ENVIRONMENTAL COUNCIL OF ZAMBIA

National Profile to Assess the Chemicals Management Infrastructure in Zambia

Towards the Implementation of the Recommendations of Chapter 19 of Agenda 21 on the Environmentally Sound Management of Toxic Chemicals

Prepared with the assistance of the United Nations Environment Programme (UNEP) with funding from the Global Environmental Fund (GEF)

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Foreword

The development of the National Profile to assess the Chemicals Management Infrastructure in Zambia followed the recommendation of the Intergovernmental Forum on Chemical Safety (IFCS) which was established as a follow up to the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992. At this conference, Heads of States or Governments adopted "Agenda 21", a document outlining responsibilities towards the achievement of sustainable development.

Chapter 19 of Agenda 21 deals with the environmentally sound management of chemicals as well as the illegal international traffic in toxic and dangerous products. The six programme areas on which governments were encouraged to base their actions and priorities are:

- Expanding and accelerating international assessment of chemical risks;
- Harmonising of classification and labeling of chemicals;
- Information exchange on toxic chemicals and chemical risks;
- Establishment of risk reduction programmes;
- Strengthening of national capabilities and capacities for the management of chemicals; and
- Prevention of illegal international traffic in toxic and dangerous products.

Zambia participated in the Rio Conference and the Stockholm Conference which established the IFCS. IFCS is a forum through which governments exchange information on activities being undertaken to safe guard human health and the environment from chemicals, in spite of benefits that the chemicals contribute to the enhancement of the livelihood of the world.

The process of developing the National Profile falls under Programme Area E of Chapter 19, titled "Strengthening National Capabilities and Capacities for the Management of Chemicals".

Zambia was identified as a pilot project country for the development of a National Profile following the activities that she had undertaken in the area of chemicals management before and after the passing of the Environmental Protection and Pollution Control Act (EPPCA) No. 12 of the 1990.the EPPCA established the Environmental Council of Zambia (ECZ), a body mandated to co-ordinate and implement all issues dealing with natural resources conservation.

At the inaugural meeting held on1st September, 1995, it was agreed that the preparation of the National Profile was necessary for the following reasons:

- It would be an authoritative document to serve as a basis for further efforts to strengthen the national system for the management of chemicals through the involvement of all concerned parties.

- It would facilitate improvements in the efficiency of government operations by:

    - providing practical information on on-going programmes and activities in the country which are concerned with the management of chemicals;
    - establishing a process which can facilitate exchange of information and dialogue among

government ministries concerned with the sound management of chemicals, and enhance co-operation and co-ordination among government ministries;
- improving and strengthening national decision making capabilities related to the management of chemicals; and
- facilitating the exchange of information and dialogue between parties in and outside of government such as industry, labour and grass-roots organizations.

- It would determine what social impacts chemicals have; and, thereby:

  - provide knowledge and understanding of potential problems caused by chemicals to workers, the general public and the environment;
  - protect workers the general public and the environment;
  - provide a basis for improved worker, public and environment protection as a consequence of improved knowledge and understanding of potential problems and alternative means for addressing them; and
  - provide a basis for improved awareness of chemical risks among workers and the public, and help to develop a national safety culture.

- It would assess the trade in chemicals; and, thereby:
  - provide information on chemicals traders;
  - provide information on whether chemicals produced, imported and exported are supporting economic goals and are not creating economic burdens through health, and environmental problems;
  - improve awareness of potential pesticide residue problems and other toxic substances which could limit opportunities for agriculture;
  - improve productivity of worker safety; and
  - improve safe transportation, handling and storage of chemicals.

- It would provide effective participation in international activities, thereby:

  - ease compliance with international and regional reporting schemes such as reporting to the Commission on Sustainable Development and the preparation of background documents for international meetings and workshops;
  - facilitating communication among countries which will permit improved learning from others' experience and lead to increased co-operation (e.g. on a regional basis); and
  - provide a basis for identifying needs for technical and financial assistance for mobilising assistance from international and bilateral sources.

- It would be incorporated in education and training programmes; and, thereby:

  - improve information accessibility by research and development agencies, and
  - facilitate incorporation into the curricula in learning institutions.

Zambia was identified in 1995 as a pilot project country for the development of a National Profile to assess the national infrastructure for the management of chemicals. The Secretariat is based at the Environmental Council of Zambia (ECZ) which is co-ordinating the project. The inaugural meeting established a co-ordinating team with representation from the following institutions:

- Chemical Society of Zambia

- Copperbelt University – School of Technology
- Engineering Institute f Zambia
- ECZ –Pesticides and Toxic Substances Unit (Project Co-ordinator)
- Ministry of Agriculture, Food and Fisheries- Policy and Planning
- Division/Department of Veterinary and Tsetse Control Services
- Ministry of Communications and Transport
- Ministry of Environment and Natural Resources- Department of Natural Resources
- Ministry of Finance and Economic Development- ZRA / Customs & Excise
- Ministry of Health- Food and Drugs Control Board
- Ministry of Labour and Social Security- Factories Department
- National Council for Scientific Research- Livestock and Pest research Centre
- University of Zambia- Department of Chemistry
- Zambia Agrochemicals Association
- Zambia Association of Chambers of Commerce and Industry
- Zambia Consolidated Copper Mines Ltd- Group Environmental Services
- Zambia National Farmers' Association

The National Co-ordinating Committee (NCT) met every three weeks in the initial stages. Members submited relevant data from their institutions to the Secretariat for inclusion in the National Profile. The Secretariat consolidated the data and the NCT evaluated it at subsequent meetings. Sub-committees were formed where necessary to deal with selected/specified areas in detail to ensure completeness of the document.

This final report is a result of collaborative effort from the various institutions mentioned and it is our hope that it will provide a credible background document to facilitate improved chemicals management in Zambia.

Director's signature and photo (perhaps yiou'ed prefer the foto on top??)

Edward H Zulu
Director- Environmental Council of Zambia

Acronyms/Abbreviations.

ASP	African Stockpile Project
BAT	Best Available Technologies
BEP	Best Environmental Practices
CBE	Citizens for a Better Environment
CBU	Copperbelt University
CHC	Chemical Hazard Communication
CDC	Curriculum Development Centre
CIS	Chemical Information System
COMESA	Common Market for Eastern and Southern Africa
CSO	Central Statistical Office
CSZ	Chemical Society of Zambia
ECA	Economic Commission for Africa
ECETOC	European Centre for Ecotoxicology of Chemicals
ECZ	Environmental Council of Zambia
EIA	Environmental Impact Assessment
EIS	Environmental Information System
ELMS	Environment and Land Management
EPA	Environmental Protection Agency, USA
EPPCA	Environmental Protection and Pollution Control Act No. 12 of 1990
ESZ	Entomological Society of Zambia
EU	European Union
FAO	Food and Agriculture Organisation
GDP	Gross domestic Product
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
IAEA	International Atomic Energy Agency
ICSC	International Chemical Safety Cards
IFCS	Inter-governmental Forum on Chemical Safety
ILO	International Labour Organisation
IOMC	Inter-Orgarnisation Programme for the Sound Management of Chemicals
IPCS	International Programme on Chemical Safety
IRLCO-CSA	International Red Locust Control Organisation- Central and Southern Africa
LPRC	Livestock and Pest Research Centre
MAC	Ministry of Agriculture and Co-operatives
MCTI	Ministry of Commerce Trade and Industry
MEWD	Ministry of Energy and Water Development
MLGH	Ministry of Local Government and Housing
MLSS	Ministry of Labour and Social Security
MMMD	Ministry of Mines and Minerals Development
MoH	Ministry of Health
MSTVT	Ministry of Science, Technology, and Vocational Training
MTENR	Ministry of Tourism, Environment and Natural Resources
NEPAD	New Economic Partnership for African Development
NIP	National Implementation Plan
OHSRB	Occupational Health and Safety Research bureau
OHSSD	Occupational Health and Safety Services Department
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans

POPs	Persistent Organic Pollutants
PTS	Pesticides and Toxic Substances
SADC	Southern African Development Community
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework on Climate Change
UNIDO	United Nations Industrial Development Organisation
UNITAR	United Nations Institute for Training and Research
WHO	World Health Organisation
ZACA	Zambia Consumers Association
WCFCB	Workmen's Compensation Fund Control Board
WSSD	World Summit on Sustainable Development

Executive Summary of the National Profile

Introduction

Towards the end of 1995, following a successful visit by a United Nations Institute for Training and Research (UNITAR) representative, Zambia was identified as one of four (04) countries to participate in a pilot project to prepare a National Profile on chemicals management.

Prior to the UNITAR representative's visit, Zambia had already instituted a firm foundation for future chemicals management programmes by enacting the Environmental Protection and Pollution Control Act (EPPCA); and through this Act, the Environmental Council of Zambia (ECZ), a body which is mandated to harmonise and co-ordinate activities both in and outside of government, relating to environmental pollution control.

The precursor to the UNITAR Pilot Project were the recommendations of the Rio and Stockholm Conferences drawing particularly on Chapter 19 of Agenda 21 aimed at achieving the sound management of chemicals by 2000.

Member countries of the UN who adopted Agenda 21 committed themselves to establish firm chemical management structures in their countries as indicated in their resolve that "A globally harmonized hazard classification and compatible labelling system, including national safety data sheets and easily understandable symbols, be available, if feasible by 2000".

The development of a harmonised chemical hazard communication (CHC) system coupled with increased widespread dissemination of awareness raising materials to all users of chemicals will contribute to significant reductions in anticipated adverse chemical hazard impacts.

In order to facilitate the institution of proper chemical management, the government under ECZ embarked on a project aimed at harmonising local CHC elements with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Further, Agenda 21 encourages all member countries to implement the GHS by 2008. Many African countries have expressed a desire to implement the GHS.

Several National Implementation Plans (NIPs) for Persistent Organic Pesticides (POPs) are currently underway in the SADC region. It was felt that the review of the Zambian National Profile developed and published in 1996 would benefit from the activities under the NIPs projects particularly more so as activities designed to facilitate the implementation of the Stockholm Convention with respect to the subject of POPs of international concern would be treated in a coherent manner.

Objectives and Anticipated Benefits

The main purpose of preparing the National Profile (NP) was to document all existing structures relating to chemicals management in Zambia, and to determine how the structures could be strengthened for the benefit of the whole nation. Specifically, the National Profile aimed to:

- serve as a basis for further efforts to strengthen the national system for the management of chemicals through the involvement of all concerned parties;

- facilitate the improvements in the efficiency of government operations;
- determine the social impacts resulting from chemicals use;
- assess the trade in chemicals;
- provide effective participation in international activities; and
- incorporate chemicals management in education and training programmes.

The benefits that would be derived from the National Profile were; to:

- provide practical information on on-going programmes and activities in the country which are concerned with the management of chemicals;
- facilitate exchange of information and dialogue among such government ministries as Industry, Labour and Non-Governmental Organizations (NGOs) concerned with the sound management of chemicals;
- enhance co-operation and co-ordination among government ministries;
- strengthen national decision making capabilities related to the management of chemicals;
- provide knowledge and understanding of potential problems caused by chemicals to workers, the general public and the environment;
- lead to the protection of workers, the general public and the environment;
- improve awareness f chemicals risks among workers and the public and help to develop a national safety culture;
- provide information to chemicals traders;
- improve transportation, handling and storage of chemicals;
- ease compliance with international and regional reporting schemes;
- facilitate communication among countries which will permit improved learning from others' experiences, and lead to increased co-operation;
- identify needs for technical and financial assistance for mobilising assistance available from international and bilateral sources; and improve accessibility of information on chemical management by research and development agencies.

Preparation of the National Profile

A National Co-ordinating Team (NCT) was established at the inaugural meeting held in September, 1995 to prepare the National Profile. The team consisted of members from a wide cross-section of interest groups, stakeholders, NGOs, professional bodies, research institutions, academia and other bodies in commerce, labour and industry (Annex 1A.1). The NCT, through its own ambit and those of sub-committees created in-situ by the NCT, and with co-ordination through ECZ, gathered, collected and collated all data and compiled the same into a draft National Profile. The draft National Profile was later subjected to a Peer Review Workshop for which the participants (Annex 1A.2) were drawn from local and international organisations.

Preparation of the 2nd Edition of the NP was undertaken primarily as part of the continuous review process recommended in 1996, and also as part of the Zambian National Implementation Plans (NIPs) for Persistent Organic Pollutants (POPs) project, working in collaboration with four working groups, viz. DDT, Agricultural POPs, Polychlorinated biphenyls (PCBs) and polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). A team of Consultants was engaged to carry out the basic information gathering and up-dating of the 1st edition of the NP in line with the UNITAR Companion Guidance Note on "Preparing/Updating a National Profile as Part of a Stockholm Convention Implementation Plan" (Working Draft, January 2003). The Draft

2nd Edition NP Report was peer reviewed by the NIPs Bureau (Administrative organ of the NIPs Project, Annex 1B).

Summary of the National Profile

National Background Information

Zambia is a landlocked country situated in the southern part of Africa between 8 – 18^0 South latitude and 22 – 34^0 east latitude, with a land area of 752, 614 square kilometers. Zambia has a democratic government with an elected Executive President. The population of Zambia is estimated to be over 9.8 million people, of whom 64.9% live in the rural areas. The growth rate in the 2000 census was 2.9 per cent per annum with fertility levels of 6 per woman. The life expectancy was 48 years and 52 years respectively for males and females. English is the official language; and there are seven major languages comprising 74 local dialects.

The major economic sectors are mining and quarrying, industrial and manufacturing, and agriculture which contribute 7.0%, 26.7% and 18.0% respectively to the Gross Domestic Product (GDP). The major minerals being mined are Copper, Cobalt, Zinc, Lead and Coal. Other mining activities include Limestone and Precious Stones. The main agricultural crops grown are maize, sweet potatoes, groundnuts, sorghum, millet, soya beans, mixed beans, sunflower and paddy rice.

Chemicals (including POPs) Production, Import, Export and Use

The chemical needs of industry and other manufacturing entities are met through imports. The major sources of chemicals imports are South Africa followed by United Kingdom and Zimbabwe, and India, Japan and China. Among the waste generated from industrial, manufacturing and agricultural activities are tailings from concentrator/slag/neutralized residue from copper, solid neutralized cake, acid calcine slurry, asbestos cement and tannery (chrome sludge) wastes.

Pesticide POPs have been in use in Zambia for the control of termites and other soil pests in maize, sugarcane, wheat; and, in the construction industry. All of the POPs used in the agriculture, consumer and industry sectors on the local market are imported.

No chemical wastes are imported into the country for processing or disposal.

Priority Concerns Related to Chemicals (including POPs) Production, Import, Export and Use

The majority of mining, manufacturing and agricultural activities are located along the line of rail. The priority areas related to chemicals (including POPs) production, import, export, and use include air pollution of inland and ground waters, soil pollution; pesticide residues in foods; heavy metals in food; storage and disposal of obsolete chemicals; treatment of hazardous waste; control of chemicals imports; emergency preparedness, occupational health and safety of workers in the agricultural, industrial and transport sectors, as well as the protection of human health and the environment. Many of the afore-mentioned concerns are being continually addressed by ECZ through the EPPCA and relevant regulations in conjunction with the Ministries of Health; Labour and Social Security; Mines and Minerals Development, and Energy. Of particular importance is the inadvertent importation and subsequent local use of electric power transmission and distribution equipment that use oils which contain PCBs.

There are other examples of other non-Stockholm POPs that are directly or indirectly imported into the country, and are therefore in common use in Zambia. These include chlordecone, endosulphan, phthalates and polybrominated diphenyl ethers (PBDEs).
The afore-mentioned are candidate chemicals for urgent consideration under the PIC procedures.

Legal Instruments and Non-Regulatory Mechanisms for (or Relevant to) Managing Chemicals, including POPs

A number of legal instruments have been enacted to control the use of chemicals and reduce the risks to humans and the environment. Among these are the EPPCA No.12 of 1990 which covers all aspects of air and noise pollution, waste management, water pollution, pesticide and toxic substances, ionizing radiation and natural resources. The Food and Drugs Act; the Pharmacy and Poisons Act which cover chemical products meant for human consumption as well as animal and human health care and; the Factories Act which protects workers from adverse effects of chemicals in the work place. The Natural Resources Conservation Act deals with the management of chemicals. The Water Act seeks to protect water resources. The Weeds Control Act controls the import, export, distribution, disposal, purchase and sale of pesticides for the control of weeds. The Standards Act of 1994 controls the quality and standardisation of products, while the Fertilisers Act provides for the control of the importation, use, storage and disposal of fertilisers.

There are overlaps between various Acts such as the Pharmacy and Poisons Act and EPPCA on registration of chemicals; between the Local Government Act of 1991, Noxious Weeds Act, Plants, Pests and diseases Act and the Public Health Act in the control of pests and diseases which need to be rectified in order to streamline law enforcement. Work is currently underway to amend, as necessary, certain parts of the law as they apply to the safe use and sound management of chemicals (including POPs), especially so as to enhance the capacity for enforcement of the law.

Ministries, Agencies and other Institutions Managing (or Related to Managing) Chemicals, including POPs

Several government ministries (Agriculture and Co-operatives; Health; Labour and Social Security; Local Government and Housing; Education, and Science and Technology) are entrusted with the responsibility of ensuring that laws, regulations and operational guidelines are in place to protect the environment and human beings from adverse effects of poor chemicals management. Specific aspects of the chemicals' life cycles from production, import/export, storage, through transportation, distribution/marketing, use and handling, disposal and disaster preparedness are handled by various Government ministries and agencies.

Overlaps in the authority and mandates of government ministries and agencies in the management of chemicals in certain areas e.g. public health (Health/Local Authorities) exist, hence the need for harmonization of responsibilities at the government level. There is a need to strengthen capacity for enforcement of laws through the provision of adequate funding to government agencies; improvements in management capacity; and provision of adequate equipment, transport and staff remuneration.

Activities of Industry, Public Interest Groups and Research Sector Relevant to POPs Management

The multi-sectoral nature of the chemical field dictates that key players from all interest groups must collaborate in a multi-partite oriented co-ordination effort that will guarantee the achievement of maximum benefit. NGOs, including professional bodies, workers' and employers' organizations as well as environment supplement government efforts by providing expertise in matters relating to chemicals management.

Inter-Ministerial Commissions and Co-ordinating Mechanisms

The fore-going has resulted in the creation of inter/multi-sectoral management boards to administer the enforcement of Acts relating to chemicals management. The boards have their members/directors drawn from both government and NGOs.

Data Access and Use

While it is generally accepted that reliable information is a key factor in facilitating a systematic development, it is essential to provide the necessary infrastructure for effective capture, processing, storage and dissemination of this vital resource. Prior to the establishment of the Environmental Council of Zambia, the Zambia Natural Resource Data Bank (ZNRDB) was established; and, has hitherto been the main source of information on natural resource conservation. Within the ZNRDB, the Environmental Information System (EIS) was later created and maintained by the ECZ. The ECZ has an Information Technology Department generally referred to as the Data bank. The unit was established in 1992 in order to address issues and concerns related to data management and storage. The data bank, developed in 1997, is still being updated to include information on POPs of concern as well as hazardous waste streams, and has assisted the Pesticides and Toxic Substances (PTS) Unit to development a National Chemicals Inventory Register, and continues to assist in developing NIPs Databases for DDT, Dioxins and Furans, Pesticides POPs and PCBs.

The development of databases outlined above has been used to produce the NIPs Draft Inventory Report, in the identification of gaps, and will form a strong basis for use in setting priorities for the subsequent elimination of POPs use in Zambia.

The Central Statistical Office (CSO) manages information regarding imports, exports, production in various sectors of the economy, and the census. Information systems for chemicals management purposes exist at institutions in government line ministries.

Local information relating to chemical management from import/production, through industrial transport, accidents, to registers of various categories of chemicals is kept at ECZ and other departments in relevant line ministries. The same agencies keep chemicals management databases obtained from international sources. Most of the databases are isolated, with very little co-ordination and harmonization.

A fair amount of qualitative information is available for use in the assessment and possible reduction of chemical risk. Information on the monitoring of the use of chemicals is located at ECZ; Ministries of Agriculture and Co-operatives; Labour and Social Security-Occupational Safety and Health Services Department; Health, and Commerce Trade and Industry. Registers of chemical products, companies, and nature of waste discharges are found at these ministries. Information on

chemicals production and trade is located at the Central Statistical Office.

Literature from international organizations such as the International Programme on Chemical Safety (IPCS), International Labour Organisation (ILO), International Atomic Energy Agency (IAEA), Food and Agriculture Organisation (FAO), United States Environmental Agency (EPA), European Centre for Ecotoxicology of Chemicals (ECOTOC), United Nations Industrial Development Organisation (UNIDO), United Nations Environment Programme (UNEP), and the World Health Organisation (WHO) is available from Government ministries and other organizations in the country.

Technical Infrastructure

The technical infrastructure necessary to ensure adequate capacity to undertake various tasks for chemical analysis through research and development is lacking. Laboratory infrastructure equipment currently available in the country is largely owned by government or parastatal institutions. Existing laboratories were tailor-made for specific institutional/industrial purposes. No laboratories are available for independent quality monitoring of imported chemicals and chemical products. Thus there is an urgent need to establish independent referral laboratories in either the public or private sectors

International Linkages

Zambia is a member of several international organizations (AU, COMESA, FAO, ILO, IPCS, UNEP, SADC, WHO) and participates in several international agreements such as the Montreal Protocol (1992), Agenda 21 (1993), the Basel Convention (1994) and the Stockholm Convention (2001).

Through the international linkages, several local projects are availed the opportunity to access funding and technical assistance e.g. registration of pesticides and toxic substances, disposal of obsolete pesticides stocks, information on chemicals management and Prior Informed Consent scheme, general environmental audits, risk assessment and management, GEF DDT in Africa Project, SADC PCB Inventory Project, Cleaner Production, the Chemical Hazard Communication (CHC) and Globally Harmonised System of Classification and Labelling of Chemicals (GHS), National Implementation Programmes for Persistent Organic Pollutants (POPs).

Assistance has been received from organizations such as GEF, GTZ, FAO, NORAD, IAEA and USAID.

Awareness/Understanding of Workers and the Public

Workers in key sectors where chemicals are handled, and the general public who are in the vicinity of these activity areas, have a right to have access to appropriate information as it applies to their situation. Both workers and the public need information to enable them make informed decisions. In particular, the public near potentially hazardous chemical works should be drilled in activities of the Awareness and Preparedness for Emergencies at the Local Level (APELL) procedures.

Mechanisms available for information dissemination to workers include the provision of legal instruments that compel employers to volunteer information and ensure the establishment of necessary Standard Operational Procedures (SOPs) in the work place to ensure worker safety.

Workshops and seminars organised at plant, local and regional levels also help to enhance training activities in the handling, use and application of chemicals in the work place and in the field.
For the public, print and electronic media advertisements catch the eyes of those with necessary literary competence in the local and official languages. More poignant impacts are made on the less literate through the presentation of drama and plays on topical issues using local languages. Other key avenues of ensuring public awareness lie in empowering key agencies of information dissemination e.g. journalists, teachers, and drama and theatre groups.

Resources Available and Needed for Chemicals (including POPs) Management

Enormous levels of qualified human resources are required to fulfill the essential task of achieving acceptable levels of sound chemicals management especially taking into account the need for Zambia to conform to globally agreed goals such as the overtures made by the World Summit on Sustainable Development held in Johannesburg (South Africa) which, in its plan of action, encouraged member countries to implement the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) by 2008.

The local human resource requirement will be drawn largely from the current stock of technically qualified personnel in the government sector. There are limitations in the capacities of existing line ministries with respect to qualified, as well as competent personnel that will be needed to fully and effectively implement national chemical management programmes in Zambia.

Budgetary allocations from government through the Public Investment Programme (PIP) have, in the past been insufficient. Other avenues of financing personnel and other inevitable costs will have to be systematically sought.

In addition to the human resource factor other complementary areas that have to be funded include:

- training in chemicals management;
- cost of legislation enforcement;
- risk assessment;
- strengthening imports controls; and
- R & D in environmentally friendly alternative chemicals.

A revision of the EPPCA levies for various services and activities, and general taxation policy could open doors to opportunities for internal funds generation to obtain the human and financial resources needed.

It would be beneficial to seriously consider the establishment of an independent, well equipped and commercially viable laboratory facility to cater for quality assurance of chemicals.

A large part of the expertise capable of augmenting government efforts in chemicals management exists in various NGOs, including the academia, research institutions, professional societies and commercial/industrial organisations. Expertise which is available through these organizations includes capabilities to collect, process and store data, testing of various chemicals, risk assessment, risk reduction, ability to analyse government policy, provision of education and training in chemicals management, research into environmentally friendly alternatives, monitoring and dissemination of vital information to key sectors of the employment sectors and the public at large. The NGOs have adequate capacity to collaborate and co-operate among themselves and with

government agencies in the development of plans and in the execution of routine chemicals management activities.

Conclusions and Recommendations for follow-up

The establishment of an autonomous governmental agency (e.g. ECZ) mandated to ensure harmonisation of all aspects of environmental pollution is key to laying the foundation for sound chemicals management. Further consolidation of efforts and actions, particularly the process of preparing a National Profile to assess infrastructure on chemicals, help to focus the vision for the future. There is need to strengthen the task forces based in line ministries so as to ensure productivity. The NCT could, through the ECZ, be used as a linking agent among the various task forces. Priority areas earmarked for urgent follow up in order to enhance chemical management capacity include:

(a) strengthening of legislation to ensure that only good quality products are imported and/or offered for local distribution and end use;

(b) improvement in capacity to gather, process and disseminate information on chemicals management;

(c) enhancement of monitoring capacity through controls on all chemicals imports so as to ensure compliance by all importing agencies as well as conformance to regulations;

(d) strengthening of health surveillance with respect to chemicals;

(e) establishment of effective regular reporting mechanisms; prudent assessments on all chemical products as well as effluents and wastes from all factories. Successful fulfillment of items (a) – (c) above would result in the establishment of Pollutant Release Transfer Registers (PRTRs);

(f) improvement in the provision of all resources, including laboratory infrastructure, as elaborated in the National Profile document;

(g) training for Customs Clearance Officers and Border Control Agents in the identification of chemicals crossing Zambian borders, and training of government officials in the regulatory process for chemicals and in the use of chemical risk assessment information in the development of regulations and standards;

(h) establishment of Awareness and Preparedness for Emergencies at the Local Level (APELL) programmes in all local councils; and

(i) networking and integration of information system and databases on chemicals in Zambia.

Chapter 1: National Background Information

1.1 Physical and Demographic Context

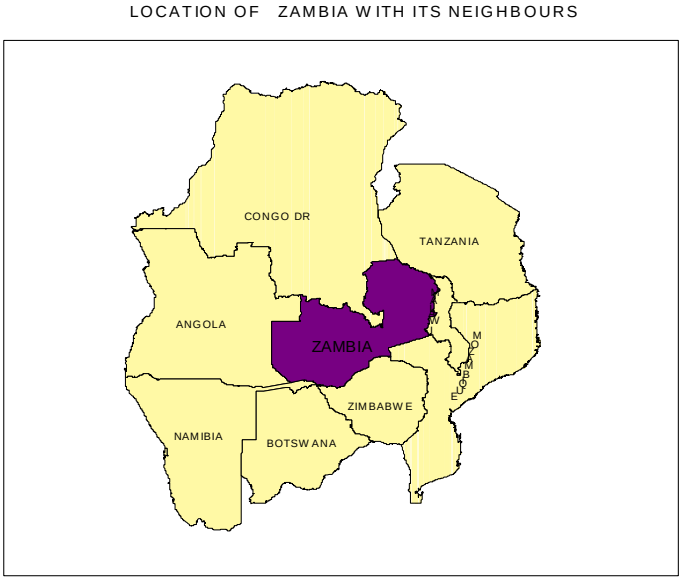
Zambia is a landlocked country situated in the southern part of Africa between 8 – 18^0 South latitude and 22 – 34^0 east latitude. It is surrounded by eight countries namely the Democratic Republic of Congo and Tanzania in the north, Malawi and Mozambique in the east, Zimbabwe and Botswana in the south, Namibia in the south west and Angola in the west. The land area is 752, 614 square kilometers of which 25% is used for Agriculture, 2% for urban developments, 30% as wildlife reserve parks and 9% as gazetted forests. About 20% of Zambia's surface is covered by water bodies in form of lakes, swamps, rivers and streams. There are two major river basins, namely the Zambezi and Congo basins into which all the river systems discharge. The main rivers are the Zambezi, Kafue, Luangwa and Luapula; and the major natural lakes are Mweru, Bangweulu, Tanganyika and the man made Lake Kariba.

Zambia has a sub-tropical climate with three distinct seasons: the cool dry winter from May to August, a hot dry season from August to October and the warm wet season from November to April. The average annual temperature ranges between $18^0$and 20^0 Celsius. The maximum annual average temperature is 32^0 Celsius and minimum temperature averages 4^0 Celsius. The northern part of the country receives the highest rainfall with an annual average ranging from 1 000 mm to over 1 400 mm. The annual rainfall decreases down south the country with the southern part receiving less than 800 mm per annum.

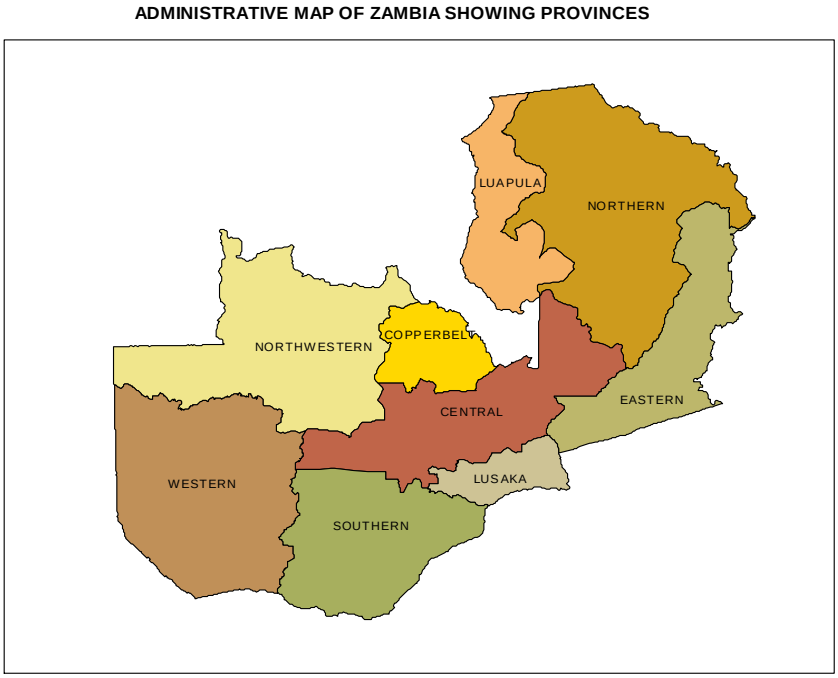
Zambia is situated on the great plateau of Central Africa with an average altitude of 1,200 above sea level. The highest elevations ranging between 1 525metres to 1 650metres above sea level are found in Northern, North Western and Central Provinces. The lowest elevations ranging from 350 to 600 metres above sea level are found in the Luangwa and Zambezi Valleys.

The relative geographic locations, sizes of the provinces as well as Zambia's neighbours are shown in Map 1.1A. Zambia is divided into nine provinces (regions), each with an administrative headquarters in which most, if not all government provincial departments are situated; 72 districts, each being further divided politically into 150 constituencies and 1,189 wards. Details of the local administrative boundaries are illustrated in Map 1.1B.

Map 1.1A: Location of Zambia with her Neighbours



Map 1.1 B: Administrative Map of Zambia showing the Provinces



Population

The Zambia Demographic and Health Survey (ZDHS), a nationally representative sample survey of

both men and women of reproductive age designed to provide information on fertility, family planning, child survival and health, is one of the tools used in population studies in Zambia. The most recent ZDH surveys were conducted in 1996 and 2001 respectively. The ZDHS which is organized by the Central Statistical Office (CSO, MFND) and the Central Board of Health (CBoH, MoH) together with the National Census are part of the major tools used in population studies. Other tools include the Food Security and Nutrition Surveys which are carried out every three months.

The 2000 National Census reported a total population of 9.9 million, representing a growth rate of 2.4 per cent per annum. The 1980 and 1990 National Censuses, reported total populations of 5.7 million and 7.8 million respectively. The population annual growth rate has declined over the last three intercensal periods from 3.1% in the period 1969-1980, through 2.7 during 1980-1990 to 2.9 over the most recent intercensal period 1990-2000. Life expectancy for males was estimated at 48 in 2000, while the figures for 1980 and 1990 were 50 and 46 respectively. There were (2000) slightly fewer women (49.96%) than men (50.06%) in Zambia. The general population dynamics are reflected in Table 1.1A.

Table 1.1A: Zambian Population Profile.

Country/ Province	**Population**	**Population Share (%)**	**Area (km^2)**	**Population Density People/km^2**	**Population Distribution (%)**		
					Rural	**Urban**	**Total**
Zambia	9 885 591	100	752 612	13.1	65	35	100
Central	1 012 257	10.2	94 394	10.7	12	7	100
Copperbelt	1 581 221	16.0	31 328	50.5	5	37	100
Eastern	1 306 173	13.2	69 106	18.9	18	3	100
Luapula	775 353	7.8	50 567	15.3	10	3	100
Lusaka	1 391 329	14.1	21 896	63.5	4	33	100
Northern	1 258 696	12.7	147 826	8.5	17	5	100
N/Western	583 350	5.9	125 826	4.6	8	3	100
Southern	1 212 124	12.3	85 283	14.2	15	7	100
Western	765 088	7.7	126 386	6.1	11	2	100

Source: CSO 2003, **"**2000 Census of Population; Official Population Figures"

The majority of Zambians live in the rural areas, a trend that has shown an upward increase from 16% in 1990 to 64% in 2000.

Copperbelt Province has the highest population followed by Lusaka, Northern, Southern, Eastern, Central, Luapula, Western and lastly North-Western Provinces. Two of the provinces, namely, Lusaka and Copperbelt are predominantly urban (81% and 82% respectively) while the rest are rural. The fertility rate has been declining from 7.0 births per woman in 1980 to 6.7 in 1990 and 6.0 in 2000. Life expectancy for males was estimated at 48 years in 2000. In 1980 and 1990 life expectancy was estimated at 50 and 46 years, respectively. The population density of Zambia increased from 7.5 people per square kilometer in 1980 to 10.3 in 1990 and 13.1 in 2000 (CSO, 2003). Lusaka province which hosts the Capital City (Lusaka), has the highest population density

(63.5 people per square kilometre) followed by the Copperbelt province (50.5 people per square kilometer), with the least density recorded in the North western province (4 people per square kilometre) as shown in Table 1.1B.

Table 1.1B: Sizes of the Provinces and their Populations

Province	Area	Population		
		Male	Female	Total
Central	94,394	510 501	501 756	1 012 257
Copperbelt	31,328	799 402	781 819	1 581 221
Eastern	69,106	648 676	657 497	1 306 173
Luapula	50,567	387 825	387 528	775 353
Lusaka	21,896	705 778	685 551	1 391 329
Northern	147,826	629 976	628 720	1 258 696
North Western	125,826	290 856	292 494	583 350
Southern	85,283	601 440	610 684	1 212 124
Western	126,386	371 844	393 244	765 088
TOTAL	**752,612**	**4 946 000**	**4 939 000**	**9 885 000**

Source: CSO 2003, **"**2000 Population Official Population Figures"

The majority of Zambians live in the rural areas (64%), showing an increase from the 61% recorded in the 1990 Census. The literacy rate for the population aged 5 years and above has remained at the same, at 55.3, as in the 1990 Census.

Some Important Health Indicators

The top ten main causes of visitation to health care facilities are as follows: Malaria, Respiratory infection (pneumonia and non-pneumonia), Diarrhoea (non-bloody), Trauma (accidents, injuries, wounds, and burns), Skin infections, Ear/Nose/Throat infections, Intestinal Worms and Digestive system (not infectious) (Table 1.1C).

Table 1.1C: Ten Main Causes of Visitation to HealthCare Facilities

Name of Condition	Incidence Rate per 1000 Population
Malaria	377.1
Respiratory infection (non-pneumonia)	143.9
Diarrhoea (non-bloody)	77.8
Respiratory infection (pneumonia)	43.8
Trauma(accidents, injuries, wounds, burns)	41.1
Skin infections	36.2
Ear / Nose/ Throat infections	23.9
Intestinal Worms	20.9
Digestive system (not infectious)	17.1

Source: CBoH, 2002, "Annual Health Statistical Bulletin"

1.2 Political/Geographical Structure of the Country

Zambia has a democratic government with an elected Executive President. The government is

composed of three independent organs namely the Executive, Legislature and Judicial. The Executive is charged with the responsibility of formulating and implementing decisions. The legislature, which is composed of 150 elected members from constituencies and 8 members nominated by the President, is responsible for formulating and enacting laws. The Judiciary is responsible for interpreting the laws of the country and administration of justice.
English is the official language. However, there are 74 local dialects (Annex 2) from which seven major languages are taught in schools and used in disseminating information. These are Bemba, Kaonde, Lozi, Lunda, Luvale, Nyanja and Tonga.

Zambia has a three-tier education system composed of primary school education consisting of seven (7) years; junior secondary school consisting of two (2) years, and senior secondary school consisting of three (3) years. After secondary education, there is tertiary level education which includes among others, vocational training leading to the award of either a certificate or diploma; or university level training resulting in the award of a certificate, diploma or degree depending on the programme.

1.3 Industrial and Agricultural Sectors

The major industry is mining, which has, in the past, been accounting for about 90% of the national foreign exchange revenue through international trade. However, non-traditional export commodities have increased their contribution to the national foreign exchange revenue lately. Most of the mining activities are concentrated on the Copperbelt Province where copper and cobalt are the main minerals being mined. To facilitate easy transportation of the mineral products to the external export destinations, a railway line was constructed linking the Copperbelt to ports in South Africa such as Durban, Port Elizabeth and Cape Town as well as the port of Dar-es-salaam in Tanzania.

From the Copperbelt, towns and settlements have mushroomed southwards along the line of rail; and so did other allied and support industries. As a result, most of the manufacturing, agricultural, retail, transportation, construction, financial and community, social and personal services establishments are found in the Copperbelt, Central, Lusaka and Southern Provinces. It is therefore, “along the rail of line” where most pollution problems due to industrial chemicals are expected to occur.

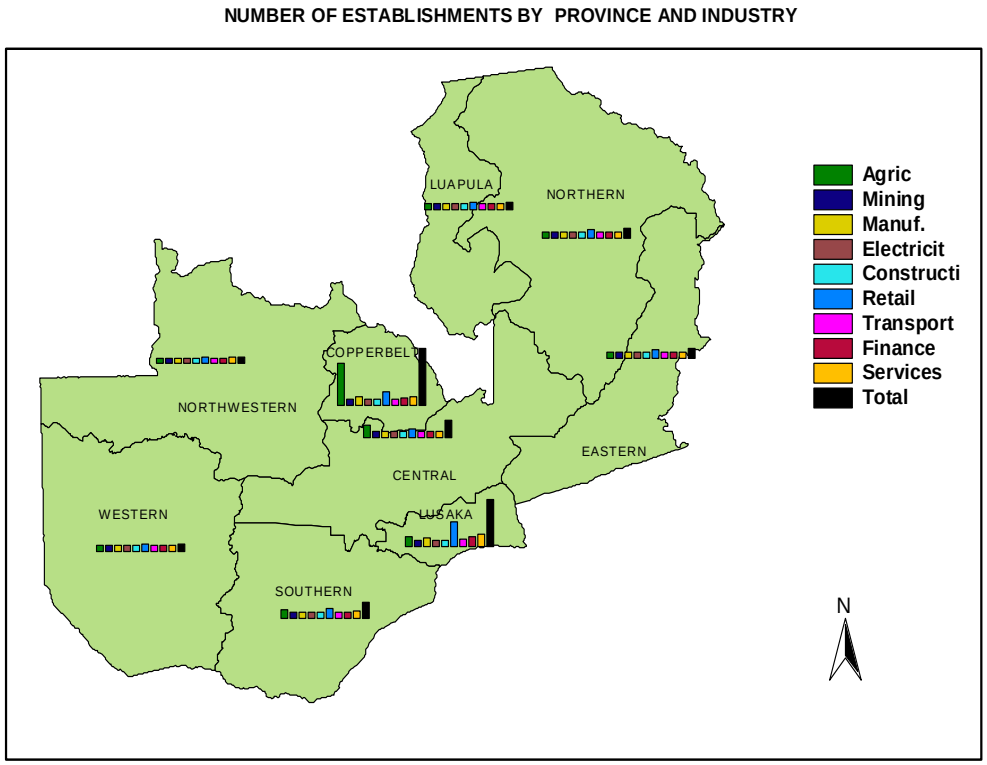
A miscellany of establishments found in each of the sub-sectors (agriculture; mining; manufacturing; electricity; construction; retail and wholesale; transport and communications; finance, real estates and insurance; as well as community and personal services) of the Zambian economy is shown in Table 1.3A and on Map 1.3A.

Table 1.3A: Number of Establishments by Province and Industry.

Province/ Country	Agric	Mining	Manuf.	Elect.	Const.	Retail	Trans	Fin	Serv	Totals
Central	667	0	30	4	3	299	11	31	61	1106
Copperbelt	3500	14	206	11	40	799	68	141	231	5010
Eastern	70	0	18	4	3	243	10	23	45	416
Luapula	17	0	4	5	1	69	8	9	18	131
Lusaka	364	7	340	5	102	1894	195	432	695	4034
Northern	21	0	21	7	1	242	15	14	54	375
N/Western	1	1	8	6	1	62	5	13	41	138
Southern	218	3	47	10	3	447	45	56	111	940
Western	2	0	9	5	0	133	3	5	16	173
Totals	**4868**	**25**	**683**	**57**	**154**	**4188**	**360**	**724**	**1272**	**12323**

Source: CSO, 2002, "Quarterly Employment and Earnings Inquiry"

Map 1.3A: Distribution of Establishments by Province and Industry



The Industrial/Manufacturing Sector is the major contributor to the Gross Domestic Product (GDP). In 1999, the Industrial/Manufacturing Sector contributed 26.7% to the GDP followed by the Agricultural Sector at 15.9% and Mining and Quarrying at 7.0% (Table 1.3B).

Table 1.3B: Overview of Industrial and Agricultural Sectors – 1999

Sector	Contribution to the Gross Domestic Product (%) at 1994 constant prices	Number of Employees	Major Products in each Sector
Mining and Quarrying	7.0	38, 521 Formal	Copper, Cobalt, Zinc, Lead, Coal, Gem stones, Precious stones and Limestone
Industrial/ Manufacturing	26.7	109, 195 Formal 726,990 Informal	Leather, Textiles, Cotton, Wood, Food
Agricultural	15.9	60, 000 Formal 2, 951,671 Informal	Maize, Sorghum, Sunflower, Groundnuts, Millet
TOTAL	**49.6**		

Source: CSO, 2000, "Quarterly Employment, Earnings Survey Report"

1.3.1 Mining and Quarrying

Mining history in Zambia dates back to the latter 16th century (approximately 1591), with serious large scale operations recorded in 1931 at Kabwe (part of then Broken Hill, in then Northern Rhodesia) lead mines. The largest recorded mining output is in copper which reached 750 000 tonne in 1995 after successful privatization of the mining conglomerate Zambia Consolidated Copper Mines Limited (ZCCM) which was jointly owned by the state and Anglo American Corporation Limited (AAC), then responsible for mining, processing and sale of minerals.

From 1997, a number of ZCCM units were privatized under new investors such as Konkola Copper Mines (MCM), Bwana Mkubwa, and Chambeshi Metals PLC. ZCCM, after privatization, was transformed into an investment holding company retaining shares in all privatized mining companies.

The major minerals being mined are Copper, Cobalt and Coal. Coal reserves at Zambia's major mine, Maamba Collieries in the southern province, are estimated to have an exploitation life expectancy of more than twenty-five years. Other mining activities include Limestone and Precious Stones. Gemstones are also mined; among theses are amethyst, aquamarine, beryl, blue sapphire, cetrine, emerald, garnet, gold, red garnet, rhodolite, spessatite, tourmaline, and quartz.

Since 1960, small scale mining (SSM) activities have emerged and proliferated, bringing with them such environmental concerns as:

- Unattended-to pits and trenches
- Mercury and cyanide wastes from gold mining
- Potential of uncontrolled use of POPs of concern

However, the Gemstone segment of the SSM sector holds the greatest potential for spearheading rural development since most gemstone and other mineral deposits are located in the rural areas, throughout the country with concentrations in Ndola Rural (Copperbelt Province), Lundazi, Chipata, Nyimba (Eastern Province), Mumbwa, Kalomo (Southern Province) and Mkushi (Central Province).

The gemstone segment currently suffers from:

- Lack of valuation skills

- Lack of appropriate credit facilities
- Lack of developed infrastructure
- Excessive illicit trafficking and
- Lack of organised market

Recognising the short-comings of the SSM sub-sector, the Government, through the Mining Sector Diversification Programme (MSDP) has created (from 2003) a loan facility of between US $2 000 to $20 000 per individual to boost production as part of GRZ strategy in poverty reduction.

In addition, MSDP through the European Development Fund (EDF) has embarked (from 2003) on a project to "Review the Legislative and Regulatory Framework" that would promote investment in this promising Non-traditional Mining Sector in order to promote effective exploitation of non-traditional mineral resources in Zambia.

Although SSMs have the capacity to contribute positively to economic development by creating employment and providing a source of income to the mine operators and the miners; and as an economic activity, they also have a bearing on the safety of miners and the environment, as shown by such documented cases as:

- In the 1997/8 wet season, three (3) fatal accidents were reported in the Ndola Rural and Lundazi gemstone mining areas with a total loss of eleven human lives;
- There are deficiencies in the administration of SSM activities from the Government sector, especially the following key areas:
    - The Ministry of Mines and Minerals Development departments (especially Mine Safety Department (MSD) in charge of safety) are understaffed, under equipped, and, do not effectively supervise regularly, the SSM operators
    - ECZ is still getting to grips with building capacity to deal with the large mining conglomerates, thus SSM's are not yet under consideration
    - MSD, Mines Development Department and ECZ do not co-ordinate in issues relating to SSM's.

Mineral production figures from major sub-sectors from 1999 to 2002 are shown in the Table 1.3.1A.

Table 1.3.1A: Mineral Production 1999-2002

A. Metallic Minerals	**1999**	**2000**	**2001**	**2002**
Cobalt (Tonne)	4 247	3 538	3 986	3 913
Copper (Tonne)	296 603	256 884	271 973	330 600
Magnetite (Tonne)	996	1 279	6 341	927
Pyrite (Tonne)	62 604	60 304	83 752	94 866
B. Gemstones				
Amethyst (kg)	510 975	1 017 834	1 145 029	1 064 606
Beryl (kg)	4 271	890	1 567	8 551
Emerald (kg)	445	369	764	1 860
Tourmaline (kg)	10 800	60 833	25 619	25 755
C. Industrial & Building Minerals				
Cement (Tonne)	171 833	236 765	215 470	230 379
Limestone (Tonne)	313 241	41 474	61 539	329 915
D. Fuel Minerals				
Coal	127 854	169 686	210 884	65 212

Source: Minerals Development Department MMMD Mineral Economics Section, 2003.

1.3.2 Manufacturing Sector

The quantities and quality of data available in this sector are still not satisfactory. The Ministry of Commerce Trade and Industry's effort to carry out a systematic survey to establish baseline data in the manufacturing sector is under way. As at August, 2002 MCTI had covered 5 out of the 9 provinces. The survey is on-going.

The manufacturing sector contributes about 10.5% to the GDP (Table 1.3.2A). The food, beverages and tobacco sub-sector accounts for about 60% of the manufacturing GDP, followed by textiles and leather products (about 17.5%), chemical, rubber and plastics (8.6%) and wood and wood products (7.6%). The contribution of basic metal products and fabricated metal products is minimal. The manufacturing industry is dependant on agriculture with over 70% of the industry (food manufacturing, tobacco, textiles and leather) being based on agricultural products processing. The highest performer is the food beverage and tobacco sub-sector (Table 1.3.2A) which has consistently contributed over 50% of total manufacturing figure.

Table 1.3.2A: Manufacturing Value Added by Sub-sector at 1994 Constant Prices (K' Billion), 1996– 2002

10.1

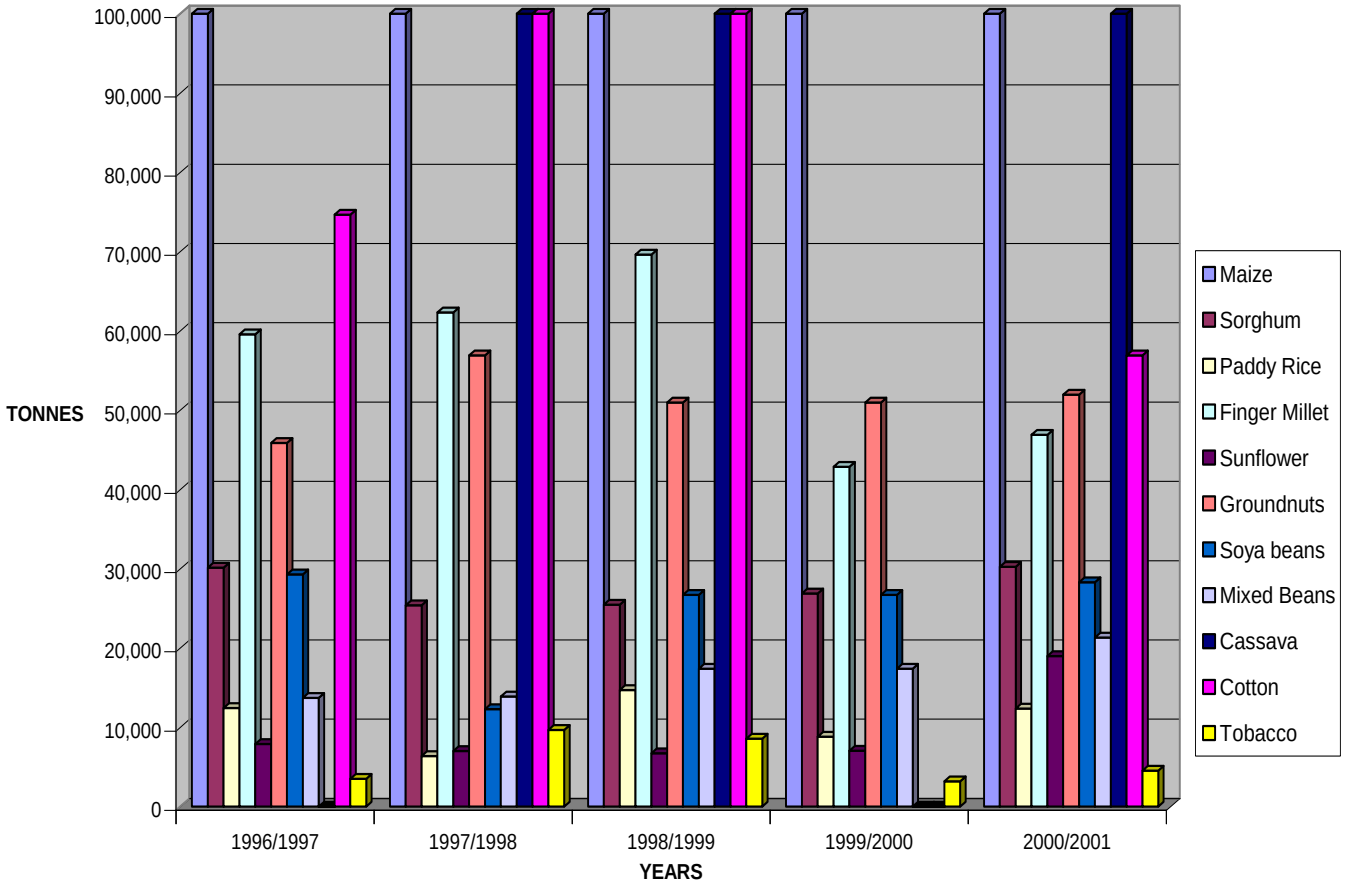
Sub-Sector	1996	1997	1998	1999	2000	2001	2002
Food beverage and tobacco	144.3	138.6	146.0	154.8	155.7	164.0	172.3
Textiles and leather products	27.1	39.1	42.4	44.8	45.8	46.8	50.0
Wood and wood products	18.1	19.6	19.2	19.3	19.2	20.3	22.2
Paper and Paper Products	4.8	7.2	7.3	7.6	7.5	7.8	8.0
Chemical/rubber/Plastics	20.6	22.5	18.7	15.5	21.9	22.8	25.1
Non- metallic mineral produc	4.7	4.1	4.5	4.4	4.6	4.8	4.9
Basic metal products	3.1	3.3	1.3	1.3	1.4	1.2	1.2
Fabricated metal products	7.9	8.0	7.3	5.9	6.5	6.0	5.8
Other manufacturers	0.5	0.5	0.5	0.6	0.6	0.7	0.8
Total manufacturing	231.1	242.8	254.2	263.3	263.3	274.4	290.3
Share of manufacturing in tot GDP	9.9	10.1	10.5	10.5	10.5	10.5	10.7

Source: Central Statistical Office, 2002.

1.3.3 Agricultural Sector

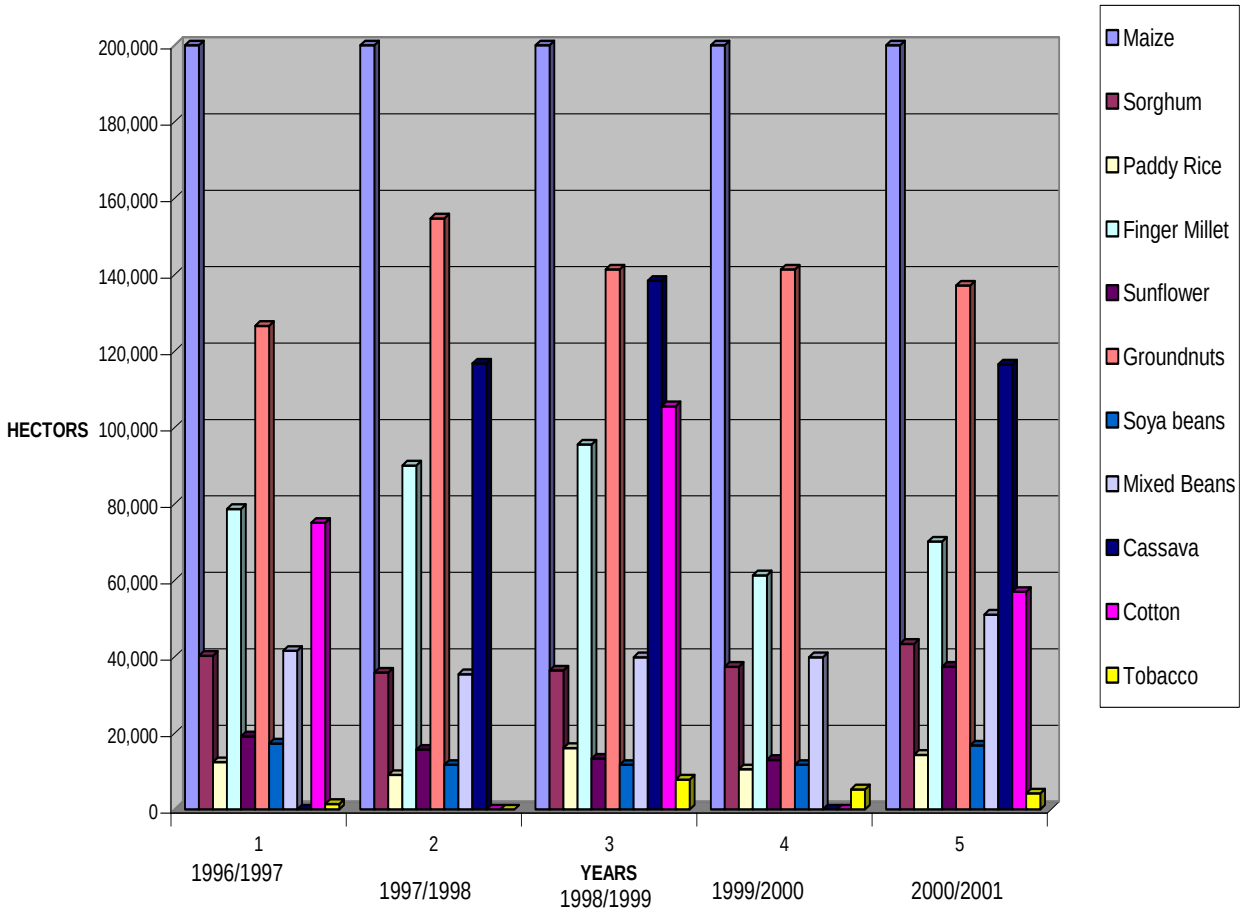
Agricultural production has been fluctuating from year to year due to fluctuations in weather conditions. Agricultural production is significantly influenced by rainfall patterns, distribution of inputs and access to financing. The major crops being grown are Maize, Sorghum, Millet and Cassava which are the staple foods for most Zambians; and Sunflower, Groundnuts and mixed beans. The major cash crops are Cotton, Sunflower and Tobacco. Crop production is shown in Table 1.3.3A for the farming seasons during the period 1997-2001, with further details on performances on a selected number of key crops per province are shown in Table 1.3.3B.

Table 1.3.3A: Crop Production -1996 to 2001



Source: Ministry of Agriculture and Cooperatives, 2002

Table 1.3.3A1: Area Planted to Various Crops – 1996/2001



Source: Ministry of Agriculture and Cooperatives, 2002

Table 1.3.3B: Breakdown of Agricultural Production by Provinces – 2001/2002

Province	Major Crops	Production (MT)	Size of Productive Areas (# hectares)
Central	**Maize**	130 655.0	83 047
	Millet	4 143.6	7 496
	Sorghum	1 835.1	2 758
	Groundnuts	2 049.0	7 005
	Sunflower	2 008.3	3 662
	Sweet potatoes	10 306.0	6 237
Copperbelt	**Maize**	64 300	36 410
	Groundnuts	1 512.4	2 655
	Sorghum	4 297	7 103
	Mixed beans	394.1	842
	Soybeans	152.1	128
	Sweet potatoes	8 518	4 444
Eastern	Maize	202 384.8	170 303
	Sunflower	4 954.4	9 787
	Groundnuts	16 779.8	52 423
	Soybeans	1381.2	2 522
	Sorghum	4 296.6	7 103
	Sweet potatoes	12 575.5	4 989
Luapula	Maize	15 713.8	10 052
	Rice	647.4	475
	Millet	3 599.3	4 400
	Mixed beans	1 316.9	2 277
	Groundnuts	6 431	13 066
	Sweet potatoes	4 886.1	2 012
Lusaka	Maize	48 354.6	25 629
	Sorghum	31.6	26
	Sweet potatoes	266.6	357
	Millet	44.5	196
	Sunflower	51.75	282
	Groundnuts	452.5	1 349
Northern	Maize	68 440	31 396
	Sorghum	2 487.2	2 909
	Millet	23 600.1	30 619
	Groundnuts	9 773	22 782
	Mixed beans	11 104.4	22 381
	Sweet potatoes	15 517.85	6 756
N/Western	Maize	19 558	18 187
	Groundnuts	1 360.3	2 401
	Millet	535.6	6.29
	Mixed beans	1 730.3	3 097
	Sorghum	3 359.5	4 521
	Sweet potatoes	4 235.04	2 531
Southern	Maize	63 092.6	148 723
	Sorghum	734.8	4 597
	Sunflower	1 655.2	5 773.0
	Groundnuts	1 458.6	21 649
	Cowpeas	583.92	2 567
	Sweet potatoes	1 067	5 183
Western	Maize	19 525.2	51 940
	Sorghum	2 840	6 610
	Millet	3 939.7	16 603
	Groundnuts	1 604.5	6 145
	Paddy rice	3 322.9	5 644
	Sweet potatoes	1 977.5	1 060

Source: MAC, 2003, "2001/2002 Crop Forecasting Survey"

1.4 Industrial Employment by Major Economic Sectors:

The Private Sector is the major employer in the Formal Sector (60.1%) followed by Central Government (23.5%), Parastatal Companies (13.7%) and Local Authorities (2.7%) (Table 1.4A)

Table 1.4: Employment Trends 1996-1999

Employment Trends	**1996**	**1997**	**1998**	**1999**
Employment by Type	3,468,000	3,739,823	4,033,417	4,156,169
Formal Sector Employment	479,400	475,161	467,193	477,508
Informal Sector Employment	2,988,600	3,264,662	3,566,224	3,678,661
Informal Agricultural Employment	2,318,600	2,579,407	2,807,174	2,951,671
Informal Nono-agricultural Employment	670,00	685,255	759,050	726,990
Formal Employment Industry	**479,400**	**475,161**	**467,193**	**477,508**
Agriculture,Food and Fisheries	68,300	58,898	58,898	60,000
Mining and Quarries	47,700	44,498	39,160	38,521
Manufacturing	47,400	47,118	46,685	46,000
Electricity, Gas and Water	4,400	5,009	5,237	5,300
Construction	13,100	17,106	13,459	12,895
Trade and Distribution	46,800	48,893	48,964	51,097
Transport and Communicatior	38,300	45,963	45,840	45,000
Financial, Real Estate and Business Services	37,600	37,862	35,276	34,682
Comm., Social and Personal Services	175,800	169,814	173,674	184,013
Formal Employment by Agency	**479,300**	**475,100**	**467,193**	**477,508**
Central Government	132,000	129,200	117,250	
Local Authorities	17,300	15,100	13,048	
Parastatal Companies	115,200	73,900	68,046	
Private Sector Companies	214,800	256,900	268,849	
Size of Labour Force	**3,982,000**	**4,411,263**	**4,579,000**	**4,635,000**
Total unemployment rate	12.9	15.2	11.9	10.3

Source: CSO, 2001, **"**Quarterly Employment and Earnings Inquiry"

The numbers of people in formal employment have been decreasing from 479,400 in 1996 to 460,260 in 2000. Conversely, the number of people employed in the informal sector increased from 86.2% in 1996 to 88.5% in 1999.

The major sectors that provided formal employment in 1999 are Community, Social and Personal Services (38.5%), Agriculture and Cooperatives (12.6%), Trade and Distribution (10.7%), Manufacturing (9.6%), Transport and Communication (9.4%), Mining and Quarrying (8.1%), Financial and Real Estate (7.5%), Construction (2.7%) and lastly Electricity, Gas and Water Sector (1.1%). The unemployment rate varied between 12.9% and 10.3 in 1999.

Agriculture is a key sector in Zambia's economic development programme, being the largest employer (71.6% in 2000) in the informal sub-sector of the productive sectors of the economy, and therefore it is virtually the source of employment to the bulk of the rural population. The large numbers of workers in this sub-sector constitutes the highest risk group to be targeted for training in techniques that avert the adverse effects of POPs in agriculture as most of them will be using the chemicals from a consumer and/or subsistence agricultural standpoint. It is essential to note that according to the 2000 National Census, 62% of the Zambian workforce are unskilled, thus the training needs assessments undertaken have to take this fact on board in order to design appropriate chemical safety schemes.

Table 1.4B: Formal Sector Employment by Industry 1996-2000

Sub-sector of Indus	**1996**	**1997**	**1998**	**1999**	**2000**
Agriculture	69 300	58 898	58 630	58 300	57 800
Mining &Quarryin	47 700	42 498	39 160	38 521	36 780
Manufacturing	47 400	47 118	46 685	46 000	45 600
Electricity	4 400	5 009	5 237	5 300	5 400
Construction	13 100	17 106	113 459	12 895	12 100
Trade	46 800	48 893	48 964	50 200	52 320
Transport	38 300	45 963	45 840	45 000	44 850
Finance	37 600	37 862	35 276	34 684	34 200
Community Service	175 800	169 814	173 674	174 800	171 210
TOTALS	**479 400**	**475 161**	**466 925**	**465 700**	**460 260**

Source: CSO, 2000, "Quarterly Employment and Earnings Survey Report"

Most of the establishments that provide employment are in the Agricultural Sector (Table 1.4C). The majority of establishments in the Agricultural (94.2%) and Industrial/Manufacturing (91.8%) Sectors employ less than 100 employees. In the Mining and Quarrying Sector, over 50% of the establishments employ more than 100 employees.

Table 1.4C: Structure of the Manufacturing/*Agricultural* ***Sectors - 1999.***

Sector	**Micro Farms/ Facilities 1 – 19 employees**	**Small Farms/ Facilities 20 – 100 employees**	**Medium Farms/ Facilities 101 – 499 employees**	**Big Farms/ Facilities >500 employees**
Mining and Quarrying	9	7	7	12
Industrial/ Manufacturing Sector	725	260	76	12
Agricultural Sector	1250	295	86	9
TOTAL	1984	562	169	33

Source: CSO, 2002, "Central Register of Establishments"

POPs Related Issues

The use of chemicals in both subsistence and large commercial agriculture poses direct risk from pesticides, especially those that are known to be on Annex C of the Stockholm Convention list e.g. chlordane, which are still finding their way into the country.

Wastes produced from industrial activities also add to the risk of POPs finding their way into the environment, bearing in mind such activities as the textile and leather industries that have, for some time, been operated in locations near major rivers such as the Kafue River, as well as the firing of industrial boilers using fossil fuels.

The mining industry carries an unquantified number of PCB-containing (transformers and capacitors) equipment. Other operators located in such active sectors as agriculture, especially large commercial farmers, utilise substantial quantities of transformers and capacitors that may potentially be candidate PCB carriers.

Chapter 2: Chemicals (including POPs) Production, Import, Export and Use

2.1 Chemicals (including POPs) Production, Import and Export

2.2 Chemical Use by Categories

2.3 Chemical Wastes

2.4 Unintentionally Generated POPs

The production of chemicals for local use or export is minimal. The chemical needs of industry and other manufacturing entities are met through imports.

Pesticide Persistent Organic Pollutants (POPs) have, in the past, been in use in Zambia. Aldrin, chlordane, dieldrin, endrin and heptochlor were used for the control of termites and other soil pests in maize, sugarcane and wheat; and, in the construction industry. Toxaphene has been used mainly for the control of ticks on cattle. It is estimated that about 150 tonne of pesticide POPs were used annually, in the 1980s.

Among the intentionally produced POPs of concern, only polychlorinated biphenyls (PCBs), Chlordane and 1,1,1-trichloro-2,2-bis(4-chlorophenyl) ethane (DDT) are still in use in Zambia. PCBs are mainly used in electrical equipment that was imported a long time ago. Importation of electrical equipment containing PCBs into the country is now banned.

2.1 Chemicals (including POPs) Production, Import and Export

Chemicals (including POPs) Production

The production of chemicals for local use or export is minimal, save for past private sector manufacturing activities of Shell Chemicals (Z) Ltd formulation facility that was located on Mungwi Road, Lusaka.

The quantities used per year vary depending on the vector control requirements. Most of the chlordane is imported from Zimbabwe and South Africa. The Ministry of Health is using DDT for the control of vectors of malaria, under conditions of the Stockholm Convention. Among the pesticide POPs only chlordane is still being used for the control of termites in plantation crops and the construction industry.

Among the many source categories of unintentionally produced POPs are such generalized major processes as partial burning of wood to produce charcoal for domestic energy needs; open burning of wastes that include very large quantities of plastic packaging materials from domestic solid waste dumps; waste incineration of domestic solid waste, as well as a potentially large increase in the acquisition of health-care waste incinerators which if operated incorrectly will release dioxins and furans from over 90 hospitals scattered all over the country in our quest to cope with intricacies of health-care waste as we endeavour to offer better waste management mechanisms to the health sector; fuel fired utility and industrial boilers; destruction of animal carcasses by local authorities;

burning of leaded-fuel in motor vehicles, and to a smaller extent crematoria because cremation is not yet popularly practiced locally.

Chemicals (including POPs) Import and Export

The chemical needs of industry and other manufacturing entities are met through imports. The value of total imports into Zambia was K1 679.9 billion in 1999, K2 774.2 billion in 2000, K4 722.6 billion in 2001 and K5 395.2 billion in 2002 (CSO). The major imports into Zambia over the period 2000-2002 (top ten) are shown in Table 2.1A.

Table 2.1A: Top-Ten Imports into Zambia

Commodity Imported	**Value of Imports (KWACHA)**		
	2000	**2001**	**2002**
Cereals	48,960,605,941	70,576,936,583	220,671,369,854
Animal / vegetable fats & oils & their cleavage products	61,104,422,415	83,411,301,047	114,673,419,035
Mineral fuels mineral oils & products of their distillates	336,640,347,739	271,952,344,620	312,819,595,945
Fertilizers	131,653,371,328	135,440,397,004	205,040,020,009
Plastics & plastic products	90,233,268,656	150,013,165,110	185,867,558,576
Books newspapers pictures & other products of printing	223,292,189,907	334,257,733,234	328,403,987,237
Iron & steel	67,913,495,883	93,885,977,459	115,943,190,472
Nuclear reactors boilers machinery & mechanical appliances	296,994,032,670	615,739,726,453	704,624,693,409
Electrical machinery, equip & parts thereof; sound recorders	237,360,315,082	309,221,378,335	367,064,192,769
Vehicles excl. railway / tramway rolling-stock & parts	272,555,991,524	363,103,672,070	465,914,770,564
TOTAL:	**1,766,708,041,145**	**2,427,602,631,915**	**3,021,022,797,870**

Source: CSO, "Imports by Chapter 1999-2002"

The chemicals and allied products component (inclusive of mineral fuel/oils; organic/inorganic chemicals; pharmaceutical; fertilizers; tannin/dying extracts and derivatives; essential oils and resinoids; surfactants; explosives; plastics and plastic products; rubber and other articles; and other miscellaneous items) of Zambia's imports has averaged 25% over the years 2000-2002. Most of the imports came from South Africa, followed by United Kingdom, and Zimbabwe.

All of the POPs used in the agriculture, consumer and industry sectors on the local market are imported.

Other chemicals such as PCBs had, in the past, been imported inadvertently and indirectly through purchases of electrical installation and distribution equipment such as transformers and capacitors mostly used in conjunction with mineral oils that were a potential source of PCBs.

DDT is currently being imported under strict controls for use by the new mining companies for their malaria control programmes. The Roll Back Malaria (RBM) Initiative which is part of the GEF DDT

in Africa project under which Zambia and her neighbours (Angola, Botswana, Mozambique and Zimbabwe) are involved in a search for alternatives to DDT is the only official channel through which it is hoped all local DDT requirements may be procured to enhance effective control.
There are other examples of other non-Stockholm POPs that are directly or indirectly imported into the country, and are therefore in common use in Zambia. Among these are:

- Endosulphan, a pesticide used in commercial agriculture, home gardening and wood preservation, which has high to moderate toxicity in birds and acts as an endocrine disruptor
- Polybrominated diphenyl ethers (PBDEs), used in flame-retardant formulations for foam (urethane) in furniture, carpet underlays and beddings since the 1960s, substances that have potential endocrine disrupting properties
- Phthalates (a wide family of compounds), used as plasticizers, as insect repellants, solvents for cellulose acetate in varnish an in the manufacture of varnishes used to strengthen the fabric surface of model aircraft. Some of these, e.g. vinyl plastics contain, about 40% di (2-ethylhexyl) phthalate which is an endocrine disruptor chemical
- Chlordecone, also known as kepone which is used as an insecticide and fungicide is a degradation product of the insecticide mirex (a member of the "dirty dozen" whose formulations contain 2.58% chlordecone) used for the control of ants.

The above are candidate chemicals for urgent consideration under the PIC procedures.

Chemicals Export

The value of exports from Zambia was K2 525.8 billion in 1999, K2 345.8 billion in 2000, K3 426.4 billion in 2001, and K3 975.3 billion in 2002. Most of the exports go to United Kingdom followed Tanzania, Switzerland and Congo Democratic Republic. In 2002, the major exports were mineral products which accounted for 73.5% of total exports (Table 2.1B). Agricultural products accounted for 11.7%.

There are no significant exports of chemicals, chemicals products or other allied commodities from Zambia to other countries.

Table 2.1B: Top-Ten Exports from Zambia

Commodity Exported	**Value of Imports (K Billion)**		
	2000	**2001**	**2002**
Edible vegetables & certain roots & tubers	28,618,030,921	59,068,889,617	37,143,633,530
Coffee tea mate & spices	32,768,796,159	37,811,124,052	39,632,331,708
Sugars & sugar confectionery	73,983,155,494	135,581,633,535	150,293,527,599
Tobacco & manufactured tobacco substitutes	32,634,721,176	42,089,809,310	66,702,868,975
Mineral fuels mineral oils & products of their distillates	28,603,082,150	35,952,802,296	33,436,610,340
Cotton	111,281,922,743	147,896,139,206	170,774,139,353
Natural / cultured pearls precious / semi-precious stones	70,670,793,791	340,085,318,622	315,992,351,597
Copper & articles thereof	1,466,383,576,001	1,812,777,214,836	2,126,827,904,614
Other base metals; cermets; articles thereof	474,759,136,948	600,586,537,210	568,564,405,236
Nuclear reactors boilers machinery & mechanical appliances	11,468,844,490	2,812,251,691	3,569,878,310
TOTAL:	**2,331,172,059,873**	**3,214,661,720,375**	**3,512,937,651,262**

Source: CSO, "Exports by Chapter 1999-2002"

2.2 Chemical Use by Categories

Inventory of Intentionally Produced Pesticides POPs

Poor record keeping on the ground makes it very difficult to ascertain reliable use patterns and quantities of the various pesticide POPs that have been used locally in the construction industry; public health sector by consumers generally and agriculture in particular, as well as in the control of pests to livestock. The lack of strict border controls still enables some unscrupulous agrochemical dealers, especially the ones who are not members of the Zambia Agrochemicals Association to sneak in unauthorised pesticides.

Table ***2.2A*** shows the results of a snap preliminary survey carried out by ECZ in 2003 to establish generalised pesticide POPs management patterns in the country.

Table 2.2A: Estimated Use of Agricultural POPs in the mid-1980s.

Agricultural POPs	Quantity Metric Tons (Annually)	Purpose	Country of Origin
Aldrin	20 15	Crop protection Construction Industry	The Netherlands
Chlordane	5	Crop protection	Europe
Dieldrin	30 30 40	Crop protection Construction Industry Tsetse Control	Europe
Endrin	5	Tick Control/Seed Dressing	The Netherlands
Heptachlor	Negligible	Crop Protection	Europe, Middle and Far East
Toxaphene	20	Tick Control	Europe

Source:- Zambia Agrochemical Association

Source: Zambia Agrochemical Association.

There are no known pesticides POPs obsolete stocks in the country.

Experiences in the Use of DDT in Zambia

The use of DDT for malaria control in the Zambia dates back to the 1940s. Widespread use of DDT for Indoor Residual Spraying (IRS) in the urban areas appears to have continued up to the early 1980s. From the mid 1980s, DDT use for IRS shows a steady decline up to 2000. The major reasons for this decline were mainly economic, as well as the Government ban on the use of DDT for agricultural purposes.

During this period (1980s to 2000) when DDT was unavailable, the IRS coverage declined and malaria re-appeared in towns where it had previously been controlled. In other towns, malaria incidence increased. There was also an apparent appearance of several insecticides in use at the local authority (District) operational level.

A country-wide survey carried out during the NIPs inventory phase has indicated that extensive use is associated with thee out of the nine provinces as shown on the map on the next page.

4. DISTRIBUTION OF DDT IN ZAMBIA

The Map below shows the distribution of DDT in Zambia

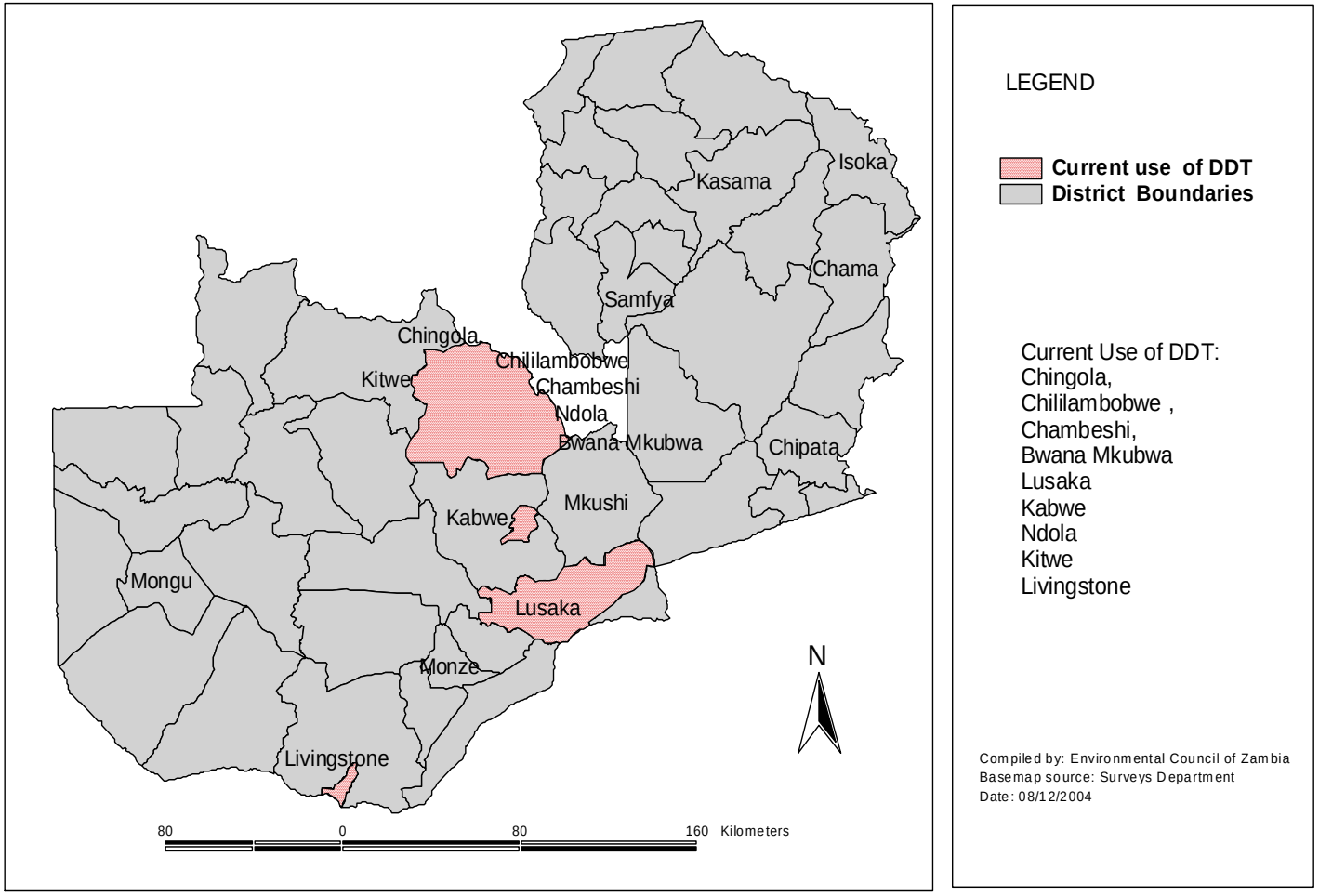


Table 2.2B: DDT Usage in the period 2000-2003s.

Year	Quantity (Kg)	User	Area
2000	6,000	Konkola Copper Mines PLC	Chingola & Chililabombwe
2001	5,400	Konkola Copper Mines PLC	Chingola & Chililabombwe
2002	5,400	Konkola Copper Mines PLC	Chingola & Chililabombwe
2002	489.77	Chambishi Copper Mines PLC	Chambeshi
2003	1,200	KCM PLC	Chingola & Chililabombwe
2003	1,500*	Central Board of Health	Ndola, Kitwe, Kabwe, Lusaka & Livingstone
2003	6,232*	Central Board of Health	Ndola, Kitwe, Kabwe, Lusaka & Livingstone
2003	250*	Chambishi Copper Mines PLC	Chambeshi & Kitwe
2003	500*	Bwana Mkumbwa Mine PLC	Ndola (Chipulukusu)
2004	2 400	Konkola Copper Mines	

Source: CBoH, 2003. * In the process of being imported into the country at October 2003.

As indicate in Table 2.2B above, from 2000/2001, DDT for IRS re-appeared on the Copperbelt, with the equivalent of 25,025 housing structures having been sprayed with DDT in Chingola and Chililabombwe residential areas. Subsequently, the two cities had reduced consumption, with anticipated increases projected for 2003.

Projected quantities to be used during the period 2005 – 2007 are:

- 11,055kg (16,500 sachets) of DDT is to be procured by CHEMTALK for the MoH for the 2004/05 malaria transmission period.
- 7,500 kg DDT is planned to be procured for next transmission season (2005/6)
- 56,280 kg of DDT planned for 2006/7 transmission season

Appropriate guidelines have to be developed quickly to address the important issue of the DT packaging (sachets) that are currently being stored (NIPs DDT Inventory, 2004) for safe disposal.

There are no known DDT obsolete stocks in the country.

Inventory of Intentionally Produced POPs (PCBs)

Zambia's bulk power needs are provided by hydro-electric power generating plants located largely in the southern province (Victoria Falls, Kariba North Bank and Kafue Gorge hydro electric power stations) along the major rivers i.e. the Zambezi and Kafue; while smaller hydro-electric power stations operated by other investors in the energy sector are located at Chishimba falls in the Northern Province; Musonda falls in Luapula province; Lunzua, Lunsemfwa, Mulungushi and Lusiwasi in Central province. In the other provinces without hydro-electric generated power, diesel and thermal power generation supplies the deficit such as Luangwa and Lundazi in the Eastern province;, Kabompo, Kasempa and Mwinilunga in the North Western province, and Kaoma and Lukulu in the Western province. The power stations churn out over 1 600 MW, accounting for almost 90% of total power output. Power transmission and distribution is undertaken by two utility companies, the bigger one (Zambia Electricity Supply Corporation, ZESCO) is government owned. The second company (Copperbelt Energy Corporation, CEC) operates largely in the Copperbelt

mining area of the country.

The distribution patterns of the hydro-electric generated power grid system lean more heavily towards support to industry. Country wide, energy consumption data show that wood fuel (which is detrimental to the environment) is dominant at 57%. Electricity consumption accounts for only 12% although hydroelectric power generation dates back to 1938. Coal contributes about 9% of the energy needs of Zambia although coal is one of the main greenhouse gas emission sources of concern.

The distribution and consumption of electricity involves the use of equipment that requires the use of oils, some of which contain polychlorinated biphenyls (PCBs) which are subject to control by the Stockholm Convention.

Table 2.2C shows the quantities of transformers (TX), oil circuit breakers (OCB), capacitors (Cap), switch gears (SG) and oil filled cables (OFC) which are currently; and all of which are in use all potential sources of PCB contamination to both the environment and human health, which are currently in use. The information was captured during a survey, which is on-going, carried out to establish baseline data.

Table 2.2C: Inventory of Potential PCB Containing Equipment in Zambia.

Serial No.	District	TX	OCB	Cap	SG	OFC	Reactor	PCB Wastes
1	Kitwe	1 060	29	1531				
2	Chingola	317	104					
3	Mufulira	261	41	42				600L
4	Kalulushi	181	40		7			57 tonne
5	Ndola	901	53	25	20	3	1	
6	Masaiti	21						
7	Luanshya	323	35	9				
8	Mpongwe	41						
9	Kasama	169					1	
10	Mpika	78						
11	Isoka	15						
12	Mbala	80		7				
13	Nakonde	26						
14	Chinsali	24						
15	Luwingu	18						
16	Mpulungu	24						
17	Mporokoso	12						
18	Mansa	78					2	
19	Kawambwa	80					1	
20	Samfya	32						
21	Mwense	32						
22	Mbereshi	18						
23	Nchelenge	15						
24	Kaputa							

Table 2.2C: Inventory of Potential PCB Containing Equipment in Zambia (Continued).

Serial No.	District	TX	OCB	Cap	SG	OFC	Reactor	PCB Wastes
25	Solwezi	57						
26	Mwinilunga	20						
27	Kasempa	21						
28	Mufumbwe	9						
29	Kabompo	9						
30	Zambezi	13						
31	Kabwe	462		1				
32	Kapiri Mposhi	59						
33	Mkushi	90						
34	Serenje	43					1	
35	Mazabuka	373						
36	Monze	141						
37	Choma	185						
38	Livingstone	376						
39	Kalomo	61						
40	Namwala	27						
41	Maamba	40						
42	Sesheke	27						
43	Zimba	25						
44	Mongu	99		6			1	
45	Kaoma	23						
46	Lukulu	8						
47	Senanga	14						
48	Kalabo	13						
49	Chipata	188	67					
50	Petauke	38						
51	Katete	28						
52	Luangwa	14						
53	Lundazi	15						
54	Chadiza	10						
55	Mfuwe	29						
56	Chama	8						
57	Kafue	165	7	1	5			
58	Chirundu	36						
59	Siavonga	38						1 260 L Oil.
60	Chilanga	249						
61	Mumbwa	81						
62	Chisamba	258						
63	Chongwe	190						
64	Lusaka	7 195	61	27	42	7	8	

Source: ECZ POPs Inventory, 2003.

The PCB inventory from which the above data was obtained was compiled in May 2002. A preliminary situation analysis of the data obtained from a country-wide survey of power

transmission and equipment revealed the status of potential PCB containing equipment in the country as follows:

- Number of transformers – approximately 15 262
- Number of oil circuit breakers – 414
- Number of capacitors – 1 642
- Number of switch gears – 10
- Number of oil filled cables – 04
- Number of PCB Containing Equipment – 77
- Drums filled with PCB oil – 1260 litres.

Inventory of Sites Contaminated with PCBs

During the PCB Removal and Disposal project conducted by ZCCM-IH and CEC, six PCB contaminated (PCBs>50ppm) sites were identified. Four of the sites were at former ZCCM PCB Interim Storage Sites at Kalulushi, Nkana, Mufulira and Kabwe while two of the sites were identified at CEC Interim Storage Sites at Luano and Avenue Substation.

Chemicals directly affect human life in many ways because they are essential to current methods of food production (fertilizers, pesticides, food additives, packaging); the manufacture of cosmetics, hygiene and health care products (pharmaceuticals, cleaning materials), and other requisite essential human needs (appliances, fuels, etc). Table 2.2F shows the quantities of chemicals consumed in various categories of chemicals used in Zambia.

Table 2.2F: Chemical Use by Categories

Type of Chemical	**Number of Tons used per Year in the Country**		
	2000	**2001**	**2002**
Pesticides –Insecticides			230 609
Pesticides – Herbicides			203 205
Pesticides – Fungicides			198 140
Pesticides – Chlordane/DDT	--/16	--/5.4	10/5.9
Fertilizers			120,089
Petroleum Products			433,087
Industrial Chemicals (Used in manufacturing/Processing Facilities)			
Consumer Chemicals			
TOTAL			

2.3 Chemical Waste

Wastes Produced

Several complex waste streams composed of a very wide range of chemicals (including POPs) are produced from all sub-sectors of the Zambian industry such as electricity power generation (hydro-electric) and transmission; agriculture (fertilisers, pesticides); manufacturing (leather tanning,

textiles industry); mining (exploration, processing, tailings); and semi-industrial (battery manufacture/repair, motor vehicle repair garages, fuel stations and petroleum storage facilities) activities. The afore-mentioned cocktails of potentially toxic and/or carcinogenic chemicals will, if discharged in significant amounts, create severe health risk for people and aquatic life as well as cause various lethal or chronic effects on the fauna and flora and receiving waters. Local capacity (human and technical) is still inadequate to effectively cope with the rising demand as the country seeks more advanced investments.

Very little point-of-generation information is available on quantities and classification of chemical wastes being generated in the country during the manufacturing and processing of various products. At present there is an apparent lack of capacity for the effective, safe and sound management of the huge quantities of wastes unleashed by human activity which eventually find their way into the environment. Some of the types and quantities of wastes generated by different industrial sectors are summarized in Table 2.3A.

Table 2.3A: Types and Quantities of Chemical Wastes Generated in Zambia

Waste Type	Tonne per Year
Soap stock, spent bleaching earth	15 060
Asbestos Cement	500
Broken glass	336
Wood splints/off specification materials	70
Chromium sludge	200
Molasses and bagass	2 800
Acidified bitumen tar	1 080
Caked bitumen and sludge	10
Lime sludge	490
Paint sludge	100
Packaging materials/Paper	30
Textile sediment sludge	10
Petroleum sludge	4
Slag/broken battery containers	240
Chromium sludge/shavings	350
Boiler ash	27 000
Acid/calcine slurry	46 000
Sulphur dioxide gas (from mining, into Kafue river)	246 000

Source: ECZ, "State of the Environment in Zambia 2000"

Obsolete Pesticide Wastes Disposal

In 1997, the Zambian Government with help from FAO, GTZ and the Government of Netherlands disposed a total of about 360 metric tons (tonne) of obsolete pesticides which were located in various places. About 303.1 tonne were collected from Zambia Co-operative Federation (ZCF) storage shed in Lusaka; 35.1 tonne from Mazabuka Veterinary storage sites (used for tsetse control), 18.4 tonne from International Red Locust Control Centre in Ndola (used for Red Locust control), 2.3 tonne from Luanshya/Mpongwe farming block and 1.1 tonne from various sites on the Copperbelt. The obsolete pesticide stocks contained diazinon, dinitro-o-cresol, endosulfan, ethyl dibromide, HCH mixtures (lindane) and 4 - chloro -2- methyl phenoxyacetic acid. The obsolete stocks were

exported to Nemchem in the UK for incineration. No other stocks of obsolete pesticides have been identified in Zambia. Although Zambia is not a member of the African Stockpile Project, a partnership of stakeholders who have come together to help dispose of and prevent any future stockpile of obsolete pesticides (currently estimated at 50 000 tonne) from all African countries, her own concern for the preservation of the environment led to the tremendous effort taken in 1997 to dispose of obsolete pesticides.

POPs Wastes Management Strategies

After the specific clean-up exercise and export of the obsolete pesticides, a programme on PCBs management was initiated in 1997 in cooperation with the Canadian International Development Agency (CIDA). The main objective of the programme was to build national capacity for the environmentally sound management of toxic chemicals with emphasis on PCBs. During the programme an inventory of equipment and wastes containing PCBs was carried out among the institutions involved in the generation and distribution of electricity, as well as the major consumers of electricity.

ZESCO and KNB have electrical equipment containing about 12,134 and 15,284 litres of PCBs contaminated materials, respectively. ZESCO has over 10,000 pieces of equipment (8,500 transformers and 1,539 capacitors) containing PCBs material. Some of the equipment is still in service. In addition, KNB has 16 drums of 210 litres of PCBs contaminated materials. Most of these materials held in storage by KNB contain more than 10,000 ppm of PCBs.

The full extent of use of electrical equipment containing PCBs has not been fully established.
Most of the PCBs waste that was held by ZCCM Investment Holdings and CEC on the Copperbelt mines was disposed of in 2002. The meticulous handling, including monitoring and clean-up of about 152,000 tonne of capacitors, solids, oil and soil contaminated (in excess of 50 ppm) PCB which was exported in 1997 was undertaken by Environment Technology International of Switzerland. The wastes (Table 2.3B) were exported from Zambia to the Ekokem OY incinerator in Finland for final disposal under the supervision of the Swiss company.

Table 2.3B: Quantities of PCB Materials Disposed of (outside Zambia) in 2002.

CONTENTS	**ZCCM CONTAINERS**		**CEC CONTAINERS**		**UN NUMBER(S)**
	Drum	Weight (tonne)	Drums	Weight (tonne)	
PCBs Contain Capacitors	120	23 586	76	14 328	2315
PCBs Contain Oil	36	7 007	0	O	
PCB Containi Solids	261	60 576	33	6 454	2315
PCBs Contain Soil	122	39 705	0	0	3152
TOTAL	539	130 874	109	20 782	

Source: CIDA Report, 1997

During the CIDA programme, two locations were identified for the construction of PCB's storage facilities. One facility, was constructed KNB in Siavonga, while the other was, at the time of inventory, being constructed at Luano substation near Chingola on the Copperbelt. These facilities

are owned and managed by ZESCO.

Prudent waste management practices, including waste reduction, are critical in the area of effective chemical (including POPs) waste management. Therefore, waste reduction, which should have its first goal as elimination, and re-use as second are among the major desired ways to deal with all categories of waste in this very high-risk area.

Importation of Chemical Waste

No chemical wastes are imported into the country for processing or disposal.

2.4 Unintentionally Generated POPs

The generation of hydroelectric power in Zambia dates back to the 1930's (about 1938). Recognising the possible dangers inherent in old and antiquated technologies used in the manufacture of first generation distribution and control equipment brought into the country, there is no ruling out the fact that most of such materials that have gone out of commission are liable to have been contaminated with PCBs. This particular POPs source was unintentional as the risk inherent in the mineral oils and equipment used had not been known at that time.

Until Zambia accessed the technical help of CIDA referred to in Section 2.3 above, we had no capacity to take effective vital chemical management decisions and actions towards decontamination of equipment in use, and decommissioning procedures for boarded items such as capacitors and transformers.
Many of the sources of unintentionally produced POPs are primarily the result of by-products of processes for which mechanisms for the quantification of the various wastes have not yet been practically established in Zambia.

In the early 1990's, following changes in the political systems in the country, Zambia underwent significant economic, social and political changes. There was a sudden change from a socialist oriented, to a liberalised economy. This necessitated privatization of most of its key industries including those that could have been major polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzo furans (PCDFs) sources. Several of these industries have ceased to operate.

Table 2.4A below gives a summary of dioxin and furan releases to all environmental media over Zambia, from a cross section of the ten main source categories listed in the United Nations Environment Program (UNEP) "Standardised Toolkit for the Identification and Quantification of Dioxin and Furan Releases". An attempt to present estimates close to the real situation was made based on data obtained from what has remained of Zambia's core economic and social activities after the privatization of the mines on the Copperbelt in the 1990`s. Releases from all the ten main categories were identified, i.e. waste incineration, ferrous and non-ferrous metal production, power generation and heating, production of mineral products, transportation, uncontrolled combustion processes, production of chemicals and consumer goods, miscellaneous, disposals/landfills and hot spots.

An indicative checklist of the possible major release routes for dioxins (PCDDs) and furans (PCDFs) in Zambia, and areas of the industrial employment sectors where the adverse effects of the various categories of Persistent Organic Pollutants (POPs) are impacting on the environment and human health, are illustrated in Table 2.4A.

Table 2.4A: Summary of Major Release Routes for Dioxins and Furans in Zambia

Cat.	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Products	Residue
1	**Waste Incineration**	22.8462	0.000000	0.0000	0.0000	0.2599
2	**Ferrous and Non-Ferrous Metal Production**	1.5232	0.000000	0.0000	0.0000	18.9016
3	**Power Generation& Heating**	5.9124	0.000000	0.0000	0.0000	0.0005
4	**Production of Mineral Prodcts**	0.4784	0.000000	0.0000	0.0000	0.0826
5	**Transportation**	0.0000	0.000000	0.0000	0.0000	0.0000
6	**Uncontrolled Combustion Processes**	0.5522	0.000000	0.0151	0.0000	0.3285
7	**Production of Chemicals and Consumer Goods**	0.0014	0.000021	0.0000	0.0001	0.0029
8	**Miscellaneous**	0.0058	0.000000	0.0000	0.0058	0.0000
9	**Disposal/Landfilling**	0.0000	0.000016	0.0000	0.0000	0.0000
10	**Identification of Potential Hot-Spots**					
1-9	**Total**	**31.32**	**0.000037**	**0.0151**	**0.0058**	**19.58**

The major source of Dioxins and Furans in Zambia is health-care (medical) waste incineration whose principal release vector is air (22.68 g TEQ/a), followed by releases to residue (0.13 g TEQ/a). The second source in ranking is the ferrous and non-ferrous metal production industry whose principal sink is the residues (18.9 g TEQ/a), which has been Zambia's economic lifeblood since time immemorial. Power generation and heating ranks third, and the principal vector of release is air (5.91 g TEQ/a).

There is a great need to put in place mechanisms for the procurement of sophisticated equipment and systems; as well as sourcing for adequate financial resources to support the urgently needed training of personnel who will be able to competently work in such vital chemical management areas as the operation of monitoring equipment in order to generate the necessary database on sources of unintentionally produced POPs.

Chapter 3: Priority Concerns Related to Chemicals (including POPs) Production, Import, Export and Use

3.1 Priority Concerns Related to Chemicals (including POPs) Generation/Production, Import, Export and Use

Priority Concerns Related to Chemicals Generation/Production, Import, Export and Use

As stated in previous sections, Zambia imports approximately 95-97% of her chemical needs, although chemicals account for 25% of total imports. The imported chemicals are used in mining, processing, manufacturing, agriculture as wall as in electricity generation and distribution. From the foregoing a whole spectrum of problems arising from the use of chemicals has to be anticipated.

The manufacturing industries are situated along the line of rail, while agriculture covers all parts of the country. However, the major problems associated with chemicals are mainly found along the line of rail, or in urban areas. The priority concerns are listed in Table 3A.For a list of major industries (see Annex 3).

The Zambian Government is a signatory to various international conventions such as the Rotterdam Convention on Restricted and Banned Chemicals, the Bamako and Basel Convention on Trans-Boundary Movement of Hazardous Wastes and the Stockholm Convention on Persistent Organic Pollutants, Montreal Protocol on the systematic phasing out of ozone depleting substances (ODSs) and mechanisms for finding safer alternatives to the ODSs in order to enhance the protection of human health and the environment from adverse effects of chemicals.

In order to effectively prepare for the implementation of the recommendations from the numerous conventions that Zambia is a Party to, and, in particular the Stockholm Convention, the Government through ECZ continues to prepare the ground, with the support of UNITAR, ECZ carried out a two year project (2001-2003) aimed at laying a sound foundation for the harmonisation of local Chemical Hazard Communication (CHC) administrative systems so as to facilitate conformance with the GHS. The purpose of developing a Chemical Hazard Communication and Globally Harmonised System of Classification and Labelling of Chemicals (GHS) action plan for Zambia was to provide a clear basis for the implementation of activities that were developed by key local sectoral working groups in order to ensure that the impacts (both positive and negative) of chemicals imported/manufactured, distributed, stored, handled, transported, used and disposed of within the country may be properly assessed, managed and mitigated against.

Priority Concerns Related to POPs Generation/Production, Import, Export and Use

Zambia, from August 2002, embarked on the formulation of National Implementation Plans (NIPs) as a Pilot Country among 14 other SADC countries for the environmentally sound management of Persistent Organic Pollutants (POPs). The NIPs formulation process will avail Zambia the opportunity to access funds for implementation of the plans aimed at facilitating compliance to the

Stockholm Convention (SC).

The SC has the overall objective to protect human health and the environment from POPs, with specific responsibilities for Parties (Countries which have signed and ratified the Convention) as well as specific goals set for actions to be undertaken by the Parties for each type of POPs as well as stockpiles and wastes in order to promote, sustain and achieve the sound management of the chemicals staring at the local, through the national up to the international level.
Within the geographic and sub-regional neighbourhoods of Zambia, other NIPs activities have been approved under different UN agencies, with Malawi and Tanzania developing theirs under UNIDO; South Africa and Zambia under UNEP while Zimbabwe's (under UNEP) is still awaiting approval. However, Zambia and three of her closest SADC neighbours (Malawi, Tanzania and Zimbabwe) are still only signatories, while Botswana, Lesotho and South Africa are Parties to the Convention. For the rest of English–speaking Africa, only Liberia is a Party whereas the remainder (Eritrea, Namibia, Uganda, Somalia and Swaziland) are not even signatories yet.

The Convention provides Parties (Countries which have signed and ratified the Convention) with basic objectives, principles and elements for use in developing comprehensive programmes and regimes for addressing their obligations with respect to POPs. The Convention focuses on reducing, and where appropriate, eliminating releases of international POPs of concern which include nine (09) pesticides (insecticides, aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene and hexachlororbenzene); two (02) industrial chemicals (PCBs and hexachlorobenzene), and four (02) by- products (polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs).

The three broad categories of the POPs of International interest (Stockholm POPs) include those which are:

- Intentionally produced and used for pest control e.g. pesticides
- Intentionally produced for industrial use e.g. PCBs
- Unintentionally produced and released, as a result of human activity e.g. PCDDs and PCDFs.

The Stockholm Convention has five (5) essential aims i.e. to:

- Eliminate dangerous Persistent Organic Pollutants, starting with the twelve (dirty dozen) worst
- Support efforts that target a smooth transition to safer alternatives to the POPs
- Target other additional POPs still in use for action
- Clean-up old stockpiles and equipment containing POPs, and
- Mobilise concerted world-wide action that will ensure a POP free future

All categories of POPs share the following properties; that they are:

- Highly toxic
- Persistent, lasting for a long time in the environment before degradation
- Evaporate and travel through the air, water over long distances
- Bio-accumulated in fatty tissue.

Impacts of chemicals (including POPs) are largely in the following areas:

Air Pollution

Air pollution attributable to the use of chemical substances has been associated with areas where mining, fertilizer manufacturing, cement production and quarrying are located. Coal and fuel oils (e.g. diesel powered generators used in the areas where there is no electrical power yet) combustion that fires industrial processes scattered along the line of rail produce CO_2, sulphur dioxide, nitrogen oxides NO_x and particulates, all of which are potential causative agents of air pollution. In the mining sector, emissions of oxides of sulphur and carbon from smelters have led to some areas such as Kankoyo Township in Mufulira experiencing poor vegetation growth. Human and animal life in such areas may also be affected.

Fertilizer production is also associated with the emissions of oxides of nitrogen, sulphur and carbon. The Nitrogen Chemicals of Zambia (NCZ) plant in Kafue is situated in a low-lying area, where wind drift is low, resulting in slow dispersion of emissions. NCZ when operating at full capacity discharges about 12,000 tonne per year of nitrogen dioxide and 40,000 tonne per year of carbon dioxide into the atmosphere. The other problems associated with air pollution are dust and particulate matter from cement making and quarrying operations situated in the Lusaka and Ndola. Consequently, soils at Mount Makulu Research Station near Lusaka have been exposed to contamination from lime from the Chilanga Cement Plant.

One inconspicuous danger from POPs becomes acute in the case of fire accidents involving PCBs containing equipment from where dioxins and furans are likely to be produced and released into the atmosphere.

Pollution in Inland Waters

Effluent from industries is the major source of pollution of the streams and river systems which are the main sources of domestic drinking water. The Kafue River which runs through the Copperbelt towns southwards through Central, Southern and Lusaka provinces, is highly polluted. It is the main source of drinking water for Lusaka City and other towns. According to studies done by the former National Council for Scientific Research (NCSR), now National Institute for Scientific and Industrial Research (NISIR), a lot of inorganic matter is carried down stream, especially where the river passes through mining areas. ZCCM discharges about 500,000 litres per day of water into the Kafue River.

In Kafue, effluent from the tannery, fertilizer plant, textile factory and a few other chemical industries located within a radius of 5km have contributed to considerable effluent loads into the Kafue river. This is because consideration for the environment may not have been taken into account in planning, sitting and construction of the various facilities. Most of the industries discharges in certain cases are not treated before they leave the premises.

Run off from agricultural activity has also contributed to pollution by fertilizers, pesticides and other agrochemical products, with values of nitrates and phosphates as high as 242 and 103.5 mg/l respectively reported for areas near the Nakambala Sugar Estates. These values are above the allowed maximum amounts.

Pollution of Ground Water

The main sources of ground water pollution may be attributable to the long-time storage and disposal of various toxic materials in the open, particularly dumping sites which have contributed to pollution are the tailing dams for mine waste due to acid mine drainage which were operated by the former parastatal mining conglomerate, Zambia Consolidated Copper Mines (ZCCM). The location of waste dumps in unused quarries tends to increase the likelihood of under ground water contamination.
In other industries, where settling dams, ponds or lagoons are in use, underground water is likely to be contaminated through downward seepage. However, the enactment of the EPPCA compelled, as well as enabled the then major mining operators Zambia Consolidated Copper Mines to acquire licenses to:

- discharge tailings effluents into public streams;
- operate domestic waste disposal sites;
- operate tailings dumps;
- operate slag dumps; and
- transport tailings to tailings dams which occupied 9 562 hectares of land.

The likelihood of spillage and leakages from PCB containing equipment could cause pollution of ground water.

Drinking Water Contamination

Most of the drinking water in or near towns is treated against micro-organisms. This reduces the level of contamination to acceptable standards as far as micro-organisms are concerned. Heavy metals and organic chemicals are not completely eliminated during this process. Concern has arisen when treatment chemicals run out, especially during the rainy season when the risk of contamination by runoff water is high.

Soil Contamination

Soil contamination from industrial activities is a result of the non existence of hazardous waste disposal sites, accumulation of obsolete chemicals, inadequate storage, and fall-out from airborne materials. In Kitwe, copper, lead and cobalt levels have been found to be high. High concentrations of lead have been detected near the copper smelter in Kitwe. In Kabwe, surface soils on the north eastern side of Kabwe mine in the Kasanda area, had lead levels in excess of 9 800 mg/kg, with levels of lead in excess of 140 mg/kg of dry soil found at a depth of 100 m. Other investigations found 1 361 mg/kg of lead, 6 639 mg/kg of Zinc and 380 mg/kg of copper in areas near Kabwe mine.

Contamination of soils through leakages, improper handling of capacitors, transformers and stored oils is a source of growing concern.

A new, but highly undesirable, phenomenon leading to uncontrolled release of PCBs into the soil is the cannibalization and vandalism of transformer units previously used by the privatized mining companies in Kabwe, Kitwe and in Ndola at the oil refinery. The situation in Kitwe is exacerbated by the unusual practice of creating scrap yards called “grave yards” where among the scrapped item are capacitors and transformers.

Petroleum products from mechanical workshops have recently become prominent as a cause of soil pollution. Residues from cattle dip disposal liquids sites have also been a source of concern.

Pesticides Residues in Foods

Data on residues of pesticides in foods is not readily available. However, the absence of adequate monitoring facilities and equipment (such as GC-Mass Spectrometry) has hampered quantification of the problem. A project under the Ministry of Health sponsored by FAO/IAEA, did not find significant residues of pesticides in crops. However, there is public concern with regard to the presence of such residues in foods.

Heavy Metals in Food

The prevalence of heavy metals in foods is found in areas where mining activities are taking place, such as Kabwe and the Copperbelt. Crops grown within a 10 km radius of lead mine contain high levels of lead and cadmium. High concentrations of lead were found in vegetables, soyabeans, maize and grass sampled from the leeward side of Kabwe mine. Lead from automobiles using leaded petrol results in contamination of crops near roads. Other chemicals include cadmium, zinc and arsenic.

Hazardous Waste Treatment

Most industrial effluents have hitherto been partially treated, or not treated at all before disposal. Consequently, highly hazardous wastes are present in various places, either on the premises of the waste generator, or in the environment.

Occupational Health: Agriculture

The non-adherence to rules requiring the use of appropriate protective clothing during use, handling and application of chemicals has been a major cause of problems as far as occupational health in agriculture is concerned. In some cases, no protective clothing is used. There is rampart misuse of pesticides and pesticide containers. Most small-scale farmers and their subordinates do not wear protective clothing resulting in pesticide poisoning.

Occupational Health: Industrial

Most facilities are not well ventilated because the priority of most investors is security of the premises. There have been reported cases of workers being locked in workplaces overnight by factory owners during the shifts. If this were to happen in chemical facilities, the potential for serious problems would be high.

Chemical Accidents: Industrial

Few accidents are reported to the Occupational Safety and Health Services Department of the Ministry of Labour and Social Security. However, there were major accidents at the Indeni Petroleum Refinery and British Oxygen Company (BOC) that resulted in damage to equipment and loss of life.

Chemical Accidents: Transport

Most of the reported incidents in Zambia have been associated with tankers carrying petroleum products and sulphuric acid.

Adverse Effects on the Ecosystem

The major segment of the ecosystem which is most adversely affected lies along the rivers into which most wastes from industries are discharged. The presence of persistent organic pollutants (POPs) in some of these discharges affect a number of species in the ecosystem. The presence of the water hyacinth on the Kafue and Kafubu rivers is one such example of the effects on the ecosystem. The wetlands on the Kafue plains are now becoming sinks for most of the pollutants. During outbreaks of the migratory locust and armyworms, large scale spraying of insecticides affects some non-target organisms.

Storage and Disposal of Obsolete Chemicals

The absence of designated storage and disposal sites other than the PCBs storage facilities, has contributed to indiscriminate dumping. Depending on the quantities being generated, some of the wastes are kept on the premises. The security at such storage sites is usually low, increasing the risk of scavenging of dangerous materials by unscrupulous or ignorant people. In addition, over time packaging materials, which are supposed to contain the chemicals, do deteriorate and cause contamination through leakages.

Control of Chemical Imports

The presence of imported sub-standard chemical products and other considerations make it necessary to introduce new systems and establish a cadre of knowledgeable officers at ports of entry. Border controls have been established by the Zambia Revenue Authority, Zambia Bureau of Standards (ZABS) Ministry of Agriculture and Cooperatives and Environmental Council of Zambia.

Table 3.2A: Priority Concerns Related to Chemicals

Nature of Problem	**Level of Concern[1]**	**Ability to Control Problem[1]**	**Availability of Statistical Data[1]**	**Specific Chemicals Creating Concerns**	**Priority Ranking[1]**
Air Pollution	Medium	Medium	Insufficient	Dioxins, Furans, Sulphur dioxide, Nitrogen oxides, Carbon dioxide, Heavy metals	High
Pollution of Inland Waters	High	Medium	Insufficient	PCBs, Chlordane, DDT, Inorganic elements (copper, cobalt, chrome) and dyes hydrocarbons	High
Pollution of Groundwater	High	Medium	Insufficient	PCBs, Chlordane, leachates, inorganics Pesticides	High
Drinking Water Contamination	Medium	Medium	Insufficient	PCBs, Dioxins ,Furans, Metals, hydrocarbon pesticides	High

Nature of Problem	Level of Concern[1]	Ability to Control Problem[1]	Availability of Statistical Data[1]	Specific Chemicals Creating Concerns	Priority Ranking[1]
Soil Contamination	High	Low	Insufficient	PCBs, Chlordane, Dioxins, Lead, Furans, Copper, Cadmium	High
Pesticide Residues in Foods	Medium	Medium	Insufficient	DDT and other Organochlorines and organo-Phosphates	High
Heavy Metals in Food	High	Medium	Insufficient	Lead, cadmium, copper, cobalt	High
Hazardous Waste Treatment/ Disposal	High	Low	Insufficient	PCBs, Sulphuric acid, Inorganics	High
Occupational Health: Agriculture	Medium	Medium	Insufficient	Organophosphate pesticides, Carbamates	High
Occupational Health: Industrial	High	Medium	Adequate	Acids, bases, PCBs, hydrocarbons, radiation sources, dioxins and furans	High
Public Health	Medium	High	Adequate	DDT, organochlorines, PCBs, dioxins and furans	High
Chemical Accidents (Industrial)	Low	Low	Sufficient	Strong acids and bases	High
Chemical Accidents (Transport)	Low	Medium	Sufficient	Petroleum products, acids	Medium
Adverse Effects on the Ecosystem	High	High	Insufficient	Industrial organics/ POPs, inorganics, nutrients (NPK),Heavy metals	High
Storage/ Disposal of Obsolete Chemicals	High	Medium	Insufficient	Various chemicals	High
Control of Chemical Imports	High	Medium	Adequate	DDT, Chlordane, Industrial chemicals	High
Emergency Preparedness	High	Low	Insufficient	Most chemicals	High

3.2 Comments/Analysis

The problems listed above have been identified by various sectors of government, industry and members of the public. Programmes have been instituted to gather more data on the same. Most of these problem areas are already set out in the National Environmental Action Plan (NEAP) document, which represents the national environmental conservation policy.

ECZ is addressing some of these problems through the EPPCA and subsequent regulations, in conjunction with the ministries of Health, Labour and Social Security and Mines and Mineral development. The Mine Safety Department is addressing the problem of air pollution on the Copperbelt. The ERB has instituted some measures to control and monitor the use and transportation of petroleum products.

Few industrial accidents have been reported because a relatively small number of companies are registered with the Occupational Safety and Health Services Department. The Workmen's Compensation Control Board also plays a complementary role as far as the provision of accident information at the workplace is concerned. Nevertheless, a closer look needs to be taken in terms of collecting more data to facilitate implementation of remediation programmes, including regular monitoring of foods at markets and stalls for pesticides and toxic substances residues. There is need to monitor chemicals regularly throughout their life cycle and strengthen laboratory facilities in the country.

There are other examples of other non-Stockholm POPs that are directly or indirectly imported into the country, and are therefore in common use in Zambia. These include chlordecone, endosulphan, phthalates and polybrominated diphenyl ethers (PBDEs).

The above-named POPs are possible candidate chemicals for urgent consideration under the PIC procedures.

In 1996, UNEP initiated a project titled "Regionally Based Assessment of Persistent Toxic Pollutants (PTSs)". The project which was funded by the Global Environment Fund (GEF) was designed to gather data and assess the sources, environmental concentrations, transboundary movement and effects of a selected number of PTSs, including POPs.

During its execution, the projects cast its nets much wider than the Stockholm POPs so as to yield results that would give GEF and other funding agencies much firmer ground in setting priorities for future action to mitigate the effects of PTSs.

The objective of the project was to provide a qualitative and quantitative measure of the threats and damage to the environment and human health posed by PTSs. The results of the afore-mentioned project will be of interest to Zambia's future attempts to deal with all types of PTSs.

Among the alternatives and measures recommended to be put in place to eliminate and/or reduce the negative impacts of the SC POPs are the following, discussed by category:

Pesticides POPs

Several mechanisms are available for possible exploitation, among which are:

- Application of a precautionary approach that will lead to
  - systematic rapid assessments; monitoring; risk reduction and the development of safer substitutes
  - development of fast-track prioritisation of identified culprits among POPs in current use so that they are exposed, then targeted for reduced use and eventual elimination and/or substitution
- Use of Integrated Pest Management (IPM) , which is already in use in Zambia
- Use of Integrated Vector Management (IVM) which offers an alternative strategy towards

the control of the anopheles mosquito (malaria vector) as is the case in the Roll Back Malaria (RBM) initiative which Zambia is involved in

- Use of genetically engineered Pest Resistant Plants
- Use of organic agriculture, whereby chlorinated pesticides and other chemical procedures, including fertilisers are avoided in favour of natural biological resources.

POPs Stockpiles and Wastes

The Food and Agricultural Organisation of the United Nations together with other Donor Agencies have been actively assisting Zambia and other SADC countries to effectively deal with the establishment of inventories of the offending POPs such as PCBs and elimination and destruction of obsolete fertilizers and other chemicals under the ASP and SADC PCB Inventory projects.

The specific application of Best Available Technology (BAT) to reduce the use of SC POPs is most attractive in the case of PCBs. Whereas in the past incineration was a viable option, it has been proven that the destruction of PCBs by incineration generates other SC POPs (dioxins and furans) leaving only one safe option for economies with lower financial capacity to resort to more sophisticated technologies i.e. the retro-filling capacitors and transformers with PCB-free oil.

Chapter 4: Legal Instruments and Non-Regulatory Mechanisms for (or Relevant to) Managing Chemicals, including POPs

Stringent controls in the use of chemicals, is one of the ways through which chemicals risks to human health and the environment can be adequately managed. Controls are put in place through legislation, regulations, guidelines or codes of practice as minimum requirements to be observed in the handling, use, application, storage, and disposal of chemicals. Legal instruments can contribute to a more efficient approach to the sound management of chemicals provided that the instrument/ laws are adhered to by the targeted stakeholders, and that the enforcement mechanisms are applied strictly.

The laws in place require that chemicals used should be registered. Before a chemical is registered for use, evidence is required to show that it has been adequately evaluated for toxicity, biodegradability, persistence, and that the chemical will pose minimum adverse effects to users and the environment.

4.1 Overview of National Legal Instruments Which Address the Management of Chemicals

The enactment of the Environmental Protection and Pollution Control Act (EPPCA) No. 12 of 1990 paved the way for the consolidation and integration of various pieces of legislation into a single Act, in order to cover all aspects of environmental protection and pollution. The EPPCA covers all aspects of Air and Noise Pollution, Waste Management, Water Pollution Control, Pesticides and Toxic Substances, Ionising Radiation and Natural Resources Conservation.

In the health sector, controls by the Public Health Act ensure the prevention and suppression of diseases to man; disinfections; control of malaria and pollution of water sources. The Food and Drugs Control Act and the Pharmacy and Poisons Act ensure that medicaments and pharmaceuticals and other related products meant for human and animal consumption meet acceptable standards of quality.

The Factories Act is tailored to protect the health of workers, including those in the agriculture

sector, from any adverse effects of chemicals at the work place.

The legal instruments covering the broad categories of the POPs (including pesticides, industrial chemicals, and unintentional by-products formed and/or released from thermal processes involving organic matter and chlorine, particularly in situations of incomplete combustion (such as PCDDs and PCDFs) from industrial production and waste management activities of interest with respect to the Stockholm Convention include the following laws, as elaborated in Table 4.A:

- Environmental Pollution Prevention and Control Act CAP 204 No. 12, 1990
- Factories Act CAP 14, of 1967
- Public Health Act CAP 295,
- Local Government Act No. 22, of 1991
- Ozone Depleting Substances Regulations, S.I. No. 27 of 2000
- Hazardous Waste Management Regulations, S.I. No. 125 of 2001
- Noxious Weed Act CAP 343
- Tsetse Control Act CAP383
- National Council for Construction Act No 13, of 2003

Table 4.A below elaborates the numerous laws, resident in Government line ministries, which govern the day-to-day chemicals management in Zambia.

Table 4.A: Existing Legal Instruments which Address Chemical Management

Legal Instrument (Type, Reference, Year)	**Responsible Bodies/ Ministries**	**Chemical Use Categories Covered**	**Objectives of Legislation**	**Relevant Articles/ Provisions**	**Resources Allocated (Fiscal Year 2003/4)**
EPPCA CAP 204 No. 12, 1990	ECZ- (MTENR)	Industrial and Agrochemicals	Environmental protection and pollution control; Establish ECZ	Part IV-X	
Waste Management (Licensing of Transporters of Waste and Waste Disposal Sites) Regulations (under EPPCA) SI No. 71, of 1993		Transportation of industrial and domestic waste	Regulation and control of waste disposal	Licence requirements for vehicles, pipelines and equipment for the transportation of waste to disposal sites/plants	(MTENR) 109 086 552 106
The Water Pollution Control (Effluent and Wastewater) (under EPPCA) S.I. No. 72, of 1993		Waste water or other fluids of domestic origin	Ensure effluents/ Discharges conform to set standards	Requirements for licenses to discharge, Standards	
Air Pollution Control (Licensing and Emission Standards) Regulations, S.I. No. 141 1996		Emissions from industrial processes	Licensing of industries that emit pollutants into the atmosphere Issuance of Emission Standards	Requirements for emissions to the environment	(MTENR) 109 086 552 106
Environmental Impact Assessment Regulations S.I. No. 28 of 1997			To contribute to sustainable development by ensuring that all developmental plans and projects take into account Environmental concerns	Ensuring all development plans and projects take into account Environmental concerns	(MTENR) 109 086 552 106
Ozone Depleting Substances Regulations, S.I. No. 27 of 2000	(MTENR)	Ozone depleting substances and/or technologies	To control import/export of ODS and technologies	Licensing of industries Which handle, import/export distribute ozone depleting substances or technology that uses ODS	(MTENR) 109 086 552 106

Table 4.A: Existing Legal Instruments which Address Chemical Management(Continued)

Legal Instrument (Type, Reference, Year)	Responsible Bodies/ Ministries	Chemical Use Categories Covered	Objectives of Legislation	Relevant Articles/ Provisions	Resources Allocated (Fiscal Year 2003/4)
Hazardous Waste Management Regulations S.I. No. 125 of 2001		Hazardous wastes	To control and monitor matters relating to generation, storage, transportation, pre-treatment, treatment, disposal, export, import and transboundary movement of hazardous wastes		
Noxious Weeds Act CAP 343		Weed killers	To regulate the eradication of noxious weeds		(MTENR) 109 086 552 106
Natural Resources Conservation Act CAP 315		All chemicals	Proper management of chemicals		(MTENR) 109 086 552 106
Local Government Act No. 22, of 1991	MLGH	Trade effluents, various pests, larvae, weeds, petroleum products	To control weeds/pests and diseases, storage of petroleum, flammable substances/explosives, and solid waste disposal		(MLGH) 41 986 819 098
Public Health Act CAP 295	MoH/Local Authorities	Pesticides	To prevention and suppress diseases to man; disinfections; control of malaria and pollution of water sources by pesticides	Part XII article 89	802 399 491 433 (Mc
Pharmacy and Poisons Act CAP 536	MoH	Class II Poisons	To control of the Pharmacy Profession; trade in drugs and poisons	Part III Sections 11, 12,25 26 Parts IV, VI, VIII &XI	(MoH)
Food and Drugs Act CAP 303	MoH	Pesticide residues and Food additives	To control the content of toxic materials in food, and quality of drugs	Parts II-V	(MoH)
Ionisation Radiation Act CAP 552 **SI No. 171, of 1992**	MoH	Radioactive materials	To protect users/and the public from ionising radiation sources and materials	Parts II, III, IV	(MoH)

Table 4.A: Existing Legal Instruments which Address Chemical Management (Continued)

Mining (Amendment) Regulations, 1973	Mine Safety Department (MMMD)	Inflammable materials; calcium carbide	Occupational safety in mining/ production activities	Part XXI Miscellany	(MMMD)
Mines and Minerals Act No. 32, of 1976	Mines Development Department (MMMD)	Metallurgical processing chemicals	To control of effluents/ discharges from treatments/ processes		(MMMD)
Ventilation and Air Pollution Regulations	Mine Safety Department (MMMD)	Emission of toxic gases	Occupational health and safety; Provision of adequate ventilation; Air pollution control	Mining Regulations Nos. 902 and 936	(MMMD)
First Aid and Fire Fighting Regulations	Mine Safety Department (MMMD)	Cyanides and antidotes	Occupational health safety in Emergency Preparedness	Part XII	(MMMD)
The Mines (Minerals Resources Extraction) Regulation SI No. 119, of 1994	Mine Safety Department (MMMD)	Evolution of sulphur dioxide bearing emissions to the atmosphere	Environmental protection and pollution from fugitive gases; To regulate the prospecting for minerals; safety and health		(MMMD)
Mines and Minerals Act No. 31, of 1995	MMMD	Chemical substances in prospecting	Regulates the use of chemical substances in prospecting and provides for minerals. Ref: Part VI	Part VI Safety Letter No. A42	7 860 344 796 (MMMD)
Control of Goods Act CAP 690 SI No. 381, of 1967	MCTI	Goods; various, especially chemicals	To control the import/ export, distribution, purchase, disposal of manufactured commodities	Section 3: Schedules 3&6	15 419 726 483 (MCTI)
Standards Act No. 20, of 1994	ZABS-(MCTI)	Manufactured products	Ensure quality and standardization of products, especially manufacturing processes involving chemicals.		(MCTI)
Water Act CAP 312	MEWD	Water pollution control	Environmental protection	Part VII Sections 56 & 57	31 336 706 490 (MEWD)

Table 4.A: Existing Legal Instruments which Address Chemical Management (Continued)					
The Agriculture (Fertilizers and Feeds) Act CAP 351	MACO	Fertilisers	Regulates and controls, importation, manufacture, processing, storage use/ handling, sale of fertilizers and farm feed.	Ref: Parts II, IV, V, VIII, IX	119 218 623 494 (MACO)
Plants Pests and Diseases (Phytosanitary Act) CAP 346	MACO	Pesticides	To control plant pests and diseases through the use of pesticides	Sections 6-9,11 & 13	(MAC)
Tsetse Control Act CAP 383	Department of Veterinary and Tsetse Control Services-(MAC)	Pesticides	To control and prevent the spread of tsetse flies	The Tsetse Control Pickets Regulations	15 419 726 483 (MCTI)
Petroleum Act CAP 424, of 1985	MEWD	Petroleum	Regulates importation, storage, transportation and handling of petroleum and other inflammable oils and liquids.		(MEWD)
Factories Act. CAP 14	MLSS	Vessels containing dangerous substances e.g. scalding/corrosive/poisonous liquids	To regulate and control the use, handling and processing of chemicals in the work place	Part VI Sections 33, 38, 39	343 056 000 000 (MLSS)
National Council for Construction Act No.13 of 2003			To regulate and control the use, handling and processing of chemicals in the construction industry		

Table 4B depicts below enumerates exclusive POP related laws resident in key line ministries

Table 4B: Existing Legal Instruments which Address POPs –Related Chemical Management

POP Category/ Stage of Chemical Use	Importation/ Exportation	Production	Storage	Transport	Distribution/ Marketing	Use/Hand	Disposal
Pesticides	EPPCA	EPPCA	EPPCA	EPPCA	EPPCA	EPPCA Public Health Act Phytosanitary Act Noxious Weed Act Tsetse Control Act OSH Act	EPPCA
Industrial Chemicals	EPPCA Control of Goods Act	EPPCA	EPPCA	EPPCA	EPPCA	EPPCA Mine & Minerals Act No. 31 of 1995	EPPCA Local Government Act Ozone Depleting Substances Regulations (SI 27 of 2000)
Dioxins & Furans	N/A	N/A	N/A	N/A	N/A	N/A	Local Government Act
Stockpiles and Wastes	S.I. No 125 of 2001 HWM Regulations	S.I. No 125 of 2001 HWM Regulations	S.I. No 125 of 2001 HWM Regulations	S.I. No 125 of 2001 HWM Regulations	N/A	S.I. No 125 of 2001 HWM Regulations	S.I. No.125 of 2001 HWM Regulations

4.2 Summary Description of Key Legal Instruments Relating to Chemicals

The principal legal instrument governing the environmentally sound management of chemicals in Zambia is the EPPCA. This Act regulates, inter alia, the following activities:

- Water pollution, by ensuring water quality; determining the conditions of discharge of effluents, as well as determining appropriate internationally recognised standards and analytical methods;
- Waste management, through the classification and/or analysis of wastes and waste disposal methods, as well as the monitoring and regulation of disposal sites;
- Pesticides and Toxic Substances management, through stringent registration and requirements with respect to the classification and labelling of chemicals and chemical products, packaging, storage, transportation, general handling, use and safety, and final disposal of these materials; and
- Air and Noise Pollution by providing baseline data and continuous information on emissions and ambient air quality as a tool for enforcement, awareness, planning and policy making

Licensing for Chemical Management (Enforcement Capacity).

This sector of chemical management mechanisms is based in the Pollution Control Division of the ECZ Inspectorate. The major players are the:

- Waste Management (WM) Unit;
- Water Pollution Control WPC) Unit;
- Air Pollution and Noise Abatement (APNA) Unit (incorporating the National Ozone unit);
- Pesticides and Toxic Substances (PTS) Unit, and
- Hazardous Waste Management Unit

Licensing under the sub-sector dealing in the importation of PTSs has made the most strides with 115 and 24 licenses (expiring in 2002/2003) having been issued, while 46 and 3 respectively for distribution. Other categories were recorded, i.e. 2 for the discharge of effluents (under water pollution), 4 for the transportation of wastes (under waste management) and 2 for emissions into the air (under air pollution and noise abatement) for 2003 compared to 2002 when 59 waste transportation, 19 effluent discharge, 6 pest control, 6 fumigation (both under PTS), 2 waste storage, 3 treatment, 1 incineration and 1 disposal licenses were issued.

Regulations under the EPPCA cover all classes of pesticides, industrial chemicals and hazardous wastes. The Pharmacy and Poisons Act covers Class II poisons and provides for their regulation. With respect to pesticides and toxic substances and residues in food, the Food and Drugs Act gives guidelines with respect to acceptance levels in foods, while the Explosives Act regulates the transportation of explosives. The Fertiliser Act provides for the control of the importation, use, storage and disposal of fertilisers, while the Petroleum Act regulates the management of petroleum products.

4.3 Existing Legislation by Use Category Addressing Various Stages of Chemicals from Production/Import through Disposal

The EPPCA was enacted to cover all aspects of chemicals management under the authority of a single national institution. Other aspects of environmental management are still under different authorities, such as the control of levels of pesticide residues and toxic contaminants in foods; the

transportation of inflammables, corrosives and chemical poisons, including matches, oily goods and compressed air; the importation, storage and use of fertilisers; the use of chemical substances in prospecting for minerals; and the control of emissions from metallurgical activities, especially the evolution of sulphur dioxide, among many others.

The Tsetse Control Act provides for the use of insecticides in the control of tsetse flies (glossina spp) in infested areas. Occasionally, outbreaks of army worms (spodoptera spp) and migratory locusts (locusta spp) entail the use of large quantities of insecticides resulting in the release of large quantities of chemicals on to the ecosystem with attendant risks to both human health and the environment.

Table 4.C below gives a broad outline of the various government authorities that are involved in the management of chemicals in specific categories of use.

Table 4C: Overview of Legal Instrument to Manage Chemicals by Use Category

Stage/Class of Chemicals	Importation	Production	Storage	Transport	Distribution/ Manufacturing	Use/ Handling	Disposal
Pesticides (Agricultural, Public Health and Consumer)	✓	✓	✓	✓	✓	✓	✓
Fertilisers	✓	✓	✓	✓	✓	✓	✓
Industrial (Used in manufacturing /processing facilities)	✓	✓	✓	✓	✓	✓	✓
Petroleum Products	✓	✓	✓	✓	✓	✓	
Consumer Chemicals	✓	✓	✓	✓	✓		

Table 4D: Approaches and Procedures for Control of Chemicals

	Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Classification	✓	✓	✓	✓	✓	✓	✓
Registration of Products	✓	✓	✓	✓	✓	✓	✓
Permits (e.g. discharge)							
Licenses (e.g. to operate)	✓	✓	✓	✓	✓		
Reporting Required	✓						
Inspections	✓	✓	✓	✓	✓	✓	✓
Information to Workers		✓	✓	✓	✓	✓	✓
Information to Public			✓	✓	✓	✓	✓

4.4 Summary Description of Key Approaches and Procedures for the Control of Chemicals

The major approach to the control of chemicals is through product registration which is the stage at which a chemical is assessed for efficacy, safety of use, toxicity and eco-toxicity, persistence and behaviour in the environment. At the same time, the label is assessed for accuracy and completeness of information to the users. Requirements for registration of chemicals came into force in 1994, are on-going, and should benefit from current positive developments in chemical management. The registration provides for the issuing of a certificate of registration.

Permits are issued for the discharge of effluents, transportation of wastes and for the operation of disposal sites. A time-linked reporting system has been instituted in order to facilitate the monitoring of compliance in these cases. The Occupational Safety and Health Services Department (under MLSS) registers factories and construction sites which, by law are supposed to be regularly visited for necessary inspection to ensure conformance to set standards. The Inspectorate Units in various ministries visit industries to check on operations, collect samples and generally monitor compliance to relevant regulations.

With respect to the Prior Informed Consent (PIC) procedure, the interim decisions under consideration, subject to periodic review are tabulated below:

Table 4E: Approaches and Procedures for the Control of PIC Chemicals Table 4E: Approaches and Procedures for the Control of PIC Chemicals

Product/ PIC Chemical	Comments	Remarks
Aldrin	Restricted. Final decision under active consideration	Product usage can be monitored; restricted to use in building foundations only.
Chlordane	Restricted. No action yet	Persistent in the environment; restricted to termite control in construction and building industries
Chlordimeform	No action yet.	Persists in the environment
Crocidolite	No action yet	
Cyhexatin (*)		Safer miticides available
DDT	Restricted.	Restricted to controlled use under WHO
Dieldrin	Restricted.	As for Aldrin.
Dinoseb Salts	No action yet.	Highly toxic
EDB	Restricted.	Highly toxic product; Use restricted to commercial farmers with appropriate equipment and expertise
Fluoroacetamide	Restricted.	Highly toxic rodenticide; safer alternatives available
HCH	Restricted.	Safer, non-persistent alternatives available
Heptachlor		Persists in the environment
Mercury Compounds	No action yet.	Highly toxic
Polybrominated Biphenyls (PBBs)	No action yet.	Persistent in the environment, bioaccumulates; has adverse effects on human health
Polychlorinated Biphenyls (PCBs)	No action yet.	Persists in the environment, bioaccumulate
Tris- (2,3dibromopropyl) phosphate	No action yet.	

(*) Information on original action is being reviewed; chemical may be removed from PIC list.

4.5 Implementation of Legal Instruments

Legal instruments require that chemicals do not, under normal conditions of use, cause harm to the user/handlers and the environment. It is for this reason that the chemicals' behaviour is assessed at registration.

During the period 2001 to 2003, Zambia was involved, as a pilot country in a Chemical Hazard Communication project aimed at raising awareness levels in the general public (the consumer in particular); the agricultural sector, the transport sector and industrial production sector with special reference to the environmentally sound use of chemicals bearing in mind the hazards inherent in the nature of chemicals. Many of the project's outcomes point to the fact that certain aspects of the existing law have to be amended in order to harmonise local administrative aspects with the GHS. It is thus imperative that the registration system that was started in 1993 be given a chance to take root under the more universally established and acceptable system. Nevertheless, inspection and monitoring of operational facilities is on going.

Legal Requirements for the Managing POPs.

Controls in place include legislation, regulations, guidelines, as well as codes of practice, as a minimum to be observed in the handling/use/application/storage/and use of POPs.

Legal instruments (Table 4.C under section 4.3) offer more efficient approaches to the sound management of POPs provided the law is adhered to and strictly enforced.

In implementing the Stockholm Convention which requires (according to Article 6 of Annex A) Parties to identify, label and remove from use, equipment containing PCBs, and to dispose of the waste PCB-containing materials in an environmentally sound manner. Zambia will endeavour to take all measures necessary to eliminate the use of PCBs in equipment by 2025.

4.6 Non-Regulatory Mechanisms for Managing Chemicals

Through the leadership of the Zambia Agrochemicals Association (ZAA), the pesticides industry has, over the years developed a voluntary Code of Practice aimed at encouraging its members to adhere to certain minimum professional as well as ethical standards of practice. However, the liberalised economic practices in commerce promoted by Government since the early 1990s have created a situation in which there are pesticide dealers who are not members of ZAA who may therefore not be easily persuaded to observe the code, thus reducing effectiveness of the benefits that could potentially accrue from this mechanism.

The Environmental Management System (EMS) encourages each individual facility to have in place, a Corporate Environmental Policy as a way of promoting environmental awareness on the part of management and workers. The environmental policy is a statement of observance of practices that do not endanger the environment. This is in the form of an internal organisational control put in place by the management, with the aim of monitoring other controls.

The Energy Regulation Board (ERB) and MoH have regulations and Codes of Conduct that control the players in the petroleum and health sub-sectors. The voluntary mechanisms discussed above and many others that might be introduced need to be backed by strong dedicated institutional bodies as well as individuals to lead and give guidance in order to enhance chances of success that may accrue

in the long term The Competent Authority has to lay down favourable incentives to encourage pro-active responses from targeted stakeholders.

Non Regulatory Internal Controls on the use of PCB Containing Machinery

The fact that Zambia has signed the Stockholm Convention places a lot of pressure on local technical and administrative authorities in charge of PCBs containing equipment to ensure conformance to the barest minimum requirements.

Strict requirements have been devised and instituted by the competent authority and placed on the following aspects of operation with respect to ensuring that PCB containing equipment is totally removed. The following self-regulating systems have been put in place to enhance capacity for best practices purposes:

- use only in allowed locations for these items
- keep accurate records
- continuous monitoring
- ensuring that all offending materials are properly marked
- Disposal of the items

In the last resort, to ensure conformity with the Stockholm Convention, phasing out of non-compliant equipment currently in use has been set for 2015. No more PCB containing equipment are allowed into the country.

4.7 Comment/Analysis

Most of the overlaps and gaps in the environmental management of chemicals have been taken care of by the enactment of the EPPCA. By this action, most of the priorities identified in Chapter 3 have been or are being addressed. The overlaps between the Pharmacy and Poisons Act (covering Class II poisons) and the EPPCA on the registration of chemicals will, for some time continue to exist until the laws are harmonised.

As regards the control of pests and diseases, there are also overlaps among the Local Government Act No. 22 of 1991; the Noxious Weeds Act Cap 343; the Plants, Pests and Diseases (phytosanitary) Act Cap 346 and the Public Health Act Cap 535 which will be resolved when the law is harmonised at the operational and administrative levels.

New regulations are now in place in those sectors that were in their infancy in 1996. These include Air and Noise Pollution Control (ANPC), Chemical Safety Regulation (CSR), Environmental Impact Assessment (EIA), and Occupational Health and Safety (OHS) Act to incorporate all institutions dealing with OHS.

However, available laws do not cover all foreseeable aspects. Thus there is a need for amendments to pertinent existing laws in order to provide for the inclusion of appropriate technical specifications for the anticipated minimum quantities (mass/volume) to which the regulations may apply; and also to state how the law relates to pesticides imported by Donor Agencies; the need to place a mandatory requirement for Certificates of Analysis and SDS`s (as part of documentation) to accompany shipments as a guarantee for the quality and safety of chemicals at or before importation.

The area of hazardous wastes still remains hazy as there are no specific guidelines in place to regulate the management of such special categories of wastes as health-care (hospital) waste, paints, solvents, used batteries, waste oils and lubricants from motor vehicle repair workshops (i.e. greases, brake fluids etc)m.

In order to effectively tackle POPs-related management issues in the sectors of the general public and consumers, as well as environmental health protection; protection of workers, especially those workers involved in insecticide spray operations in vector control and in agriculture, new regulations need to be developed to ensure conformance of the laws listed below to the Stockholm Convention:

- Public Health Act;
- Local Government Act;
- Factories Act, and
- National Construction Council Act No 13, of 2003.

Finally, it is envisaged that, in future it will be mandatory for each company or facility to have a company profile because this action will make data collection on chemicals much easier.

The critical issue regarding the need for the provision of adequate funding of the safety of operatives working at all levels must be vigorously addressed in order to not only facilitate, but also to guarantee the effective implementation of the administrative and legal requirements for the sound management of chemicals. In particular, it is necessary to point out that the budgetary figures allocated to line ministries should always be closely matched with the corresponding disbursements.

Chapter 5: Ministries, Agencies and Other Institutions Managing (or Related to Managing) Chemicals, including POPs

5.1 Responsibilities of Different Government Ministries, Agencies and other Institutions

5.2 Description of Ministerial Authorities and Mandates

5.3 Comment/Analysis

5.1 Responsibilities of Different Government Ministries, Agencies and other Institutions

The responsibility of ensuring that chemicals do not present adverse effects to humans and the environment rests with various Government ministries and institutions through laws, regulations, guidelines and other measures that provide some degree of protection.

The ministries involved in ensuring that minimum damage occurs to the environment from the use of chemicals include the Ministry of Tourism, Environment and Natural Resources (MTENR), the Ministry of Health (MoH), the Ministry of Labour and Social Security (MLSS), the Ministry of Agriculture and Cooperatives (MACO), and the Ministry of Mines and Mineral Development (MMMD). The afore-mentioned lead ministries and many other line ministries involved in the routine management of chemicals are listed in Table 5.A below.

Table 5A: Responsibilities of Government Ministries, Agencies and other Institutions

Stage of Life-Cycle/ Ministry Concerned	Import-ation	Produ-ction	Storage	Trans-portation	Distributio /Marketing	Use/ Hand-ling	Disposal	Disaster Prepared ness
MTENR	✓	✓	✓	✓	✓	✓	✓	✓
MoH	✓	✓	✓	✓	✓	✓		✓
MACO	✓	✓	✓	✓	✓	✓		✓
MLSS		✓	✓		✓	✓	✓	✓
MCTI	✓	✓	✓	✓	✓			
MMMD		✓	✓			✓	✓	✓
MST						✓	✓	
MFND	✓							✓
MCT				✓				
MHA	✓							✓
MFA	✓							
MLGH	✓		✓	✓		✓	✓	✓
MEWD	✓		✓	✓		✓	✓	✓
MoD	✓		✓	✓		✓	✓	✓

The broader aspects relating to the POPs-related responsibilities of Government ministries, Agencies and other institutions are listed in Table 5.B below.

Table5B: POPs-related Responsibilities of Government Ministries, Agencies and other Institutions

Stage of Life Cycle/ POP Category	Importation	Production/ Monitoring	Storage	Transp- ortation	Distrib/ Marketing	Use/ Handling	Disposal	Disaster Prepared ness
Pesticides POPs/DDT	ECZ	MLGH/ MLSS/ ECZ/MACO	ECZ/ MoH	ECZ	MoH/ZAA	ECZ/ MoH	ECZ	ECZ/ MoH
Industrial Chemicals	ECZ	MMMD/ ECZ/NCC /ZBS	ECZ	ECZ	ECZ	ECZ/ OHSSD OHSRB	ECZ	ECZ/MoH
Dioxins & Furans	-	ECZ/MMMD MLGH	-	-	-	-	ECZ	ECZ/ MLGH /MoH
Stockpiles and Wastes	-	ECZ/MoH /MLGH	ECZ/MoH MLGH	ECZ	ECZ	ECZ	ECZ	ECZ/MoH

5.2 Descriptions of Ministerial Authorities and Mandates

In Zambia, ECZ, a quasi-government statutory body under the Ministry of Tourism, Environment and Natural Resources is the National Focal Point in matters relating to the sound management of chemicals. As the Lead Agency at the national level, ECZ provides the vital technical competence base for information exchange with international, regional, sub-regional, national and local stakeholder institutions. The ECZ thus provides a systematic administrative conduit for matters relating to chemicals management, and performs the overall Secretariat functions on programmes relating to chemical management.

ECZ has been working on programmes to strengthen Chemical Management and Administrative Framework to enhance enforcement capacity on the ground. In this regard, ECZ management instituted the Strategic Plan for 2001-2005 which specifically targets the adoption of focused directions within the operating units key among which include:

- engaging stakeholders in developing and implementing sound practices for solid waste management in Zambia e.g. by improving the management and siting of disposal sites;
- reducing air pollution from industrial emissions in urban areas e.g. by providing baseline data and continuous information on emissions and ambient air quality as a tool for enforcement, awareness, planning and policy making ;
- monitoring and improving the management of surface and ground water pollution e.g. by building a comprehensive and organised information base on surface and ground water pollution and its effects as a basis for licensing and monitoring;
- co-ordinating and advising stakeholders in the use of and management of natural resources e.g. by increasing community participation in the natural resources management, especially by building capacity in District Natural Resource Committees, selected NGOs and community Based Organisations (CBOs) to provide awareness to stakeholders; and
- Improving the management of pesticides and industrial chemicals in Zambia, especially by ensuring that by the end of the plan at least 90% of the dealers in pesticides; 90% of the dealers in agrochemicals and 60% of the dealers in industrial chemicals are registered, and lastly ensure compliance with regulations

Ministry of Tourism, Environment and Natural Resources

The ministry which has since 1996 had its title changed from Ministry of Environment and Natural Resources (MENR) to Ministry of Tourism, Environment and Natural Resources (MTENR) is mainly concerned with natural resources conservation, while the maintenance of environmental quality is the responsibility of the ECZ. This is done through the Pesticides and Toxic Substances (PTS), Water Pollution Control (WPC), Waste Management (WM), and the Air Pollution and Noise Abatement (APNA) (incorporating the National Ozone unit) and Environmental Impact Assessment Inspectorates.

Ministry of Health

The Ministry of Health (MoH) administers the following Acts:

- The Food and Drugs Act, administered through the Food and Drugs Board and the Inspectorate Officers based in MoH as well as other inspectors based in MLGH Public Health Departments of the Local Authorities. The Food and Drugs Board operates a referral laboratory which offers services to government agencies as well as the private sector. The laboratory also monitors the quality of chemicals and drugs;
- The Ionising Radiation Act, enforced through the Radiation Protection Services (RPS). The officers in this unit monitor all non-ionising and ionising radiation at places of work and in the general environment. They inspect machinery such as radiological equipment used in hospitals, for sources of radiation;
- The Pharmacy and Poisons Act, enforced through the Pharmacy and Poisons Board and Medical Supplies Department. It monitors all pharmaceutical and medical supplies including some chemicals (Class II poisons) which are imported into the country. The registration of all other non-medical chemicals is the domain of ECZ;
- The Pneumoconiosis Act is administered thorough the Occupational Health and Safety Research Bureau (OHSRB) based in Kitwe. OHSRB monitors occupational diseases in workers. It also carries out hazard assessment measurements at the work place. The institute has highly qualified personnel namely: medical doctors, health technicians, paramedics, industrial hygienists, nurses etc.; and
- The Public Health Act, enforced through the Central Board of Health and Local Authorities under the ministry of Local Government and Housing.

Ministry of Finance and National Development

The Ministry of Finance and National Development (MFND) is an active participant in the management of chemicals through the strict border controls and surveillance undertaken by the Zambia Revenue Authority (ZRA). ZRA, through the Customs and Excise Department, monitors and controls the importation and exportation of goods in conjunction with collaborator personnel from the ECZ to ensure that not only are products registered prior to importation into the country, but also that the correct revenues due in the form of duties and levies are collected.

Ministry of Home Affairs

The Ministry of Home Affairs (MHA), through the Drug Enforcement Commission (DEC), has meticulously mounted a rigorous programme aimed at ensuring that traffic in illicit drugs and other narcotic substances is curtailed whilst providing community public awareness raising educational

activities on the dangers inherent in drugs abuse and other related issues. The DEC also helps national healthcare agencies in the establishment and sustenance of rehabilitating facilities for local addicts. The DEC actively participates in inter-ministerial matters such as the collaboration with the Food and Drugs Control Laboratory (under MoH) and the Customs and Excise Department (under MFND).

Ministry of Labour and Social Security.

This ministry is responsible for the administration and enforcement of the provisions of the Factories Act. This Act is enforced through the Occupational Safety and Health Services (OSHS) Department. The legislation is aimed at protecting workers against occupational accidents and diseases. The OSHS Department carries out systematic inspections of all premises covered by the factories Act, i.e., factories, construction sites, as well as farms to ensure the protection of workers from the hazards inherent in chemicals and physical agents, and also biological, physiological, mechanical and psychological hazards.

Ministry of Agriculture and Co-operatives.

This ministry, whose title has since 1996 changed from Ministry of Agriculture Food and Fisheries (MAFF) to Ministry of Agriculture and Co-operatives (MACO), administers the following Acts:

- the Fertilizer Act which controls the importation and use of fertilizers;
- the Phytosanitary Act which is aimed at the eradication and prevention of the spread of plant pests and diseases in Zambia as well as prevention of the introduction of plant pests and diseases from outside the country; and
- the Tsetse Control Act administered through the Department of Veterinary and Tsetse Control Services, which control and monitors general animal health and diseases.

The ministry also provides extension services to farmers in animal and crop production.

Ministry of Mines and Minerals Development.

This ministry enforces the provisions of the Mines and Mineral Act through the Mines Safety Department, and is concerned with health and safety of mine workers and persons living in mining areas, and the protection of the environment both during the life of the mine, and after cessation of active mining. The mining industry provides substantial employment opportunities. The ministry's responsibilities with respect to chemical management are similar to those of the OSHS Department (under MLSS), but are applicable only to the mining sector. The department has good monitoring equipment and qualified personnel. However, monitoring is weak.

Ministries of Education (MoE), and Ministry of Science, Technology and Vocational Training (MSTVT).

These two ministries, have since 1966 been spilt into two separate entities. The Ministries are now titled Ministry of Education; and, Ministry of Science, Technology and Vocational Training, respectively. The former deals with educational issues from the primary up to secondary level as well as university level, while the latter deals with post secondary skills and vocational training aspects. The two ministries therefore have a major role to play in the process of laying down a

formidable foundation that is necessary for acquisition of information on the management of chemicals in the country through the provision and inclusion of environmental education in the curricula in formal education. Institutions within government that run relevant programmes include the University of Zambia (UNZA), Great East Road Campus in Lusaka; Copperbelt University (CBU), Riverside Campus in Kitwe; Technical Education and Vocational Training Authority (TEVETA) with over two hundred registered institutions spread over the whole country; Chainama Hills College of Health Sciences and Evelyn Hone College of Applied Arts and Sciences in Lusaka.

Ministry of Commerce, Trade and Industry.

The Ministry maintains statistics on companies operating in the industrial production sector of the Zambian economy. The ministry enforces the Standards Act through the Zambia Bureau of Standards, and develops and maintains standards of quality for numerous analytical processes and finished products.

Ministry of Energy and Water Development

The Ministry maintains statistics on and controls the use of the water sector of the Zambian economy. The ministry enforces the usage of water through the, and develops and maintains standards on water quality.

Ministry of Defense

This ministry controls all uses of chemicals related to defense and security in Zambia.

5.3 Comment/ Analysis

From the above observations, there are indications that some overlaps exist among ministries and statutory bodies in government, and other concerned bodies as need arises. The institutions share information through workshops and meetings. For instance, the ECZ (under MTENR) and the Occupational Safety and Health Services Department, (OSHSD, under MLSS) continue to collaborate, as they have worked jointly in the past. This partnership will definitely augment future developments in chemical management. OSHSD and the Radiation Protection Services (under MoH) have similarly worked jointly on issues that affect them. The Public Health Department and OHSRB (both under MoH); the former being a strong collaborator with an agency under MLGH, while the latter collaborates very strongly with the Labour Department under MLSS on certain issues.

Furthermore, institutions share extensively in problem solving as they perform their respective functions. The setting up of the PIC Committee was aimed at addressing issues of chemical control, as well as to establish a think-tank that would offer sound advice to government accordingly.
Most of the existing legislation does not adequately address current key issues and problems of chemical risk control and management. There is a need to progressively provide for continuous reviews and updates of the legislation so as to tailor it to suit, as well as enable it to attain the vital coping mechanisms to deal with new developments and future challenges.

Most institutions lack infrastructure and resources to enforce laws under their jurisdiction. The work, which the institutions are doing, is not up to acceptable standards because of constraints such as:

- poor funding
- poor administration

- lack of transport
- lack of equipment, and inadequate remuneration for qualified staff

Chapter 6: Activities of Industry, Public Interest Groups and Research Sector Relevant to POPs Management

6.1 Description of Organisations/Programmes

6.2 Summary of Expertise Available Outside of Government

6.3 Comment/Analysis

The approach adopted by institutions outside of government in relation to the management of chemicals is that of lobbying for action by interest groups. These institutions do not have legal mandates or powers to enforce. The institutions in this category vary, ranging from universities, and research institutions, professional bodies and industrial organisations and Non-Governmental Organisations (NGOs), as well as individuals with the necessary expertise, technical competences and experience in particular specialised areas. The effectiveness of their contributions depends largely on how wide their membership is, and the relevance of their activities to national issues and chemicals management.

6.1 Description of Organisations/Programmes

Professional and Industrial Organisations

- Chemical Society of Zambia (CSZ)

Contact: The President
P O Box 101 Step-In Post Office,
Cairo Road,
Lusaka
E-mail: chemsocz@zamtel.zm

The Chemical Society of Zambia (CSZ) is a professional organisation of chemists that provides technical leadership in the areas of chemical science, expertise in quality assurance in manufacturing, analytical quality control, industrial applications and other aspects of chemicals management. Some of the key objectives of the Society are, among others:

- working in close liaison with learning institutions to ensure standards of qualification, competence and conduct of those practicing chemistry as a profession;
- general advancement of the practice of chemical science in various fields of chemistry, including chemical management; and
- serving the national and public interest in an advisory, consultative or representative capacity in matters relating to the science and practice of chemistry.

- Entomological Society of Zambia (ESZ)

Contact: The Chairman
ESZ
P O Box 350071,
Chilanga.
Tel: 260-1-278362/278188

The Entomological Society of Zambia is a scientific organisation of professionals whose discipline covers persons operating/working in government, research institutions, NGOs and the private sector. The prime objective of the society is to develop, advance and disseminate entomological knowledge in all aspects of the science, particularly, but in not exclusively, in relation to insects occurring in Zambia. Some of the activities carried out in order to achieve the aims of the society include the following:

- fostering communication and knowledge;
- organising scientific meetings;
- participating in, and acting as host to National and International Entomological Congresses, and
- publishing a newsletter and a journal

○ Zambia Agrochemical Association (ZAA)

Contact: The Chairman
Cropserve Ltd.
P O Box
Lusaka.
Tel: 260-1- 287689 Fax: 01-286949

Zambia Agrochemicals Association is an organisation composed of major importers, manufacturers and distributors of agrochemicals. ZAA is affiliated to Croplife International, the International Association of Agrochemical Manufacturers. The Chairmanship of the association rotates among the member companies.
The main objectives of ZAA are:

- to ensure the safe and responsible formulation, distribution and use of pesticides with regard to the community and the environment;
- to promote, protect, co-operate and further the interests of the association;
- to encourage full co-operation of members in order to achieve a united approach on all matters affecting their common interests;
- to present views of industry with government, governmental departments, associated industries, consumers and others at home and abroad, and
- to foster and encourage product stewardship, discourage malpractices, and other incidental matters.

○ Zambia Association of Manufacturers (ZAM)

Contact: The Chairman
P O Box 51018
Lusaka.
Tel: 260-1-242780/2 Fax: 260-1-242785
E-mail: odonnell@zamnet.zm

The Zambia Association of Manufacturers is composed of members from a wide spectrum of producers of numerous commodities including chemicals. The Association has a membership of 100 institutions affiliated to it. Specific sub-sectors bodies also join ZAM as members. The main objective of ZAM is to present the views of manufacturers to government and the public.

- Zambia Association of Chambers of Commerce and Industry (ZACCI)

Contact: The Chief Executive Officer
P O Box 30844
Lusaka.
Tel: 260-1-252483/253020 Fax: 260-1-252483
E-mail: zacci@zamnet.zm

ZACCI draws its membership from District Chambers of Commerce and Industry, Sector Chambers e.g. Chamber of Mines in Zambia, Trade Associations e.g. Export Growers' Association of Zambia (ZEGA) as well as Corporate Members, that is individual organizations engaged in industry and commerce. The objectives of ZACCI include, among others:

- high business ethics and standards
- low factor costs of production
- strong domestic business and business associations

Among many of ZACCI's functions are the following:

- provision of information related to trade, investment and technology transfer
- publicizing capacities of members and their areas of business including receiving or mounting trade investment business missions

ZACCI also offers many services its membership. These include, among others:

- organising training programmes covering various business related issues including Cleaner Production, and
- consultancy services on business related matters

- The Zambia Congress of Trade Unions (ZCTU)

Contact: The Secretary General,
ZCTU,
P O Box 20652
Kitwe.
Tel: 260-2- 224765/225091 Fax: 260-2-228284
E-mail: zctu@zamnet.zm

The ZCTU together with Zambia Federation of Employers (ZFE) form the crucial tri-partite collaborative negotiating forums that discuss and agree modes of worker/employer provision of necessary protection in all work place situations where the workers are represented by a union.

- The Zambia Federation of Employers

Contact: The Executive Director
1st Floor, Electra House
P O Box 31941
Lusaka
Tel: 260-1-223340 Fax: 260-1-223336

ZFE together with ZCTU and Government form the crucial tri-partite collaborative negotiating forums that discuss and agree modes of worker/employer provision of necessary occupational health and safety and environmental protection in all work place situations where the workers are

represented by a union.

Universities, Research Institutes, Private Laboratories

- University of Zambia (UNZA)

Contact: Head of Department
School of Chemistry
P O Box 32379
Great East Road Campus
Lusaka.
Tel: 260-1-291777
E-mail: chemistry.natsci@.unza.zm

This is the highest institution of learning in the country. UNZA provides academic courses for both undergraduate and post-graduate levels in most science disciplines. The university provides laboratory facilities to the public in such areas as environmental monitoring and research.

- Copperbelt University,

Contact: The Dean,
School of Technology
PO Box 21692, Jambo Drive,
Kitwe.
Tel: 260-2- 228212 Fax: 260-2- 222469

This institution provides academic training in technological studies.

- National Institute for Industrial and Scientific Research (NISIR)

This institution, formerly NCSR, was established by an Act of Parliament(Cap 26) in 1997 (repealing Cap 236 of 1967) is charged with the responsibility of carrying out scientific and technological research through several units.

Water Resources Research Unit
Contact: Attn: Head,
Environmental Research Laboratory
PO Box 310158
Lusaka
Tel: 260-1- 281081 Fax: 260-1-283502
E-mail: nisiris@zamnet.zm

The unit provides analytical and consultancy services to the water and sanitation sector, as well as endeavour to develop appropriate and affordable water treatment technologies.

Radio Isotopes Unit,
Contact: Attn: Head,
PO Box 310158
Lusaka
Tel: 260-1- 281081 Fax: 260-1-283502 E-mail: nisiris@zamnet.zm
This unit seeks to increase the peaceful application of nuclear science and technology in Zambia;

and, to make radiological and non-radiological assessments of the quality of the environment.

Livestock and Pest Research Centre (Chilanga)
Contact: The Head
Livestock and Pest Research Centre (Chilanga)
PO Box 350049
Chilanga
Tel: 260-1- 278328 / 278362 Fax: 01- 283502
E-mail: lprc@zamnet.zm

This centre is involved in the development of pesticides from plants, vector resistance to pesticides, pesticide residue analysis and studies in mycotoxins in food and Livestock feeds.

Plant and Tree Improvement Research Centre
Contact: The Head,
Plant and Tree Improvement research Centre
P O Box 21210,Kitwe
Tel: 260-2-226734 / 226410
E-mail: nisiris@zamnet.zm

This institution is involved in the development of natural pesticides from plant species such as extracts for control of snails which are carriers of bilharzia.

- Alfred H Knight

Contact: The Executive Director
P O Box 260200
Kalulushi
Tel: 260-2-731792
E-mail: ahknight@coppernet.zm/ahk.kalulushi@alfred-h-knight.co.uk
Web Address: www. Alfred-h-knight.co.uk

Non-Governmental Organisations

- The Zambia National Farmers Union (ZNFU)

Contact: The Executive Director
P O Box 30395
Lusaka
Tel: 260-1-252649 Fax: 260-1-252648
E-mail: znfu@zamnet.zm

- Wildlife Conservation Society of Zambia (WCSZ)

Contact: The Executive Director
WCSZ
P O Box 30255,
Lusaka
Tel: 260-1-251630
E-mail: wcsz@zamnet.zm Websites: wscz.org.zm

WCSZ was established in 1953 and has ten branches in Zambia. The main objectives of WCSZ are:

- to produce and disseminate educational materials to Zambian youth as a way of creating environmental conservation awareness; and

- to lobby government to establish proper management of biodiversity for future generations.

- Citizens for Better Environment (CBE)

Contact: The Executive Director
P O BOX
KITWE.
Tel: 02 226530
E-maul: cbezambia@hotmail.com

This environmental NGO actively engages in public awareness programmes and advocacy for chemical safety.

- Zambia Consumers Association (ZACA)

Contact: The Executive Director
P O BOX
KITWE.
Tel: 02 224593
E-maul: zaca@zamnet.zm

This general public interests protection oriented NGO actively engages in public awareness programmes and advocacy for environmental, social, economic and chemical safety, particularly for the consumer.

Table 6.A below gives an array of all available human resource expertise outside of government, some of whom can, and have been co-opted into the chemical management matrix.

Table 6A: A Summary of Expertise Available Outside of Government

	Research Institutes	Universities	Industry	Environment and Consumer Groups	Labour Unions	Professional Organisations	International organisations e.g. (FAO/WHO)
Data Collection	✓	✓	✓			✓	
Data Collection	✓	✓				✓	
Risk Assessment	✓	✓	✓			✓	
Risk Reduction			✓	✓		✓	✓
Policy Analysis					✓	✓	
Training & Education	✓	✓	✓	✓	✓	✓	✓
Research Alternatives	✓	✓	✓			✓	
Monitoring	✓	✓	✓	✓		✓	✓
Enforcement							
Information to Workers	✓	✓	✓	✓	✓	✓	✓
Information to Public	✓	✓	✓	✓	✓	✓	

6.3 Comment/Analysis

The relationship that exists between NGOs and governmental institutions involved in chemicals management is very cordial and sound. The agencies outside of government which constitute the NGOs include membership from Employers, Employers' Organisations, Employees' representative organisations and/or Trade Unions, environmental watch-dog units such as the Wildlife Conservation Society of Zambia (WCSZ) and Citizens for Better Environment (CBE), as well as research and institutions of higher learning such as UNZA/CBU, NISIR, Mt. Makulu Research Station, Golden Valley Research Trust and other professional organisations. The afore-mentioned organisations contribute essential information to government on issues of local and international concern connected to the sound management of chemicals in general, as well as issues relating to the management of POPs in particular.

The workers representatives (the unions) contribute by ensuring that awareness raising activities are undertaken at work places, and also that training programmes are promoted, arranged and executed effectively by employers among unionised institutional employees to inculcate the basic concepts and operational modes of sound chemical management. The methods of information transmission, among others, include the conduct of workshops and bipartite inspections of work places to verify information assimilation capacity. Learning institutions are encouraged to include rudimentary aspects of safe chemicals management in their curricula. The philosophy behind such activities is that pupils and students develop a sense of responsibility at an early stage in their education such that by the end of their studies the crop of graduates will be more knowledgeable and competent in dealing with issues of chemicals management. Professional bodies such as the Agriculture Science Association of Zambia (ASAZ), Physic Association of Zambia (PAZ), CSZ, ZAA and ESC provide that exclusive component from their specialisations in making chemical management amenable to understanding by the public as well as acting as the conduit through which issues of public concern can be digested for appropriate action by governmental agencies.

The main thrust of NGOs is to lobby government on behalf of the public or the institutions they represent in order to enlist the necessary actions and/or responses from government. Most NGOs have direct access to government line ministries and/or departments as contact points from which they obtain essential information for the smooth operation of their own activities, or through whom they may present or transmit relevant information or other any divergent views, as the case may be.

ECZ has, in the past, worked in collaboration with many professional bodies, as was the case with ZAA during the formulation of the regulations on pesticides and toxic substances. ZAA has, in particular, concerned itself with issues relating to the bio-accumulation of pesticides in the environment, and has instituted self-imposed internal control mechanisms by introducing a 'Code of Practice' with regard to the safe management of pesticides for its members. WCSZ has contributed immensely to the development of educational materials on environmental conservation for schools.

Chapter 7: Inter-Ministerial Commissions and Co-ordinating Mechanisms

7.1 Inter-Ministerial Commissions and Co-ordinating Mechanisms

7.2 Description of Inter-Ministerial Commissions and Co-ordinating Mechanisms

7.3 Description of Mechanisms for Obtaining Input from Non-Governmental Bodies

7.4 Comment/Analysis

The cross-sectoral nature of chemicals management entails that other partners or concerned parties have to be informed or consulted on various matters on a regular basis. Despite the statutory mandates that particular bodies may have with regard to particular areas or sectors of chemical management, it is important to seek the advice, expertise, and experiences of others. The consultation process promotes confidence and mutual trust and respect. The provision for the formation of various boards with a multi-sectoral approach to administer legislation has been a very welcome and useful development. The operation of boards removes suspicion on the intentions and aims of new organizations.

7.1 Inter-Ministerial Commissions and Co-ordinating Mechanisms

The National Conservation Strategy (NCS) recommended the formation of a co-ordinating body to oversee the planning and integration of environmental issues in major projects. Most projects that were set up before 1990 have no approved Environmental Impact Assessments (EIAs); consequently resources are being diverted to repair damage from past industrial activities.

7.2 Description of Inter-Ministerial Commissions and Co-ordinating Mechanisms.

Inter-agency mechanisms are set up during legislation, in the form of inter or multi-sectoral management boards. These bodies identify partners from whom co-operation is envisaged. The current types of co-ordinating mechanisms include:

- Occupational Safety and Health Board;
- Environmental Council of Zambia Board;
- Food and Drugs Board;
- Radiation Protection Board;
- Pharmacy and Poisons Board;
- National Malaria Control Centre;
- Tropical Disease Research Centre;
- Zambia Bureau of Standards Board,
- Energy Regulation Board,
- National Science and Technology Council Board, and
- Zambezi River Authority.

Meetings among members from government, NGOs, private and professional bodies, institutions of

higher learning and research are held regularly to address environmental problems. Smaller technical committees or task forces are set up to tackle specific subjects and/or problems.

Table 7.A gives an overview of Inter-Agency Commissions and Co-ordinating Mechanisms.

Table 7.A: Overview of Inter-Agency Commissions and Co-ordinating Mechanisms.

Name of Mechanism	Responsibilities	Secretariat	Members	Legislative Mandate	Information Provided in Section7.2 (Yes/No)
Occupational Health & Safety Board	Prevention and monitoring of occupational diseases.	MoH/ MLSS	Intersectoral	Occupational Health &Safety Act	Yes
Radiation Protection Board	Monitoring of radiation and ionisation Sources	MoH	Intersectoral	Radiation Act	Yes
Pharmacy and Poisons Board	Pharmaceuticals Control /proprietary medicines; trade in drugs and poisons.	MoH.	Intersectoral	Pharmacy and Poisons Act.	Yes
Food and Drugs Board	Ensuring food quality and chemicals control.	MoH.	Intersectoral	Food and Drugs Act	Yes
Zambia Bureau of Standards	Standards Development in Industry	ZABS	Inter-sectoral	Standards Act	Yes
Prior Informed Consent	Determine restrictions on toxic/ persistent chemicals	ECZ	Multi-sectoral	Standing Committee	Yes
NBTC Board	Promote adoption of technology; Ensure technology is used in an environmentally sound manner	NBTC	Multi-Sectoral	NSTC Act	No
NSTC Board	Co-ordinate research in Science and Technology	NSTC	Multi-sectoral	NSTC Act	Yes
ERB	Regulates use of petroleum products	ERB	Multi-sectoral	Petroleum Act	

7.3 Description of Mechanisms for Obtaining Input from Non- Governmental Bodies.

There are many ways of obtaining information from Non-Governmental Organisations (NGOs), and involving them in chemical management programmes. Information from NGOs is obtained through consultative meetings, workshops and seminars. These are often the result of initiatives made by the NGOs by way of correspondence expressing their concerns to relevant Heads of government ministries. Another channel is the sponsorship of television documentaries which help in information dissemination on topical issues or panel discussion programmes. In order to reach a much wider audience, bearing in mind that TV services are not accessible totally over the whole country, feature articles are placed in the press. For example, the Wildlife Conservation Society of Zambia (WCSZ) publishes a column entitled "Warthog" (in the Sunday Times of Zambia)which covers environmental issues related to wildlife, while another publication called the Green Times deals with issues relating to the environmental in general, and chemicals, in particular.
A more focused approach to ensure effective participation from NGOs is to involve them directly in

the processes of initiation, development and implementation of chemical management programmes.

Individual members from NGOs were incorporated as active members from inception to the end of both of the CHC/GHS and NIPs projects in Zambia. The synergies inherent in the multi-sectoral (multi-partite) nature of working groups yielded very positive synchronies leading to the successes achieved. Two useful project planning and administrative structures created and used are:

The National Project Co-ordinating Committee (NPCC):

The National Project Coordinating Committee (NPCC) established under the auspices of the National Chemical Hazard Communication Project was composed of institutional members of the institutional stakeholders invited to the inaugural meeting selected equitably by ECZ. For prudent project execution, at the sectoral group level, a committee named the Bureau, composed of the Secretariat, Project Co-ordinator and Sectoral Group Chairpersons planned the administrative affairs of the project.

The National Project Implementation Committee (NPIC).

Recognising the specificity of technical projects with respect to time, it was found vital to plan how the ideas, ideals and plans generated during the projects would be integrated into the fabric of the nation's routine governmental schemes of chemical management. The NPIC, constituted with the full consent of the NPCC and Lead Agency takes over the running of the subsequent life of the aspects infused into the local chemical management systems

7.4 Comment/ Analysis

The current co-ordinating mechanisms are working well but there is need to strengthen them further. The concept suggested in 1996 to maintain a Core Group of organisations intimately conversant with the Profile preparation process be maintained to oversee the implementation of the recommendations of the National Profile is still very valid, and reiterated. An appropriate budget should be provided to facilitate the group's work.

Additional to the need to provide adequate funds to facilitate the operations of the Secretariat (ECZ) and Core Group of organisations mentioned above, as well as for purposes of ensuring the successful implementation of the NIP for the SC, there is need to institute an Integrated Management Mechanism that includes Waste Management in order to ensure success.

In the case of the two (CHC/GHS and NIPs for POPs) projects, the subsequent sustenance of the key chemical management tools developed during the formative stages depends largely on the institution and constitution of a select competent multi-partite team put together to ensure effective completion and successful running of the systems developed, bearing in mind that more complex issues relating to the management of POPs now enter the equation at the national level.

Chapter 8: Data Access and Use

8.1 Availability of Data for National Chemical Management

8.2 Location of National Data

8.3 Procedures for Collecting and Disseminating National /Local Data

8.4 Availability of International Literature

8.5 Availability of International Databases

8.6 National Information Exchange Systems

8.7 Comment/Analysis

Information is essential to coherent and systematic development planning. The availability of reliable information is a vital factor to good decision-making processes. Sound chemical management decisions require accurate databases with regard to the nature, type and quantities of chemicals produced, imported and used in the country, as well as chemicals use patterns and beneficial and adverse effects. Line ministries that administer various aspects of chemicals management have developed databases, which have hitherto operated in isolation. The information base available currently is not adequate to support the mammoth task of achieving the sound management of chemicals.

8.1 Availability of Data for National Chemical Management

The ECZ has an Information Technology Department generally referred to as the Data Bank. The unit was established in 1992 in order to address issues and concerns related to data management and storage. This unit manages all the data that is collected by the Inspectorates for the development of databases which avail information for use by Inspectors for monitoring and decision making purposes. An example of such a system is the Licensing Information System (LIS). This is the main system used for such purposes as Licensing of Industries and Compliance Monitoring. LIS captures data from two centres based in the north (Ndola) and south (Lusaka), thus effectively covering for the whole country. LIS operates the following subsystems:

Licensing:

The development of this subsystem has been completed. The subsystem manages such information as the types and validity status of licences; names of companies covered by licence type issued which data helps in the qualitative as well as quantitative aspects of the licences.

Compliance Monitoring:

This subsystem is (at the time of issuance of the NP edition) still under development but is used to record all the returns received from industry every six months. This information is used to monitor lincees' conformance to specific set licence set conditions.

Inspection:

This subsystem, which is also still under development, is used to store information on the number of inspections that have been done on the industry and the outcome.

Future plans include the development of the LIS for application in the Pollutant Release and Transfer Register (PRTR) in accordance with requirements of the Bahia Declaration on Chemical Safety.

With regard to National Chemical Management, the Data Bank has assisted the Pesticides and Toxic Substances (PTS) Unit to develop a National Chemicals Inventory Register. This information system is being used to provide valuable information to Zambia Revenue Authority (Customs and Excise Department) officers and ECZ officers who were trained under the Chemical Hazard Communication (CHC) project to enforce labelling requirements that have been recently effected in Zambia at border posts, located at two major border posts of Livingstone and Chirundu.

The Register which was developed in 1997 is currently being updated so as to make the subsystem available for use in data capture and monitoring purposes, as well as to expand it so as to include the POPs of concern as well as hazardous waste streams.

The ECZ Data Bank is in the process of assisting the PTS unit to develop NIPs Databases for the following categories of chemicals:

- PCBs
- Dioxins and Furans
- Pesticides POPs
- DDT

So far the information from the above databases has been used to produce the NIPs Draft Inventory Report; and, in the identification of gaps. After additional data collection, these databases will be finalised and will be used in setting priorities for the elimination of POPs use in Zambia.

With the introduction of the "public right-to-know policy", it has become imperative that information is as current as possible. However, the quantity and quality of data collected depends on the provision of adequate resources. Additionally, the beginning of the privatisation process for companies enhanced the need to subject these companies or industries to the Environmental Impact Assessment (EIA) process. The objective of the appraisal is to determine any liabilities that could be passed on to prospective buyers.

Table 8.A gives an assessment of the nature of data available at the national level.

Table 8.A: Quality and Quantity of Available Information

Data Needed for/to	Pesticides (Agricultural, Public health and Consumer use)	Industrial Chemicals	Consumer Chemicals	Chemical Wastes
Priority Setting	Fair	Fair	Fair	Fair
Testing Relevant to Local Conditions	Fair	Fair	Fair	Fair
Risk Assessment (environment/health)	Fair	Fair	Fair	Fair
Classification/Labelling	Good	Good	Good	Fair
Registration	Good	Fair	Fair	Good
Licensing/Permit	Good	Good	Fair	Good
Risk Reduction Decisions	Fair	Fair	Fair	Fair
Accident Preparedness/ Response	Poor	Poor	Poor	Poor
Poisoning Control	Poor	Poor	Poor	Poor
Emission Inventories	Good	Fair	Fair	Fair
Inspection & Audits (environment/health)	Good	Good	Fair	Fair
Information to Workers	Good/Fair	Fair	Fair	Fair
Information to Public	Fair	Fair	Fair	Fair

8.2 Location of National Data

The Central Statistical Office (CSO) is the major national source of information, covering all national activities, including production and trade statistics. CSO has statistical units attached to each government ministry with the necessary staff on secondment to facilitate data collection.

The information on the monitoring of the product life and use of chemicals is located at ECZ, the Ministry of Agriculture and Co-operatives, the Occupational Safety and Health Services Department, Ministry of Labour and Social Security, Ministry of Health, and the Ministry of Commerce Trade and Industry. Registers of products, companies and natural waste discharges are maintained at these organisations.

Table 8B below lists the numerous locations that host the data bases and the various modes through which information on chemical management based in government, quasi-government and other agencies can be accessed.

Table 8B: Location of National Data

Type of Data	Location	Data source	Who Has Access	How to Gain Access	Format
Production Statistics	CSO/MCTI	Manufacturing Companies	Public	By request	Paper files/ Database
Import Statistics	ZRA/CSO/ MCTI	ZRA Border Control Points	Public	By request	Paper files/ Database
Chemical Use Statistics	ZAM/ZACCI/ MACO	CSO/ZAM/ ZACCI	Public	By request	Paper files/ Database
Agricultural Use Statistics	MACO	ZNFU	Public	By request	Publications /Bulletins
Industrial Accident Statistics	WCFCB/ MLSS/MSD	Industries	Public	By request	Files
Transport Accident Statistics	Road Traffic Commission/ CSO	Zambia Police	Public	By request	Files/ Database
Occupational Health Data (Agricultural)	MoH/MLSS	Industries/ Public	Public	By request	Files/ Database
Occupational Health Data (Industry)	MoH/MLSS	Industrial Facilities	Public	By request	Files/ Database
Poisonings Statistics	MoH	Hospitals/ Clinics/ Public Analysts	Public	By request	Files
Pollutant Release and Transfer Registers	ECZ	Industries	Public	By request	Files/ Database
Hazardous Waste Data	ECZ	Industries Companies/ Individuals	Public	By request	Files/ Database
Pesticides Register	ECZ	Industries/ Companies	Public	By request	Files/ Database

8.3 Procedures for Collecting and Disseminating National/ Local Data

The collection of information is carried out using various methods depending on the effectiveness and cost. Some of the methods used include:

- the development of questionnaires tailored to the data required, targeting the identified data sources. Questionnaires are accompanied by cover letters, outlining the scope, objective, purpose and use for which the data is being requested;
- site visits to targeted institutions (including individuals) to discuss and clarify points in the questionnaire; and
- review of information submitted to support applications for the registration of products, companies, corporations and entities with various responsible agencies.

The data required on chemicals include production, manufacture, use, distribution, disposal, efficacy, toxicity and ecotoxicity. Most data is accessible by the public on request. In some cases, a

small charge is levied to cover printing and postage. Confidential data is only accessible to those who are eligible to use it. The data collected is disseminated through circulation of publications to concerned parties, seminars and workshops.

8.4 Availability of International Literature

Access to international literature helps in decision making where/when local data is not available. The literature available is in the form of assessments of chemicals by countries and UN agencies, reports of activities and programmes, and decisions on controls that have been taken, or are under consideration. This literature has proved valuable for the development of legislation and regulations on chemicals management.

Table 8C: Availability of International Literature

Literature	Location(s)	Who Has Access?	How to Gain Access
Environmental Health Criteria Docs.(IPCS)	ECZ Library/MoH/ MLSS	Public	By request
Health and Safety Guides (IPCS)	ECZ Library	Public	By request
Chemical Safety Data Sheets (IPCS)	MoH/ MLSS	Public	By request
Decision Guidance Documents for PIC Chemicals (FAO/UNEP)	ECZ	Public	By request
FAO/WHO Pesticides Safety Data Sheets	MLSS/MoH/MACO/ UNDP Library	Public	By request
Documents from FAO/WHO Joint Meeting on Pesticides Residues	ECZ/MoH/MACO (Codex contact point)	Public	By request
Risk Management of Toxic Chemicals (Finnida)	ECZ	Public	By request
OECD Test Guidelines (SIDS)	ECZ	Public	By request
Good Laboratory Practice Principles	GES-AHK	AHK Personnel	By request
WHO/UNEP Global Environment Library Network	UNDP Library	Public	By request
ILO Encyclopaedia of Occupational Health and Safety	MLSS	Public	By request
United States Environmental Protection Agency (EPA)	ECZ	Public	By request
National Safety Council Data Sheets (USA)	GES-AHK,	Relevant AHK Personnel	By request
European Centre for Ecotoxicology of Chemicals (ECETOC)	ECZ	ECZ Staff	By request
Information on POPs Management	ECZ	Public	By request

8.5 Availability of International Databases

Like the ordinary literature, databases provide quick reference information on various aspects of chemicals from reputable international organisations. These databases contain information on chemical assessment that is not available from local institutions. A programme on Chemical Information Exchange Networks (CIEN) was conducted by ECZ, in 2002, for a variety of local institutions in accessing International Databases on the Internet such as legal file, INCHEM, EXTOXNET, TOXNET and Scorecard.

Table8D: Availability of International Databases

Databases	Location(s)	Who Has Access?	How to Gain Access
International Register of Potentially Toxic Chemicals (IRPTC)	ECZ	ECZ Personnel	By request
ILO/CIS	MLSS/OSHS Dept.	Public	By request
EnviChem (Finland)	ECZ	Public	By request
Uniform System for the Evaluation of Substances	ECZ	Public	By request
International Nuclear Information System (INIS)	NISIR	Public	By request
INFOCAP	ECZ		By request
UNITAR	ECZ		cwm@unitar.org
UNEP	ECZ		www.pops.int
IFCS	ECZ		
Environmental Information Network (INFORTERRA)	NISIR	Public	By request
CIEN	ECZ	Public	By request
MERCK INDEX	NISIR	Public	By request

8.6 National Information Exchange Systems

The exchange of information between institutions and individuals is by request to the head of institutions or departments where data is located. When permission is granted, future exchange may be made without necessarily following the initial procedure for every request. A network is usually established of institutions and individuals with similar interests. Seminars, workshops, open discussions and bulletins or journals form means of information exchange.

Some ministries have established inter-ministerial or inter-departmental co-ordinating committees to tackle certain specific problems.

Depending on the bulk of international material received, a summary of the critical information may be made and distributed to concerned parties. The ECZ Databank circulates an index of books, journals and other publications available at ECZ library to other libraries. There is, generally, poor electronic communication among institutions due to low capacity in terms of both infrastructure and competent and skilled personnel. Thus, most institutions are not interlinked.

8.7 Comment/Analysis

The generation of information in the various sectors depends on the technical infrastructure, competence of personnel and financial resources available. Many of the studies currently undertaken which are aimed at generating vital data on essential aspects of chemical management are restricted to short periods, and in a few selected institutions. There is need for more research to be carried out in order to obtain as much data as possible on the agricultural and industrial activities and their impact on the environment. The EIS programme is one such facility through which information is being collected and disseminated. In general, there exists a sound networking among different institutions at both national and international levels in Zambia.

In order to effectively and efficiently capture the key technical cues necessary to build capacity to cope with requirements for the NIP and SC implementation, there is need to upgrade the local data collection base by instituting additional systems as follows:

- creation of a Product Data Base generated from reliable regularly updated SDSs with details inclusive of :
  - local names
  - composition,
- institution of systematic regular health and environment surveillance of toxic exposure to chemicals
- creation of reliable Chemical Incidence and Accident Data bases

As far as possible, the new systems should be harmonised using common definitions (e.g. those based on the GHS or the IPCS/INTOX) which would then necessarily be externally harmonised at the regional sub-regional (e.g. SADC) and /or the regional levels (e.g. AU).

The NIPs for POPs project offered great opportunities for Zambia to access funds that helped in creating locally grown systems which will facilitate the generation of reliable information that may enhance chances to lay down mechanisms to effectively capacity build local chemical management infrastructure to combat existing inadequacies and help to prevent the adverse effects of POPs.

Chapter 9: Technical Infrastructure

9.1 Overview of Laboratory Infrastructure

9.2 Overview of Government Information Systems/Computer Capabilities

9.3 Overview of Technical Training and Education Programmes

9.4 Comment/ Analysis

9.1 Overview of Laboratory Infrastructure

The major laboratories with capacity to undertake chemical analyses for various substances are found in government institutions, such as the Food and Drugs Control Laboratory, the Geological Survey Department Laboratory and the Medical Stores Laboratory, universities and research institutes; and within industry, for example, those located at operational bases of the major mining companies. These laboratories were set up to perform specific functions and may not be readily available for other specialised tasks.

The Food and Drugs Control Laboratory was established to help in the enforcement of the Food and Drugs Act. The laboratories in learning institutions are for research and teaching purposes. The laboratories set up by the copper mining conglomerates on the Copperbelt were established for the exclusive use of the operating divisions primarily for metallurgical process quality monitoring, and later when environmental law was tightened, for pollution monitoring and control. Laboratories specifically set up to independently monitor the quality of chemicals are not, as yet, available. However, CEC and ZESCO have equipment and kits for detecting PCBs in soil, and oil samples.

Available laboratories utilise international standards, especially the ISO 9002 for quality assurance purposes. SADC-ELMS, through the Swedish University of Agriculture, has developed a Draft manual, entitled "Environmental Monitoring of Pesticides in the SADC Region".

Table 9.A: Overview of Laboratory Infrastructure for Regulatory Chemical Analysis

Name/ Description of Laboratory	Location	Equipment/ Analytical Compatibilities Available	Accreditation (if YES, by Whom)	Certified GLP(if Yes, by Whom)	Purpose
NISIR	NISIR-Livestock and pest Research Centre, Chilanga Airport Road Laboratories, Lusaka	HPLC_UV& Fluorescence and Conductivity Detectors GLC ECD&FID AAS,FPM,UV-Visible, IR, Radioisotope Excitor Particle Air sampler	No	No	Research in insect pest control, residue analysis, development of local plants pesticides Environmental/ Food research

Table 9.A: Overview of Laboratory Infrastructure for Regulatory Chemical Analysis(Continued)

Name/ Description of Laboratory	Location	Equipment/ Analytical Compatibilities Available	Accreditation (if YES, by Whom)	Certified GLP(if Yes, by Whom)	Purpose
UNZA-Chemistry Dept.	Lusaka	AAS; UV, IR GLC-ECD,FID	No	No	Academic, Training, Analytical Consultancy
Food and Drugs Control Laboratory	Lusaka	GLC,IR,AAS, UV-Visible Spectrometry	Zambia Bureau of Standards: ISO 9002	ZABS	Food and Drugs Analytical Services and Residue Analysis
Geological Survey Dept.	Lusaka	AAS, XRD/XRF	No	No	Minerals Quality and Quantity
Alfred H Knight	Technical Services Kalulushi	1.Qualitative & Quantitative Analysis of metals/organic; inorganic Chemicals 2. Quality assurance testing of petroleum/oxy fuel products/ heavy fuel oils	1. British Standard Institute (BSI) ISO ENB 9002 quality system standard 2. No	No No	1.Mining and Metallurgical Analytical Services 2. Monitoring the Health of Machinery
Mount Makulu Agric. Research Station	Chilanga	GLC-ECD FPD	No	No	Pesticides Analysis
Central Veterinary Research Institute	Balmoral Chilanga	Spectro-photometer	No	No	The strength of -acaricides -testing for ticks
Tropical Disease Research Centre	Ndola		No	No	Research on basic pharmaceutical cures for local/tropical diseases

9.2 Overview of Government Information Systems/ Computer Capabilities

The main government department responsible for management of the full range of information is the Central Statistical Office (CSO). The range of data includes census, production in the various sectors of the economy, as well as exports/imports. Other government departments have their own systems for processing and storage of data. These are situated in the planning units of respective ministries. Statisticians are seconded to statistical units in the ministries.

Research Institutes and Statutory Bodies also have data banks. At the ECZ, environmental information generated through reports and other publications is deposited in the computerised library.

Capabilities in terms of computer hardware/accessories available at various points of data capture in the country are shown in Table 9B.

Table 9.B: Computer Capabilities

Computer System/Database	Location	Equipment Available	Current Uses
SAS/ Dbase/IMPS/SPSS SQL MS 2000/EXCHANGE 2000/WINDOWS 2000	CSO	IBM PCs, HP Server, Compaq Server, Acer	Data processing, Live Database Networking, E-mail, Website
Zamnet Communications Ltd UNZA Computer Centre	COMESA House	IBM PCs, IBM Main Frame	Data processing Internet
Dbase	ECZ	Gateway 2000, AT&T PCs	Data processing And storage
Dbase/SPSS	MAFF	IBM PCs/Gateway 2000	Data processing
WINFO/ChemiData/ICSC	MLSS	Legend PC	Data processing
COMPAQ PROLIANT ML 370 G2/ COMPAQ PROLIANT 1600--SERVER. COMPAQ EVO--CLIENT. VSAT NETWORK/UNIX/ ASYCUDA/ FOXPRO	MFED (ZRA)	ES9000 Main Frame /IBM PCs/COMPAQ EVO MODEL - Clients VSAT Network -WAN	Data processing

9.3 Overview of Technical Training and Education Programmes

Learning institutions provide certificates and diplomas for undergraduate courses in natural sciences. The courses provide the necessary basic understanding of environmental issues, and are helpful in preparing individuals for challenging positions in the field of chemicals management. Specific courses such as environmental studies and engineering have been introduced recently.

The CHC/GHS project undertaken during the period 2001-2003, in Zambia, opened the opportunity for the sector working groups to identify training needs, available and existing institutions in key areas where capacity building activities in chemical hazard communication and management could be established.
The National Situation Analysis on the state and levels of CHC understanding by consumers;

workers in the agriculture, industrial production and transport sectors as well as the general public revealed the presence of very wide gaps in the levels of knowledge and understanding of CHC in all sectors. Overall, the general results of the Comprehensibility Testing (CT) carried out over all four sectors showed that the levels of CHC understanding were very low.
The success of the project can be gauged from the number of positive outcomes of the CHC project which include, among others:

- worker training programmes have been initiated at three industrial facilities using comprehensibility testing tools from the project
- as a result of the awareness raising efforts associated with the project, two products were removed from the market because of improper labelling, and
- as part of the project, Customs Clearance Department officers and ECZ officers have been trained to enhance capacity in the enforcement of labelling requirements in effect in Zambia at border points.

One of many significant and poignant expectations from the project is the development of an Emergency Response System for the Transport sector, approved for funding by the Environmental Support Programme of the World Bank.

9.4 Comment/ Analysis

Laboratory facilities for quality control and quality assurance for in-house production inputs verification, process control and final products certification are available for some industries. However, the absence of local Good Laboratory Practices (GLP) certified laboratory services poses a hindrance to implementation of the GHS. There is, therefore, a need to source for funding for two purposes.

Primarily, efforts should be aimed at securing funds to rehabilitate existing government infrastructure that could be designated to perform the tasks necessary for chemical classification to provide local capacity in this area. Secondly, the local business community could be assisted to establish independent laboratories with necessary international standard certification to provide services at a fee to supplement the government laboratory. This development would significantly improve the monitoring capacity on the quality of locally manufactured and imported chemicals and chemical products. Information processing equipment is available at various institutions. From the surveys carried out so far, including the results from both the National Situation Analysis and Comprehensibility Testing carried out during the CHC/GHS project indications are that there is need for specific area targeted programmes such as small-scale farmer training in the handling, use and application of Agrochemicals.

Chapter 10: International Linkages

10.1 Co-operation and Involvement with International Organisations, Bodies and Agreements

10.2 Participation in Relevant Technical Assistance Projects

10.3 Comment /Analysis

This choice of Zambia's Independence Day 24th October was made to coincide with the day the United Nations was founded. This recognition for international co-operation and understanding was placed in the forefront of foreign policy. The position of Zambia as a landlocked country has made it imperative that linkages with eight countries bordering her and the international community are maintained and strengthened.

In this regard, Zambia has endeavoured to participate in meetings of the United Nations such as the Rio Conference on environment and Development (UNCED), the Bamako Convention, the African Union (AU), Southern African Development Community (SADC) and the New Economic Partnership for African Development (NEPAD). Zambia is a signatory to many conventions including the Basel Convention on Trans-boundary movement of hazardous Waste, the African Conservation Convention and the Montreal Protocol on Substances that deplete the Ozone Layer. Zambia has also participated actively in the formulation and drafting of the Southern African Development Community (SADC) Code of Practice on the Safe Use of Chemicals. ECZ provides linkages among concerned parties.

10.1 Co-operation and Involvement with International Organisations, Bodies and Agreements

The linkages with international organisations, especially those concerned with chemicals management, have benefited the country in many ways both at the local (national) and sub-regional levels.

National Level

- International and bi-lateral Organisations' support through UN agencies, such as UNEP/IRPTC, FAO, UNITAR, as well as other Donor Agencies to address issues relating to chemicals' especially in the area of enhancement of managerial capacity for environmental protection and sustainable management of natural resources as well as co-ordination of implementation for environmental international conventions
- Exchange of international information/literature relating to chemicals (including POPs) management, including measures or actions taken with respect to specific chemicals, such as PIC chemicals; and
- Exchange of information on legislation and technologies used to reduce risks at the local level, through literature from US-EPA, and other international agencies and other countries
- Specific donor aided remediation steps aimed at eliminating the use of hazardous chemicals and minimisation of the potential harmful effects of the chemicals and their wastes on the eco-system were undertaken after the 1997 FAO/GTZ funded destruction of obsolete pesticides; the list below illustrates some among the many:
    - The Cleaner Production Programme was introduced using ZACCI as the vehicle of

transmission on an ECZ programme funded by NORAD
    - The mining company First Quantum started using solvent extraction in copper recovery processes from tailings at Bwana Mkubwa Mine in Ndola, at a conversion cost of approx. US $ 30m
    - Nchanga mine borrowed US$ 2.5m to repair equipment required for redirecting effluents from a stream to an abandoned open pit
- Zambia launched her own two (02) year plan, the National Implementation Programme (NIP for Persistent Organic Pesticides, POPs) for the Stockholm Convention on 14 August, 2002 via a multi-sectoral administrative structure.

Regional/Sub-Regional Co-operation

Zambia hosted an international workshop for Anglophone countries under the theme "Sub-Regional Workshop on Support for the Implementation of the Stockholm Convention on Persistent Organic Pollutants" held at Sun International Hotel, Livingstone, over the period 25-27 November, 2002 at which experiences were shared on the extent of the POPs problem, and how to manage the POPs.

Of the 18 Anglophone countries attending workshop:

- 15 had signed the Stockholm Convention; while
- 6 had not yet signed the Convention
- Out of the 15 in the first category above, only 4 are Parties to the Convention!

The Livingstone sub-regional workshop revealed the following scenario, as shown in the table below, with respect to Donor Aided activities aimed at preparing for the SC in Africa.

TABLE INDICATING NIP STATUS IN ANGLOPHONE COUNTRIES (STATUS AS AT 2002)

COUNTRY	AGENCY	STATUS
Egypt	UNIDO	Approved
Ethiopia	UNIDO	Approved
Ghana	UNIDO	Approved
Lesotho	UNIDO	Approved
Malawi	UNIDO	Approved
Nigeria	UNIDO	Approved
Seychelles	UNIDO	Approved
Tanzania	UNIDO	Approved
Gambia	UNEP	Approved
Kenya	UNEP	Approved
South Africa	UNEP	Approved
Zambia	UNEP	Approved
Mauritius	UNDP	Approved
Zimbabwe	UNDP	Pending

Several regional and sub-regional co-ordinating mechanisms have been developed and promoted in Zambia since the first edition of the National Profile (1996) was produced.
At the Sub-regional level, there are vast opportunities for cooperation in such common areas as

Research & Development, Networking and Information Exchange, Upgrading of numerous Facilities (e.g. existing training institutions) in the Region, Harmonisation of Administrative and Legislative measures with respect to the potential enhancement of chemical (including POPs) management, waiting to be tapped.

Activities and possibilities for the promotion of mechanisms for coherence in chemicals (including POPs) management are embodied in the following very positive institutional and administrative arrangements; some of which have emerged since the first edition of the NP include:

- The African Union
- Southern African Development Community (SADC)
- New Economic Partnership for African Development (NEPAD)
- SADC Mining Sector Co-ordinating Unit
- SADC Industry and Trade Protocol (1996)- Manufacturing & Trade Committee
- SADCSTAN –Standardisation Co-operation
- SADC Protocol on Transport, Communications & Metrology
- SADC Protocol on Energy;
- African Stockpile Programme (ASP)
- Southern and Eastern African Regulatory Committee on Harmonisation (SEARCH) Initiative;

The commonalities in approach in the SADC region indicate that there are benefits that would accrue from integration of the GHS and SC implementation programmes with regional initiatives e.g. the SADC Chemicals, Transport and Trade Protocols. This is particularly so because bodies like SADC and NEPAD have Directorates within their administrative structures which will definitely provide the necessary support to sustain and enhance the operationalisation of the afore-mentioned programmes as part of the chemical management systems.

Table10A: Membership in International Organisations and Bodies

International Organisation/ Body/Activity	**National Focal Point (Ministry/Agency & Contact)Point)**	**Other Ministries/ Agencies Involved**	**Related National Activities**
Intergovernmental Forum on Chemical Safety (IPCS)	Director-ECZ	Line ministries	Awareness Programmes

Table10.B: Participation in International Agreements/Procedures Related to Chemical Management

International Agreements	**Primary Responsible Agency**	**Relevant National Social Implementation Activities**
Convention on the African Migratory Locust 1963	IRLCO-CSA /MAC	Control of outbreaks of migratory insect pests

Table10.B: Participation in International Agreements/Procedures Related to Chemical Management(Continued)

International Agreements	Primary Responsible Agency	Relevant National Social Implementation Activities
International Plant Protection Convention 1969	MAC	Phytosanitary controls
African Convention on the Conservation of Nature and Natural Resources -1972	MTENR	Nature conservation awareness
ILO Convention Concerning Protection Against Hazards Arising from Benzene 1974	MLSS	OSH in work places
ILO Convention 155	MLSS	OSH in work places
ILO Convention 170	MLSS	OSH in work places
ILO Convention 174	MLSS	OSH in work places
Agreement on the Action Plan for Environmental Management of the Common Zambezi River System (Bilateral Agreements) 1990	Zambezi River Authority/ MEWD	Control of pollution and use of waters in the shared river system
Montreal Protocol 1992	MTENR/ ECZ	Audit of ODS/ Phasing out/ Seeking alternatives
Agenda 21 Commission for Sustainable Development 1993	MTENR/ ECZ/MLSS	Implementation of the NEAP/ Environmentally Sound Management of Chemicals
UNEP London Guidelines (Voluntary Procedures)	ECZ	Industry awareness
ILO Convention 148	MLSS	OSH in work places
UN Recommendation for the Transport of Dangerous Goods	MTENR/ ECZ/MCT	Labelling of vehicles
Basel Convention on the Transboundary Movement of Hazardous Waste 1994	MTENR	Control/ monitoring of Hazardous Wastes
Bamako Convention	MTENR	Control/ monitoring of Hazardous Wastes
GATT/WTO Agreements (Related to Chemical Trade)	MCTI/MAC/ MoH/ZABS	Implementation of products in International trade
Chemical Weapons Convention	MoD	
UN Framework Convention on Climate Change 1993	MTENR	Monitoring seasons
Regional Tsetse and Trypanosomosias Control	RTTCP/ DVTCS	Control of tsetse and Trypanosomosias
Rotterdam Convention on Prior Informed Consent (PIC) Procedure 1998	MTENR	Protection of the health of workers and consumer
Stockholm Convention 2001	MTENR	Protection of human health and the environment from adverse effects of Chemicals
SADC Code of Practice on the Safe Use of Chemicals 2003	MLSS	OSH in work places, including the Agriculture sector

10.2 Participation in Relevant Technical Assistance Projects

A number of projects have been funded with specific objectives aimed at improving chemical (including POPs) management, as well as to enhance local capacity building in appropriate techniques of gathering more reliable information and data on the effects of chemicals. The projects are in the areas of general environmental audits, monitoring, chemical use, identification of adverse effects, risk assessment and management, and disposal. Among the organisations involved in providing support are AU, CIDA, EU, GEF, GTZ/FAO, IAEA, NORAD, UNDP, UNECA, UNEP, UNIDO, UNITAR, and the World Bank. The National Environmental Action Plan (NEAP) developed in the 1990s identified other areas for which support was being sought.

Over the years 1997 to 2003 several chemical (including POPs) management enhancing technical projects have been undertaken through ECZ. Some of the activities are depicted in Table 10.C.

Table 10.C: Participation as Recipient in Relevant Technical Assistance Projects

Name of Project	International/ Bilateral Donor Agency Involved	National Contact Point	Relevant Activities
NEIS	NORAD	ECZ	Information gathering and dissemination/ Publications
EMS	NORAD	ECZ	Industrial audits
Air Regulations	NORAD/SFT	ECZ	Preparation of air quality Regulations
Audits	USAID	ZPA	EIA audits
RTTCP	EU	MAC	Tsetse Control
Larger Grain Borer	FAO	FAO	Monitoring of Larger Grain Borer
Pesticides Residues	FAO/IAEA	FAO/IAEA	Pesticides levels in crops/ food/soils
Phasing out of Ozone Depleting Substances(ODS)	UNEP	UNEP	Removal of ODS
Environmental Management Programme 1996-2000	CIDA	ECZ	Kafue Weed Monitoring Project/ Lusaka Ground Water Study/EIA Sectoral Guidelines/Environmental Emergency Response/Management of Toxic Substances
EIA Regulations S.I. No. 28 of 1997	NORAD	ECZ	To contribute to sustainable development by ensuring that all plans and projects Take into account environment concerns
PCB Inventory Project 1997	CIDA	ZESCO/ ECZ	Inventory on PCBs in Zambia
Environmental Support Programme 1998-2003	World Bank/ UNDP/Nordic Development Fund	ECZ	Strengthen areas of public awareness, environmental monitoring and reporting; especially pollution control in mines

Table 10.C : Participation as Recipient in Relevant Technical Assistance Projects (Continued)

Cleaner Production 1998-2003	NORAD	ECZ	Improving Industry's environmental management so as to help reduce global industrial pollution and waste
Name of Project	**International/ Bilateral Donor Agency Involved**	**National Contact Point**	**Relevant Activities**
IPPP 2000-2003	NORAD	ECZ	In areas of Air Pollution, Water Pollution, Hazardous Waste Management, Environmental Management and Environmental Auditing
CHC/GHS 2001-2003	UNITAR	ECZ	Harmonised system of classifying and labelling Chemicals and
CIEN 2002	UNDP/GEF	ECZ	Establishment of Information Exchange Network in Zambia
ASP 2000	UNECA/AU/ Crop Life Intl./ GEF/FAO/WHO World BANK/ PAN (UK & Africa/UNIDO/ UNEP Chemicals	ECZ	Disposal of, and prevention of any future stockpile of obsolete pesticides (currently estimated at 50 000 tonne from all African countries
NIPs 2002-2004	GEF/UNEP	ECZ	Development of National Implementation Plan for POPs of International Concern
Environment and Natural Resources Management Project 2002-2004.	UNDP	ECZ	Enhancement of managerial capacity for Environmental protection and sustainable management of natural resources/Co-ordinating implementation of International Conventions.
GEF DDT in Africa Project 2002	GEF/WHO	MoH	Zambia, Angola, Botswana, Mozambique, and Zimbabwe are involved in a search for alternatives to DDT
SADC PCB Inventory Project 2002/3	GEF/CIDA	ZESCO/ ECZ	Assisting 14 SADC countries, including Zambia, to develop inventories on PCBs
Environmental Support Programme (ESP) 2002-2004	UNDP/ WORLD BANK	ECZ	Enhancement of managerial capacity for environmental protection; coordinating the implementation of International Conventions

10.3 Comment/ Analysis

The implementation of international activities at the national level is carried out through the formation of intersectoral committees or task forces. These groups meet on a regular basis to give direction and monitor progress.
The development of PTS regulations, which incorporated ideas from FAO Code of Conduct, the PIC procedure, and guidelines for industries, was done through intersectoral forum activities. There is a need to collect more data to facilitate decision making on issues relating to PIC chemicals.

Project funding by International Organisations is done through the Economic and Technical Cooperation Department (ETCD, MFND). The Planning Department (PD, MFND) produces Public Investment Plans (PIPs) which outline all activities undertaken or under consideration, including information on responsible organisations. In addition, a National Technical Co-operation Assessment and Programming (NTCAP) has been introduced to specifically evaluate and maximise benefits from technical assistance projects. As a consequence, an environmental unit was set up in the PD to co-ordinate projects and ensures that projects do not produce adverse effects on the environment

Existing linkages with International Organisations that support chemicals (including POPs) management should continue to be strengthened.

With regard to opportunities for co-operation in preparing National Implementation Plans (NIPs) for the Stockholm Convention (SC) at the Sub-Regional level, the major areas lie in the following POPs category-specific activities:

POPs- Pesticides and Industrial Chemicals

- Pooled resources to build capacity to assess for exemptions
- Development of capacity for trade with both Parties and Non-Parties
- Develop action plans to map out more rigorous controls for the use of DDT
- Shared Research and Development plans, and
- General and specific strategies for implementation of the SC

POPs-Unintentional

- Establishment of compatible source inventories as well as release estimates
- Build capacity for Best Available Technologies (BAT) requirements for some new sources and promotion of BAT for existing and some new sources, and
- Promotion of Best Environmental Practices (BEP) for both new and existing sources

POPs-Stockpiles and Wastes

- Development of common strategies for the identification and initiation of inventories
- Development and agreement for transboundary movement
- Building of capacity for identification of sites, and
- Development of solid links to the ASP project.

Chapter 11: Awareness/Understanding of Workers and the Public

11.1 Legal Instruments on the Awareness of Workers
11.2 Awareness and Understanding by the Public

The understanding by workers and the public of the characteristics of the substances that they deal with on a day-to-day basis is one of the important ways in which accidents may be forestalled. The knowledge by workers of the likelihood of adverse effects that may result from handling the substances brings out a sense of respect and alertness. However, with time and experience, relaxation in due regard for full operational procedures may lead to accidents. To establish working environment standards for each industry, legal provisions have been made to ensure uniformity in order to enhance adherence.

11.1 Legal Instruments on the Awareness of Workers

The provisions in the Law designed to achieve compliance for the protection of workers have been made so that sanctions may be instituted for non-compliance. With anticipated increased costs to be incurred in this respect, most employers would have no incentive for worker protection other than the Law.

In order to enhance chances of compliance at the institutional level, senior management staff from relevant industries are included as participants during formulation of the laws and regulations. It has been observed that depending on the level of awareness by top management, information flow to those below is almost guaranteed. Problems arise when top management is uninformed or their level of awareness is low.

The provision of extension services by MACO staff, and the inspectorate functions at MoH and MLGH seem to have the potential to increase general awareness. Most of the extension services may not include information directly relating to the environment. Therefore, there is need to broaden the scope of extension services so as to incorporate information targeted at the general public who may not necessarily be engaged in agriculture, but who are at risk and in real danger arising from the hazards inherent in the nature of the chemicals in the consumer sector. Results of the Comprehensibility Testing carried out under the CHC project revealed that most people were not aware of the hazards posed by chemicals.

11.2 Awareness and Understanding by the Public

ECZ operates a Communications and Education Department (CED) which spearheads the Environmental Education (EE) and Public Awareness activities at ECZ is mandated to "inform and educate the public on environmental issues, regulations and standards, and their role in managing the environment. This is in order to promote and encourage active participation of the public in managing the environment through media liaisons, awareness campaigns and environmental education." The objectives of CED are:

- to act as a public relations wing of ECZ by accurate and timely dissemination of information or facilitate this and promote the corporate image
- to act as a media liaison link for all the other units to both print and electronic media, and

general public enquiries on the various unit activities and general environmental activities
- to undertake Education and Awareness responsibility of ECZ so as to enlighten the public on environmental activities/issues, and enhance levels of awareness on environment as a key priority, not only by policymakers, industries and farmers, but also the general community at large.

The major activities of CED include:

- production and dissemination of EE materials
- resource provision on EE
- co-ordination of EEPA activities in the country
- organisation and co-ordination of exhibits, performing arts, workshops and seminars for information dissemination.
- networking with learning institutions on development and implementation of EE curriculum
- promotion and co-ordination of networks in EE programs
- facilitation of Community based programmes aimed at promoting sustainable resource use.
- co-ordination of activities aimed at disseminating information through the media.
- production of ECZ's Corporate Newsletter
- undertaking of public relations for ECZ activities and
- production of radio and TV programmes.

Financial assistance to CED comes from the Zambian Government as well as through the Environmental Support Programme (ESP), NORAD and the Southern African Development Community Regional Environmental Education Project (SADCREEP). However, the unit requires a lot more financial support to uplift its capacity to reach out more effectively.

The presence of NGOs as vehicles for dissemination of information has increased awareness on current issues. The sensitisation of journalists to increase coverage of environmental issues is also bringing fruitful results.

Journalists

Journalists from both government and private media have been identified as conduits for public information on subjects of importance that the public needs to know and participate in. The chemicals issue is one such subject. In this regard, ECZ and other institutions have conducted workshops for journalists to increase their awareness.

Educational Broadcasts

Materials are developed by WECSZ, ZEP, NAIS and others for a wider audience. Teachers are taught through ZEEP programmes at the Chalimbana In-Service Training Centre.

Newspaper Features

Apart from regular features like "Warthog" in the Sunday Times of Zambia and "Environmental Watch" carried by the Zambia Daily Mail, other articles are published on various issues. The first and only environmental newspaper produced in Zambia todate, the "Green Times" covers issues such as the environment, participatory development, advocacy and gender equity. The paper is

published monthly.

Advertisements

Private radio stations offer their services in the spirit of sharing with the communities they operate in by broadcasting materials on environmental issues. Publications of the Government Gazette are used to inform the public on registration of chemicals and other vital issues. Information on mandatory laws is published through gazette notices.

Workshops, Seminars and Meetings

Workshops and seminars bring together individuals in various fields to share knowledge on issues relating to chemical (including POPs) management and handling, and also to plan and adopt strategies that maximise available resources. The decentralisation of decision making relating to health, local government and agriculture from national to provincial, district and community levels, ha increased the potential in for enhanced public awareness raising activities.

Drama Performances

Plays and drama provide a channel for the dissemination of information on topical issues. Performances are offered in both English and seven major local languages. Zambia, through ECZ, has produced a video entitled "Citizens Beware". The objectives of this video are to educate members of the general public on the dangers of POPs. The video also advises farmers and the general public on better management of chemicals. Furthermore, ECZ educates the general public on issues relating to chemical (including POPs) management and handling through drama performances.

Chapter 12: Resources Available and Needed for Chemicals (including POPs) Management

12.1 Resources Available in Government Ministries/Institutions
12.2 Resources Needed for Management of Chemicals (including POPs)
12.3 Comment/Analysis

The enactment of the EPPCA and its regulations for management of chemicals shows a clear commitment on the part of government to provide resources for effective implementation. Through the PIP, resources have been allocated, but it has to be determined whether these are adequate.

12.1 Resources Available in Government Ministries/Institutions

Professional Staff

The level of education in most ministries and institutions is University or College with a background in natural sciences.

Table 12.A: Resources Available in Government Ministries/Institutions

Ministry/Agency Concerned	Number of Professional Staff Involved	Type of Expertise Available	Financial Resources Available (Zm K billions) (2003 Budget)
MTNR (ECZ)	368	Natural Resource Officers, Inspectors	109 086 552 106
MoH/MLGH (Control of Epidemics/ Manpower Development)	347	Doctors, Occupational Therapists,	802 399 491 433 (MoH) 41 986 819 098 (MLGH)
MACO Agric. Research Agric. Training DVTCS/ IRLCO-CSA	7 135	Research Extension Officers Agric. Research Officers, Training Officers, Entomologists, Research Officers, Scientists	119 218 623 494
MLSS	263	Factory Inspectors	6 594 225 520
MCTI (ZABS)		Standards Officers	15 419 726 483
MMMD (Environment, Research, Monitoring)		Chemists, Geologists, Geophysicists, Petrologists, Metallurgists, Gemologists, Inspectors	7 860 344 796

Table 12.A: Resources Available in Government Ministries/Institutions (Continued)

Ministry/Agency Concerned	Number of Professional Staff Involved	Type of Expertise Available	Financial Resources Available (Zambian Kwacha) (2003 Budget)
MFND (ZRA)		Customs Control Officers	
MCT / MHA (Rescue Fire Service Road Traffic Commission/ DEC	548	Fire Officers, Road Traffic/Fuel/ Narcotics Inspectors, Chemists	17 075 198 491(MCT) 89 886 021 907 (ZP)
MSTVT (NISIR, NSTC)		Educators, Technologists, Research Scientists	86 522 921 735
MEWD (National Water Resources Master Plan Community Development and Monitoring **Hydrological Assessment and Monitoring**	244	Hydrologists, Hydrogeologists, Engineers(water, mechanical) Water Development Officers	31 336 706 490

12.2 Resources Needed for Management of Chemicals, Including POPs.

Professional Staff

Most government departments need to increase the number of qualified staff in order to cover the whole country effectively. In addition, remuneration should be set at competitive levels to enhance retention of qualified staff.

Financial Resources

The provision of budgets that cover the operations of institutions will remove some of the bottlenecks experienced so far. At the moment, government is using a cash budget system of funding. This may affect operations of certain institutions as funding depends on available financial resources. However, there is need to identify sources for additional financial assistance so that the management of chemicals (including POPs) enhances human potential. In particular, financial resources are needed for:

- harmonisation of local legislation and National Standards with the GHS and strict enforcement of legislation so as to address concerns over the entire life-cycle of all chemicals (including POPs);
- training in chemicals (including POPs) management;

- risk assessment and management, including undertaking of studies to detect/determine the presence of toxic pollutants, especially POPs;
- strengthening of import controls to forestall importation of substandard, hazardous and toxic
  substances, and support of current research initiatives in the identification and use of less toxic alternative chemicals;
- development of a Database on Chemical Incidents such as spillages, poisoning, inhalation and other Chemical Accidents and Aspects;
- development of CHC brochures, media packages, and other community awareness raising outreach materials;
- establishment of Emergency Response Systems;
- establishment of Poison Control Centres; and
- development of educational materials on chemical hazards for use in formal education.

12.3 Comment/Analysis

The levels of human and financial resources required to manage chemicals (including POPs) are enormous. Institutions like ECZ and OSHSD (MLSS) are understaffed. Avenues available to fill in technically qualified and experienced personnel and laboratory infrastructure gaps include:

- investment by government in building, and appropriately equipping additional specialised laboratories;
- making use of the personnel who were lost during the restructuring exercises that were carried out in many line ministries by offering short-term contracts to competent retired/laid off technocrats readily available on the job market; and
- recruitment of more professional staff into the civil service, with the help of external funding agencies.

Annex 1: Names and Addresses of Key Individuals and Organisations- NP 1st EDITION, 1996.

1. A1 MEMBERS OF THE NATIONAL CO-ORDINATING TEAM (NCT) OF THE 1ST EDITION OF THE NATIONAL PROFILE PREPARATION, 1996.

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1A.2 NAMES OF INSTITUTIONS INVITED TO THE "NATIONAL WORKSHOP ON CHEMICAL MANAGEMENT TECHNICAL PLANNING SESSIONS 23-25 APRIL, 1996" FOR THE 1st EDITION OF THE NATIONAL PROFILE.

1. Food and Drugs Control Laboratory (MoH, Government)
2. Zambia Environmental Education Programme (NGO)
3. Planning Department (MAC, Government)
4. Ministry of Environment (MTENR, Government)
5. Natural Resources Department (MTENR, Government)
6. Ministry of Transport and Communications (MTC, Government)
7. National Commission for Development Planning (MFND, Government)
8. Central Statistical Office (MFND, Government)
9. Wildlife Conservation Society (NGO)
10. Department of Metallurgy (MMMD, Governnment)
11. Unite Nations Development Programme (UNDP,UN)
12. United Nations Industrial Development Organisation (UNIDO,UN)
13. Zambia Associations of Chambers of Commerce and Industry (NGO)
14. University of Zambia (Academia/Research)
15. Zambia Revenue Authority (MFND, Government)
16. Zambia Electricity Supply Corporation (MEWD, Parastatal)
17. Ministry of Commerce and Trade (MCTI, Government)
18. Zambia Association of Manufacturers (NGO)
19. Nitrogen Chemicals (Z) Ltd (MCTI, Parastatal)
20. Ministry Of Health (MoH, Governmental)
21. International Labour Organisation (ILO, UN)
22. Ministry of Labour and Social Security (MLSS, Governmental)
23. Mines Safety Department (MMMD, Governmental)
24. Chemical Society of Zambia (CSZ, Professional Body)
25. Zambia Agrochemical Association (ZAA, Professional Body)
26. Zambia National Farmers' Union (ZNFU, NGO)
27. National Institute of Scientific and Industrial Research (NISIR, Research)
28. Copperbelt University (CBU, Academia/Research)
29. Department of Veterinary and Tsetse Control Services (DVTCS, MAC)
30. Food and Agriculture Organisation (FAO, UN)
31. World Wide Fund for Nature (WWF, NGO)
32. National Agricultural Information System (NAIS, MAC)
33. Indeni Petroleum Refinery Ltd. (MEWD, Paraststal)
34. Canadian International Development Agency CIDA, Donor Agency)
35. Zambia Consolidated Copper Mines Ltd. (MMMD, Parastatal)

1B. LIST OF MEMBERS OF THE NATIONAL PROJECT CO-ORDINATING COMMITTEE (NPCC) FOR THE DEVELOPMENT OF THE ZAMBIAN NATIONAL IMPLEMENTATION PLANS FOR PERSISTENT ORGANIC POLLUTANTS

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Annex 2: List of Zambian Languages (Dialects)

1. Ndembo
2. Lunda
3. Luba
4. Luchazi
5. Chokwe
6. Luvale
7. Mbowe
8. Mbunda
9. Makoma
10. Ndundulu
11. Mwenyi
12. Nyengo
13. Mashi
14. Kwangwa
15. Kwandi
16. Mboela
17. Nkoya
18. Mashasha (Nkoya)
19. Lozi
20. Simaa
21. Shanjo
22. Totela
23. Subiya
24. Toka
25. Leya
26. Lumbu
27. Tonga
28. Ila
29. Sala
30. Lenje
31. Soli
32. We
33. Goba
34. Iwa
35. Kaonde
36. Lukolwe
37. Lamba
38. Nsenga
39. Chikunda
40. Chewa
41. Ngoni
42. Tambwa
43. Bemba
44. Bwile
45. Shila
46. Lunda (Kazembe)
47. Chishinga
48. Mukulu
49. Ng'umbo
50. Bisa
51. Aushi
52. Unya
53. Kabende
54. Lala
55. Mbo
56. Swaka
57. Lima
58. Seba
59. Luano
60. Inamwanga
61. Mambwe
62. Lungu
63. Swahili
64. Kunda
65. Tumbuka
66. Senga
67. Kamanga
68. Yombe
69. Fungwe
70. Wenya
71. Lambya
72. Nyika
73. Wandya
74. Tambo

Annex 3: List of Major Industries

Base Metal Industry	**Chemical/Coal/Petroleum /Plastics**	**Fabrication-Machinery/ Equipment**
National Drum & Can Ltd Monarch (Z) Ltd Steeltech Zambia Ltd Zambia Aluminium Scaw Ltd Saxon Steel Ltd Discount Steel Ltd ZAMEFA Ltd Sonar International Ltd	MCFI International (Z) Ltd Lee Yeast Kafue Chemicals Ltd DGH Poly Products Ltd Merco (1971) Ltd Athol Plastics (Pvt) Ltd Polymer Mouldings Ltd Polythene Products Ltd Nasla Industries Ltd Norgroup Plastics Ltd Habib Industries Ltd Kings Plastics Ltd Plastex Packaging Ltd Nisco Industries Ltd Lamise Investments Ltd FoamKing Manufacturers Ltd Lublend Ltd Kazuma Enterprises Ltd. Indeni Petroleum fineries Ltd BP (Z) Ltd Mobil Oil (Z) Ltd Jovenna (Z) Ltd Caltex Oil (Z) Ltd Agip (Z) Ltd Total (Z) Ltd Spectra Oil Corporation Ltd Trishul Adhesives & Chemicals	Zambia Railways Ltd Heroes Foundry Ltd
Mining and Quarrying	**Battery Manufacture**	**Toiletries and Health Care Products**
KCM PLC MCM PLC Bwana Mkubwa Mining PLC Chambishi Metals PLC Chilanga Cement PLC Ndola Lime Co. Ltd Turner Asbestos Products Ltd	Chloride Zambia Ltd Exide Batteries Inveco Batteries Amanita Batteries Ltd	SaraLee Nasla Chemicals Interchem Ltd Unilever (SEA) Ltd Vitafro Ltd Trade Kings Ltd
Pharmaceuticals	**Fertilisers**	**Construction**
International Chemicals Ltd. IDC Ltd Pharco Ltd Melcome Pahrm. Ltd Kings Pharmaceuticals Ltd Gamma Pharm. Ltd Tejay Pharmaceuticals Ltd Chemdol (Z) Ltd	Nitrogen Chemicals (Z) Ltd Omnia Fertilisers (Z) Ltd	Turner Construction Brunelli Construction Spencon (Z) Ltd Nemerit Enterprises Ltd Minestone (Z) Ltd Shimizu Corporation Ltd Poseidon Constr. Co Ltd NCC Phoenix Contractors Ltd

		Construction Noremco Construction Velos Enterprises Ltd J J Lowe (Z) Ltd

Annex 3 Continued.

Food Industry	**Pesticides**	**Wood and Wood Products, Printing**
Copper Harvest Foods Ltd Lyons Zambia Ltd Liquefied Foods Ltd Speciality Foods Zambia Ltd Bonita Zambia Ltd Finta Danish Dairies Zambia Sugar PLC National Milling Corp Ltd Nyati Milling Ltd APG Milling Ltd Antelope Milling Co. Ltd Simba Milling Co. Ltd Eureka Chickens Ltd Zambeef Products Ltd Zambezi Ranching & Cropping PLC Yaffico Industries Ltd Crystal Products Manufacturers Zuwalite Industries Ltd Dunavant Oil Ltd High Protein Foods Ltd Amanita Premium Oils Ltd Zambian Breweries PLC National Breweries Ltd Kariba Breweries Ltd Golden Breweries Ltd Kankoyo Breweries Ltd Kaingo Breweries Ltd	United Phosphorus (Z) Ltd Farmchem Services Ltd Dunavant (Z) Ltd Farmers Barn Ltd Nemchem International Ltd Cropchem Services Ltd Cropsreve (Z) Ltd Hygrotech (Z) Ltd Zambia Cooperatives Federation Ltd Agchem Tech. Services Ltd. Rechitt Benkiser (Z) Ltd Index Investments Ltd Lamise Investments Ltd Agrocentre Danatract Ltd **Textiles/Clothing And Leather Goods** Bata Shoe Company Bata Tannery Malar Industries Ltd Copperbelt Shoes Ltd Mukuba Textiles Ltd Kafue Textiles Ltd Swarp Spinning Mills Ltd Sakiza Spinning Ltd Zambia China Mulungushi Textiles Ltd Zamleather Ltd Vimal Textiles Zambia Textiles Ltd Continental Textiles Colwyn Bonar Ltd	Setrec Steel & Wood Processing Company Ltd Wood Processing Industries Ltd ZAFFICO Chris Furniture Government Printers Zambia Education Publishing House Associated Printers Ltd Aquila Printers New Horizons Printing Press UNZA Press Printers Zambia Printing Company Printech Ltd Monterey Printing Commercial Press Mercantile Printers Sobi Industries IMCO Industries Ltd Mukatasha Enterprises Ld

Annex 4A: Glossary of Terms

Glossary of Terms

Agricultural Chemical means, a chemical compound or mixture produced exclusively for the sole purpose of increasing/improving the productivity and quality of farm crops, inclusive of all fertilisers and pesticides.

Consumer Chemical means, any industrial chemical whose products are meant for the direct/immediate
use by the consumer public, particularly for such areas as household cleaning, hygiene, water treatment etc.

Environmental Impact Assessment means, a systematic examination conducted to determine whether or not a proposed project or alteration/modification to an existing project or alternatives may have significant adverse or beneficial impact on the environment.

Formulation means, the combination of various ingredients designed to render the product useful and effective for the purpose claimed.

Industrial Chemical means, a large scale commercially manufactured chemical compound, either organic or inorganic, which may be used directly or made to undergo further transformation in the production of detergents, drugs, fertilisers, perfumes, plastics and other synthetic finished chemical products.

Licence means, an official document that authorises/allows corporations and/or individuals to engage in activities dealing in and/or related to chemicals, issued under the appropriate sections of the EPPCA.
Permit means, an official written order that allows corporations and/or individuals to engage in activities dealing in and/or related to chemicals, issued under the appropriate sections of the EPPCA.

Pesticide means, any substance or mixture of substances intended for the prevention, destruction or control of pests. This includes vectors of human or animal disease, unwanted species of plants and animals that may cause harm during or otherwise interfering with the production, processing, storage, transportation or marketing of food, agricultural commodities, wood or wood products or animal feed stuffs, or which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies.

Pollution Prevention means, the total sum of all interventions that maintain, at the lowest levels, the quantities of possible contaminants in a particular environment such that the probability of pollution to human, animal and plant life is minimised or totally inhibited.

Production means, all activities concerned with the manufacture/production of good and/or services.

Rural means, a potential location generally situated away from the line of rail or with low population density, where people are engaged in subsistence agricultural activities.

Trade means, engagement in trade (buying and selling of commodities), including export, import, formulation and domestic distribution**.**

Urban means, a potential location with a large population, high population density, and with a threshold population of twenty thousand (20 000) and above, with a low prevalence of agricultural activities,

Annex 4B: **List of reviewers**

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3. Mr. J. Mukosa — Environmental Council of Zambia
4. Ms. N. Muunyinda — Environmental Council of Zambia
5. Mrs. T. Bowa — Environmental Council of Zambia
6. Dr. S.F. Banda — University of Zambia
7. Dr. K. Sichilongo — University of Zambia
8. Mrs. C. Malijane — Ministry of Health
9. Mr. Z. Machaliwa — Environmental Technology International
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Annex 5: Bibliography

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