na	na	na	na
Edo	na	na	Na	na	na	Na	na	na	na	na
Ekiti	1,152	155	51	20	2,652	1,252	255	57	167	1,728
Enugu	na	na	Na	na	na	Na	na	na	na	na
Gombe	302	156	66	-	3,626	2,595	214	62	81	17567

Imo	na	na	Na	na	na	Na	na	na	na	Na
Jigawa	na	na	Na	na	na	Na	na	na	na	Na
Kaduna	3,591	102	21	187	1,001	3,903	119	22	227	1,116
Kano	na	na	Na	na	na	Na	na	na	na	Na
Katsina	1,774	261	60	27	2,912	1,984	551	132	74	13,813
Kebbi	na	na	Na	na	na	Na	na	na	na	Na
Kogi	na	na	Na	na	na	Na	na	na	na	Na
Kwara	na	na	Na	na	na	Na	na	na	na	Na
Lagos	na	na	Na	na	na	Na	na	na	na	Na
Nassarawa	na	na	Na	na	na	Na	na	na	na	Na
Niger	na	na	Na	na	na	Na	na	na	na	Na
Ogun	na	na	Na	na	na	Na	na	na	na	Na
Ondo	na	na	Na	na	na	Na	na	na	na	Na
Osun	3,106	1,774	12	4	10,564	2,902	1,535	52	15	14,750
Oyo	2,003	706	109	107	5,107	4,539	2,255	178	146	15,165
Plateau	3,012	342	200	112	1,000	2,851	170	176	108	1,220
Rivers	na	na	Na	na	na	na	na	na	na	Na
Sokoto	na	na	Na	na	na	na	na	na	na	Na
Taraba	na	na	Na	na	na	na	na	na	na	Na
Yobe	2,050	600	109	250	16,118	2,535	820	212	270	20,292
Zamfara	na	na	Na	na	na	na	na	na	na	na
FCT	na	na	Na	na	na	na	na	na	na	na

Source: State Statistical Agencies