CHEMICALS

1.0 INTRODUCTION

Chemicals are indispensable in many economic activities and are a vital part of everyday life. They provide society with a wide range of benefits, particularly increased agricultural and industrial productivity and improvements in the control of disease. However chemicals have the potential to cause considerable health and environmental problems from production through to disposal. Misuse or failure to follow best practice can be costly. The presence in the environment and use of chemicals for various purposes affect the quality of the air, water, soil and human health.

1.1 Overview of Policy, Legal and Institutional Framework for Chemicals Management in Ghana

The 1992 Constitution of Ghana provides the broad policy basis for the protection of the environment. The relevant sections are as follows:

- Economic Development - Article 36 (9): The State shall take appropriate measures needed to protect and safeguard the national environment for posterity; and shall seek co-operation with other states and bodies for the purposes of protecting the wider international environment for mankind.
- Economic Development - Article 36 (10): The State shall safeguard the health, safety and welfare of all persons in employment, and shall establish the basis for the full deployment of the creative potential of all Ghanaians.
- Duties of a Citizen - Article 41 (k): The exercise and enjoyment of rights and freedoms is inseparable from the performance of duties and obligations, and accordingly, it shall be the duty of every citizen to protect and safeguard the environment.

The Policy Statement on the Environment requires the State to "take appropriate measures, irrespective of the existing levels of environmental pollution and extent of degradation, to control pollution and the importation and use of potentially toxic chemicals". This expectation from the State requires a more comprehensive policy on toxic substances for the country.

The ultimate aim of Ghana's environmental policy is to improve the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. The policy, specifically, seeks to:

- Maintain the ecosystems and ecological processes essential for the functioning of the biosphere;
- Ensure sound management of natural resources and the environment; adequately protect humans, animals and plants, their biological communities and habitats against harmful impacts and destructive practices, and preserve biological diversity;
- Guide development in accordance with quality requirements to prevent, reduce, and as far as possible, eliminate pollution and nuisances;
- Integrate environmental considerations in sectoral, structural and socio-economic planning at the national, regional, district and grass root levels;
- Seek common solutions to environmental problems in West Africa, Africa and the world at large.

The National Environmental Policy stated above has some relevance, in a broad sense, for the management of pesticides and toxic chemicals in Ghana. There are a number of laws that have some relevance to the control and management of chemicals, but most of these laws do not address the dangers posed to humans and the environment by the chemicals in question. Where they may be relevant, the institutions that deal with them do not have the resources to monitor or research into their disposal.

Section 10 of the EPA Act establishes the Hazardous Chemicals Committee with the following functions:

- monitor the use of hazardous chemicals by collecting information on the importation, exportation, manufacture, distribution, sale, use and disposal of such chemicals;
- advise the Board and the Executive Director on the regulation and management of hazardous chemicals; and
- perform such other functions relating to such chemicals as the Board or the Executive Director may determine.

Part Two of the Environmental Protection Agency Act, 1994 (Act 490) is dedicated to Pesticides Control and Management and provides rules for registration, classification, licensing, importation, manufacture, formulation, labelling, transportation, distribution, reporting, disposal, non-disclosure of information and inspections of pesticides in Ghana.

A framework exists under the Environmental Protection Agency Act for inter-sectoral collaboration in the control and management of chemicals in the country. The EPA is the coordinating institution and the key Ministries, Departments and Agencies (MDAs) that constitute the various committees aimed at sound management of chemicals in the country include:

- Plant Protection and Regulatory Services Directorate (PPRSD) of the Ministry of Food and Agriculture;
- Ghana Standards Board;
- Ghana Atomic Energy Commission;
- Customs, Excise and Preventive Service;
- Ministry of Health/Ghana Health Service;
- Food and Drugs Board;
- Universities and Research Institutions and
- Non-Governmental Organisations (NGOs).

The above laws provide a framework for the management of all chemicals and pesticides. Other chemical related laws in operation in the country include the following:

- The Food and Drugs Law, 1992, (PNDCL 305B) which was enacted to control the manufacture, import, export, distribution, sale, use and advertisement of foods, drugs, cosmetics, household chemicals and medical devices. Drugs, cosmetics and household chemicals are made from several chemical substances that may have a negative impact on health and environment if the manufacture, distribution and disposal are not controlled and managed properly.

- The Factories, Offices and Shops Act, (Act 328) 1970, which seeks to protect the health and safety of workers from the dangers posed by chemicals to employees in the working environment;
- The Standards Decree, 1973 (NRCD 173)
- The Draft Policy and Bill on Occupational Safety and Health, 2000 which seeks to ensure that measures are instituted to ensure the attainment of optimum health for workers in all occupations in Ghana.
- The Mercury Law, 1989
- The Minerals (Off-Shore) Regulations, 1962 (as amended)
- The Oil in Navigable Waters Act, 1964
- Infectious Disease Ordinance (Cap 78)
- The Prevention and Control of Pests and Diseases of Plants Act, 1965 (Act 307).
- Prevention of Damage by Pests Decree, 1968 (NLCD 245)
- Cocoa Industry Regulations, 1968 (NLCD 278).
- Merchant Shipping (Dangerous Goods) Rules, 1974 (LI 971)
- Customs, Excise and Preventive Service Law (PNDCL 330)
- Local Government Act, 1992 (Act 462)
- Export and Import Act, 1995 (Act 528).
- Environmental Assessment Regulations, 1999 (LI 1652)

1.2 Assessment of Chemical Risks

The control and management of chemicals including pesticides has therefore been a very important programme of the EPA dating back to the erstwhile EPC. Administrative directives and requirements of international agencies such as FAO and UNEP were the main basis of action in the initial stages. The Agency obtained much technical assistance support in the form of training, and information and established structures including legislation leading to the promulgation of the Pesticides Control and Management Act, 1996 (Act 528), which was subsequently made Part Two of the EPA Act, 1994 (Act 490).

The Chemicals Control and Management Centre of the Agency has the primary objective of protecting human health and the environment from the potential harmful effects of chemicals. This is to ensure the co-existence of the general population with chemical substances through the maximization of their benefits whilst minimizing adverse health and environmental impacts.

1.2.1 Mechanisms for Systemic Evaluation, Classification and Labeling of Chemicals

1.2.1.1 Control and Management of Industrial and Consumer Chemicals

Industrial chemicals are being controlled under section 10 of the Environmental Protection Agency Act, 1994 (Act 490), which established the Hazardous Chemicals Committee (HCC).

The routine activities are undertaken to control and manage industrial and consumer chemicals are as follows:

i. Annual clearance permits for industrial/consumer chemicals;
ii. Supplementary permits for the industrial/consumer chemicals;
iii. Single import permits for industrial/consumer chemicals;
iv. Single import permits for meat products;
v. Management of obsolete chemicals and hazardous waste (HCC);
vi. Training of stakeholders;
vii. Public awareness campaigns on reducing the risks of chemicals;
viii. Routine inspections and monitoring to keep track of imported raw materials, including plastic granules, clinker, fertilizers and meat products.

Routine inspections involve regular sampling of the industrial raw materials for analysis by the Ghana Standards Board to determine levels of heavy metals. Similarly, samples of meat products are sent to the Ghana Atomic Energy Commission to determine levels of radioactive contamination before clearance permits are issued.

1.2.1.2 Control and Management of Hazardous Chemicals

The Environmental Protection Agency Act, 1994 (Act 490) provides for the establishment of a multi-stakeholder Hazardous Chemicals Committee. According to Section 10, paragraph 3 of the Act, the functions of the Hazardous Chemicals Committee are to:

- Monitor the use of hazardous chemicals by collecting information on the importation, exportation, manufacture, distribution, sale, use and disposal of such chemicals.
- Advise the Board and the Executive Director on the regulation and management of hazardous chemicals; and
- Perform such other functions relating to such chemicals as the Board or the Executive Director may determine.

The Agency collects information on all chemicals (industrial chemicals and agrochemicals) imported into the country. The processing of applications for imports of chemicals are supported by documents such as the Material Safety Data Sheets or Technical Dossiers, which provide technical information on the chemicals. The documents may also suggest disposal options of such chemicals as well as information about their toxicity.

The disposal of obsolete or unwanted hazardous chemicals or wastes poses a great challenge for regulatory authorities in Ghana. The disposal of municipal and some types of chemical wastes are essentially carried out at landfill sites, which are not engineered. Incinerators for the disposal of some hazardous wastes are not available in Ghana. The improper disposal of chemical wastes into the environment may also result in long-term exposure of the population to pollutants that cause adverse health effects. The EPA currently has a procedure for the disposal or destruction of unwanted or obsolete hazardous wastes. The disposal covers all degraded, damaged, expired, and obsolete or otherwise unwanted chemical substances and products.

An organization or individual wishing to dispose of unwanted materials (industrial or commercial chemical wastes) applies to the EPA for both advice and permission. The application is accompanied by the following:

- A list stating the type(s) of substance(s), their quantities and origin of importation or manufacture.
- Material Safety Data Sheet (MSDs) or Technical Dossier or Label covering each substance or materials as appropriate.
- Description of the storage facility where the unwanted substances are stored etc.

Inspectors of the EPA then visit the premises. The activities undertaken by the Inspectors include the following:

- Visual inspection of the material to be disposed of to ascertain declared quantity, form, location and packaging.
- Collect samples of materials for analysis if necessary
- Request owner of material to provide such additional information as will be necessary for the proper classification of materials as hazardous or non-hazardous.

Based on the available information covering the material/substances, the inspection team recommends the appropriate mode of disposal/destruction or other measures concerning the material. The nature and characteristics of the wastes shall determine the suitable handling, destruction and disposal options taking into consideration all existing environmental and legal requirements.

The EPA also collaborates with a number of institutions in the destruction and disposal of unwanted materials. Such institutions include Ghana Standards Board, Food and Drugs Board, Municipal and District Waste Management Departments etc.

1.2.1.3 Control and Management of Pesticides

Part Two of the EPA Act, 1994 (Act 490) - Pesticides Control and Management makes the Environmental Protection Agency of Ghana the lead agency responsible for a comprehensive pesticide regulatory program. In that capacity, the EPA has the sole authority and responsibility to register all pesticides imported, exported, manufactured, distributed, advertised, sold or used within Ghana. This allows the EPA to confirm that the product provides for both human and environmental protection.

Registration of Pesticides

The purpose of the registration process is to determine, before registration, that the product can be used safely and effectively in accordance with its label directions. The pesticide product label and scientific data must be reviewed and found acceptable before the product can be registered. By this process, registration helps to ensure that all pesticides used in Ghana have been examined

for safety and efficacy before they are distributed within the country - thereby assuring availability of effective pesticides, which pose acceptable risk for sale and use in Ghana.

Restricted use pesticides are those that have higher risk potential for humans, wildlife and the environment. The EPA has determined that the benefits provided by these pesticides outweigh the risks as long as they are properly handled, applied, and disposed. Knowledge and prevention are the keys to avoiding accidents and unwanted exposures.

Ghana's pesticide registration is a step-by-step process that involves a number of evaluations culminating in a final decision to register or deny registration of a pesticide. The evaluation is expected to identify potential problems that may arise from the sale and use of pesticides under Ghana's unique conditions and culture.

The process of registration determines whether mitigating measures are necessary to ensure that effective products will be available which do not present undue hazards for farmers, the public, the consumer or the environment.

To be registered, an applicant has to provide a technical dossier on the product. The information provided should include the purpose, composition and origin of the pesticide; the physical and chemical properties and toxicity levels of both the formulation and the active ingredient(s). The dossier must be accompanied by reports of relevant ecotoxicological and toxicological studies conducted on the product formulation and respective active ingredients. The labelling and packaging of the product also have to be declared including measures to be taken in case of an emergency. Three subcommittees of the Pesticides Technical Committee (Human Toxicology/Ecotoxicology, Bioefficacy, Labeling and Advertisement subcommittees), then evaluate the dossier. The Agency may only register a pesticide if it is satisfied that the pesticide is safe and effective for the use for which it is intended and that the pesticide has been tested for efficacy and safety under local conditions.

Data submitted to support registration of a pesticide are subjected to in-depth scientific analysis within the registration unit. The scientific evaluation subcommittees perform the scientific evaluation. The EPA may refuse to register any product that fails to meet the registration requirements. In registering the pesticide, the Agency shall classify it for:

- For General use,
- For Restricted use, or
- Suspended or banned

After the product is registered, information about the product and its label are computer coded. A paper copy is also maintained for each pesticide product. The enforcement section of the CCMC; trained EPA Regional staff; staff of PPRSD/MOFA and the appropriate committees of the District Assemblies are responsible for enforcing proper sale, use, and storage of pesticide products.

Procedures for Licensing of Pesticide Dealers

Dealers who wish to engage in pesticide business (import, export, manufacture, distribute, sell or use) must first be formally registered to do business in Ghana, and obtain a license from the EPA to do so in accordance with the Act.

The Pesticides Licensing and Enforcement Unit of the Pesticides Department licenses the following categories of dealers in Ghana:

- Importers, manufacturers and formulators
- Distributors, retailers and dealers
- Commercial operators (i.e. pest control operators)
- Transporters of restricted pesticides

Both users and applicators of restricted use pesticides must first be trained in the proper handling of such pesticides and then licensed by the EPA in accordance with the Act. Those applicators that will apply pesticides commercially must also be tested before a license can be issued.

Prior to the issuing of licenses to the dealers, they submit applications to the Agency indicating their intentions. Currently, information required for licensing of dealers in pesticides includes address of the company, names and qualifications of responsible persons in the company, list of pesticides to be handled under the license and a description of technical storage and handling facilities. The pesticides licensing staff then visit and inspect the premises to be used for the business. The Agency may then issue a license authorising the applicant to import, export, manufacture, distribute, advertise or sell pesticides if it has reasonable grounds to believe that the applicant will comply with the conditions required under the license. Licenses could be suspended or cancelled by EPA if the applicant does not fulfil the conditions.

Enforcement of Part Two of EPA Act

The recommended list of pesticides or pesticides register is made available to industry and other stakeholders such as Customs, Excise and Preventive Service (CEPS) and Ministry of Food and Agriculture (MoFA). According to Section 38 of Act 528, every customs officer shall:

- Assist in the enforcement of the provisions of the Act and
- Prevent the importation into Ghana of any pesticide, where the importation is contrary to this Act.

The Act also provides for the appointment of Pesticides Inspectors. According to Section 31 paragraph 1, a member of the relevant sub-committee of a District Assembly so authorised or an inspector appointed under section 15 of the Environmental Protection Agency Act, 1994 (Act 490) may:

- inspect equipment used or to be used in applying pesticides
- inspect any storage or disposal facilities and areas used for the storage of disposal of pesticides
- inspect any land actually, or reported to be exposed to pesticides

- investigate complaints of injury to human beings, animals or damage to land and pollution of water bodies resulting from the use of pesticides
- take samples of pesticides applied or to be applied
- monitor the sale and use of pesticides

The Inspectors have the right to stop illegal activities and arrest suspected persons or seize their equipment.

1.2.2 Initiatives for Assessment of Toxic Chemicals (Hazard and Risk Assessment)

Ghana has developed acceptability criteria for the registration of pesticides in Ghana based on hazard assessment covering the following aspects:

1.2.2.1 Labelling in English or a Local Language

If the product label is not in English the product will not be registered. The label may also be in a local language in addition to the English.

1.2.2.2 Bioefficacy – Pesticides for Crop Protection Purposes

If the pesticide is to be registered for use on any crop, a full bioefficacy dossier needs to be provided. The pesticide will then only be registered if bioefficacy is considered acceptable.

1.2.2.3 Bioefficacy – Pesticides for Public Health Purposes

Any pesticides to be used for public health purposes should have been evaluated, and subsequently approved or recommended, by the WHO.

1.2.2.4 Other Registrations

If the product (or a similar product) has been registered in at least 2 OECD member states, or by CILSS, it may be registered. If the product (or a similar product) has not been registered in at least 2 OECD member states or by CILSS, it will need to go through the full evaluation process.

1.2.2.5 WHO Hazard Class of the Product

If the end-user product (formulation) falls in the WHO hazard class of Ia (*extremely hazardous*), the product will not be registered.

If the end-user product (formulation) falls in the WHO hazard class of Ib (*highly hazardous*), any registration will be for restricted use only. If such a restriction cannot reasonably be enforced under Ghanaian conditions, the pesticide will not be registered (as yet).

Pesticides destined for household use will only be registered if they fall in WHO hazard class III (*slightly hazardous*).

Note: Classification of the pesticide will be on the basis of the LD_{50} of the **formulated** product (as submitted by the company). In the absence of such data, or as a secondary quality check, the LD_{50} of the formulation will be calculated using the most recent *WHO guidelines on the classification of pesticides*.

1.2.2.7 Pesticide is a Known or Probable Carcinogen

If the pesticide is a known or probable carcinogen, the product will not be registered.

Note: Data will primarily be drawn from the submitted dossier, but will be crosschecked against the following secondary assessments:

- International Agency for Research on Cancer (IARC): Group 1 (*carcinogenic to humans*) and Group 2A (*probably carcinogenic to humans*), are not acceptable.
- US-EPA: [old classification] Groups B1 & B2 (*probable human carcinogen*); or [new classification] Group L2 (*likely carcinogenic to humans*), are not acceptable.

1.2.2.8 Pesticide is a Known or Probable Mutagen

If the pesticide is a known or probable mutagen, or genotoxic, the product will not be registered.

Note: Data will primarily be drawn from the submitted dossier, but may be crosschecked against one or more of the following secondary assessments (if available):

- WHO toxicology reviews for the Joint Meeting on Pesticide Residues (JMPR)
- Registration reviews carried out by well-established registration authorities (e.g. US-EPA, APVMA-Australia, EU).

1.2.2.9 Pesticide has Known or Probable Effects on Reproduction or is Teratogenic

If the pesticide has known or probable effects on reproduction, or is teratogenic, the product will not be registered.

Note: Data will primarily be drawn from the submitted dossier, but may be crosschecked against one or more of the following secondary assessments (if available):

- WHO toxicology reviews for the Joint Meeting on Pesticide Residues (JMPR)
- Registration reviews carried out by well-established registration authorities (e.g. US-EPA, APVMA-Australia, EU).

1.2.2.10 Pesticide Appears on PIC List

If the pesticide is listed in Annex III of the Rotterdam Convention ("the PIC list"), the pesticide will need to go through the full registration procedure (Note: such a pesticide will likely get a restricted use status, or may be banned altogether).

1.2.2.11 Pesticide has POP Characteristics

If the pesticide is listed on Annex A or B of the Stockholm Convention it will not be registered.

If the pesticide has the characteristics defined in Annex D of the Stockholm Convention:

- The pesticide is persistent (i.e.: DT_{50} [water] > 2 months, or DT_{50} [soil] > 6 months, or DT_{50} [sediment] > 6 months), and
- The pesticide may bioaccumulate (i.e.: BCF > 5000 or log K_{ow} > 5), and
- The pesticide has potential for long range transport (i.e.: DT_{50} [air] > 2 days), and

- The pesticide is highly toxic,

It will be considered a potential persistent organic pollutant (POP). Such a product will need to go through the full registration procedure (*Note:* it will likely get at least a restricted use status, or may be banned altogether).

1.2.2.112 Pesticide is in the Montreal Protocol

If a pesticide is listed in the Montreal Protocol, for phase out, it will not be registered.

1.2.2.13 DT_{50} [soil/sediment]

If a pesticide has a field-DT_{50} [soil or sediment] > 3 months, it will need to go through the full risk assessment procedure for the soil and groundwater environment.

1.2.2.14 DT_{50} [water]

If a pesticide has a field-DT_{50} [surface water] > 1 month, it will need to go through the full risk assessment procedure for the aquatic environment.

1.2.2.15 Bioconcentration Factor (BCF)

If a pesticide has a BCF > 1000 (or in the absence of such data, a log K_{ow} > 3), it will need to go through the full risk assessment procedure for the aquatic environment.

1.2.2.16 Product Causes Severe Eye Irritation or Damage

If an end-user product (formulation) causes severe eye irritation or damage, it will not be registered.

Note: Data will primarily be drawn from the submitted dossier, but may be crosschecked against one or more of the following secondary assessments (if available):

- WHO toxicology reviews for the Joint Meeting on Pesticide Residues (JMPR)
- Registration reviews carried out by well-established registration authorities (e.g. US-EPA, APVMA-Australia, EU).

1.2.2.17 Product Causes Severe Skin Irritation, Skin Corrosion or Skin Sensitization

If an end-user product (formulation) causes severe skin irritation, skin corrosion, or if it is a skin sensitizer, it will not be registered.

Note: Data will primarily be drawn from the submitted dossier, but may be crosschecked against one or more of the following secondary assessments (if available):

- WHO toxicology reviews for the Joint Meeting on Pesticide Residues (JMPR)
- Registration reviews carried out by well-established registration authorities (e.g. US-EPA, APVMA-Australia, EU).

1.2.2.18 For Export Crops: MRL of Pesticide set to Zero in Country of Import

A product that is to be used on a crop that is (mainly) destined for export will not be registered for that specific crop if the maximum residue limits (MRLs) are set to zero in the (main) importing country.

A product for which the maximum residue limits (MRLs) have been set to zero by established registration authorities, for human toxicological and/or environmental reasons, will not be registered on any export crop.

1.2.2.19 Problems in Ghana

Any product that has shown problems in Ghana, with respect to efficacy, health or environment will need to go through the full registration procedure.

1.2.3 Participation in Various International and Regional Initiatives

Ghana participated fully during the negotiations of various Multilateral Environmental Agreements (MEAs) on chemicals and wastes and has ratified all the chemicals and waste related Conventions except the Bamako Convention and the ILO Convention on the Safety of Chemicals at the Workplace (1990). Table 1 provides the list of chemicals-related MEAs and their ratification status for Ghana. Measures are being taken to give effect to our obligations under these Conventions.

Table 2: Chemicals- Related MEAs and their Ratification Status for Ghana

No	Convention	Year of Ratification
1	Vienna Convention on the Protection of the Ozone Layer	1989
2	The Montreal Protocol on Substances that Deplete the Ozone Layer	1989
3	Stockholm Convention on Persistent Organic Pollutants (POPs) (2001)	2003
4	The Rotterdam Convention on Prior Informed Consent (PIC) Procedure of certain Pesticides and Chemicals in International Trade (1998);	2003
5	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)	2003
6	Bamako Convention on the Control of Transboundary Movements of Hazardous Wastes (1991)	Not ratified
7	FAO International Code of Conduct for the Distribution and Use of Pesticides (as amended in 2003)	Adopted
8	ILO Convention on the safety of Chemicals at the Workplace (1990)	Not ratified
9	The UN Convention on Substances that Deplete the Ozone Layer (Vienna Convention) (1985)	1989
10	Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	1989
11	London Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer (1990)	1992
	UN Chemicals Weapons Convention (1993)	1997

The implementation status of the above Conventions is as follows:

1.2.3.1 Implementation of the Vienna Convention and Montreal Protocol

Under the provisions of the Montreal Protocol, Ghana is expected to phase out the use of CFCs by 2010 and to facilitate Ghana's compliance with this provision; quotas have been allocated to selected companies.

1.2.3.2 Implementation of the Basel Convention

The Basel Convention was adopted in 1989 and entered in to force on 5th May 1992 in response to concerns about toxic waste from industrialized countries being dumped in developing countries and countries with economies in transition. The convention controls the movement of hazardous wastes across international frontiers and develops criteria for environmentally sound management of the wastes.

The EPA of Ghana processes applications for the export and import of hazardous (mostly lead from used batteries) from and into Ghana respectively. Ghana is participating in a number of initiatives for the control of illegal transboundary movement of hazardous waste especially e-waste into the country.

1.2.3.3 Implementation of the Stockholm Convention

The Stockholm Convention seeks the elimination or restriction of production and use of all intentionally produced POPs (industrial chemicals and pesticides). It also seeks the continuing minimization and, where feasible, ultimate elimination of the releases of unintentionally produced POPs such as dioxins and furans.

Ghana has prepared and submitted a National Implementation Plan (NIP) for the Stockholm Convention. The NIP assessed Ghana's capacity to implement the Convention and serves as basis for phase out/reduction programmes and ultimately elimination of POPs at the country and global levels.

1.2.3.4 Implementation of the Rotterdam Convention

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

Ghana has prepared a National Action Plan for the Rotterdam Convention and there a system in place coordinating the preparation of Ghana's import notifications on the chemicals listed in Annex 3 of the Convention as well as reporting.

1.2.4 Information Exchange and Cooperation

Information management is very vital in sound management of chemicals. Developing countries are often faced with this challenge. Modern information and communication technologies are lacking. The United Nations Environment Programme (UNEP) Chemicals and the United States Environmental Protection Agency (US-EPA) have undertaken a two-year project in Ghana to supply equipment and training on access to chemical information using the Internet. The EPA is the national coordinating agency responsible for obtaining local commitment and organizing the national activities. The CIEN project aims at:

- enhancing the capacities of countries to obtain and share information needed for their national decision-making especially in the field of chemicals management.
- creating the framework for access to and exchange of information to support national, regional and international activities for sound chemicals management.
- assisting appropriate government agencies in developing countries to access the internet, providing training to chemical managers and appropriate stakeholders on how to access chemical information on the internet
- encouraging the establishment of a national/regional network for chemical information exchange between chemicals management stakeholders.

The project catalyses the building of the national institution's (EPA's) own information database related to chemicals management as the basis of information exchange network that would connect the main agencies involved in chemicals management. Some of the key institutions involved in the project are CEPS, MoFA, Ghana Standards Board.

The CIEN project is expected to result in the establishment of infrastructure and technical capabilities to access and exchange chemical information as follows:

- A website where national and international partners can gain access to chemicals information services
- Trained staff in accessing chemicals information through the internet
- An institutional kiosk providing information on all actors/stakeholders and their respective informational base
- Information kiosks and libraries on chemicals management, assisting the general public to gain access to existing bibliographical references about specific subjects and to access them directly from their computers

1.2.5 Public Education

The EPA periodically organises training workshops and seminars for stakeholders on the control and management of chemicals. Dealers in agrochemicals are also given refresher courses in pesticides management. The Plant Protection and Regulatory Services Directorate (PPRSD) of the Ministry of Food and Agriculture (MoFA) also organises training programs for pesticides dealers. The Ghana National Association of Farmers and Fishermen (GNAFF) is also represented at most training workshops organised by the EPA and the MoFA. The Agricultural Extension Officers of MoFA are also in direct contact with farmers and teach them among others the correct way to apply pesticides and fertilizers to their crops and also on the need to wear protective clothing when applying pesticides. Training of farmers focuses on FAO guidelines on

the distribution and use of pesticides. Handbooks (published in 2000) on management of pesticides have also been prepared by the Pesticides Management Division of the PPRSD, which serves as a basis for training. This handbook is available to the public.

1.3 Sound Management of Toxic Chemicals

Ghana has banned all pesticides and industrial chemicals subject to control under the Rotterdam and Stockholm Conventions and through the pesticides registration, structures and procedures have been established to prevent the re-introduction of such chemicals into the country.

1.3.1 Objectives of Ghana's Chemicals Management Programme

The objectives of chemicals management in Ghana include the following:

- To ensure that chemicals are used safely to protect the environmental and public health and reduce unacceptable risks associated with use of chemicals.
- to protect human health and the environment from the effects of indiscriminate and inappropriate use and management of chemicals.

1.3.2 Strategies

The strategies to be adopted in achieving the above objectives include the following:

- Developing and implementing a national, scientifically-based and sustainable "whole of life cycle" approach to the management of chemicals;
- Further strengthening Ghana's legal framework to establish a comprehensive set of statutory instruments needed for safe management of all chemicals;
- Establishing appropriate laboratory facilities for analyzing all types of chemicals and toxic wastes;
- Evaluating and registering of pesticides and industrial and consumer chemicals to ensure suitability for designated use(s) and proper handling and labeling;
- Working with all stakeholder institutions, including customs and excise officials, to monitor and prevent the importation of unregistered and banned chemicals;
- Licensing all pesticide and chemicals dealers to ensure proper distribution, handling and storage of chemicals at wholesale and retail premises and to encourage effective communication with end-users on appropriate product use and on product safety requirements;
- Monitoring compliance with all aspects of the *Environmental Protection Agency Act, 1994* and, where necessary, advising the appropriate Government agencies of the need to take enforcement action;
- Working with staff of the Ministry of Food and Agriculture (Plant Protection and Regulatory Services Directorate) and District Assemblies and with farmer organisations to promote awareness of the need for proper use and management of all agricultural chemicals and, in particular, of the need for and means of safe handling of all biocides;
- Establishing a National Integrated Chemicals Management Information System (NICMS) to provide comprehensive, reliable, up-to-date and readily accessible information on all aspects of chemicals management and safety;

- Fostering effective linkages with international organisations dealing with chemicals management (UN Agencies, UNEP (Chemicals), FAO, UNITAR, UNIDO, ILO, WHO, IOMC and OECD);
- Encouraging Cleaner Production by industry through the progressive replacement of hazardous materials in production processes;
- Encouraging the establishment of appropriately located, designed and operated facilities for the treatment and disposal of hazardous wastes and obsolete or banned chemicals.

1.3.3 Key Activities

- intensify training, education and awareness of all stakeholders (CEPS, dealers, farmers,
- establish poison centres
- conduct inventory of obsolete pesticides, other chemicals and hazardous waste
- identify, assess, reduce and minimise as far as possible by environmentally sound disposal practices, risks from storage of obsolete and outdated chemicals
- establish national registers and databases including safety information for approved chemicals
- upgrade existing national laboratories for testing of chemicals
- promote strategies for over dependence on use of agricultural chemicals through alternative farming practices, integrated pest management (IPM) and other appropriate means
- ensure that manufacturers, importers with the collaboration of producers of chemicals develop appropriate emergency response procedures for on-site and off-site activities
- capacity building and research in assessing the risks of chemicals to health and the environment
- link with African Regional Centres of the Basel Convention for capacity building to manage hazardous wastes
- conduct SEA on chemicals management programmes

1.3.4 Outcomes

- virtual elimination of the importation and use of unregistered, obsolete or banned chemicals
- full compliance with license requirements by all pesticide dealers
- development of a comprehensive set of guidelines on the use and management of hazardous chemicals
- all users of hazardous chemicals (particularly agricultural chemicals) properly trained and equipped and fully committed to employing safe management, application and (where necessary) withholding practices to ensure protection of human health and the environment
- reduction in the use of hazardous chemicals in industry and minimisation of hazardous wastes through widespread adoption of cleaner production practices and technologies
- establishment of a range of high quality facilities to safely treat and dispose of hazardous wastes and obsolete or banned chemicals
- establishment of Poison Control Centres.

1.3.5 Performance Indicators

- continuing reductions in the incidence of illegal importation and use of unregistered or banned chemicals
- levels of compliance with license conditions by pesticide dealers
- percentage of agricultural chemicals users with appropriate training and employing safe practices
- extent of replacement of hazardous chemicals in production processes
- extent of reduction in hazardous wastes streams
- proportion of hazardous wastes treated or disposed of at facilities operating in full compliance with EPA requirements

1.3.6 Key Partnerships

The Chemicals Control and Management Centre staff constitutes a small expert group which has a range of important operational responsibilities which it discharges in co-operation with various EPA Departments (notably the Regional Offices) and with other Government agencies (particularly the Customs, Excise and Preventive Service, the Ministry of Food and Agriculture, the Ministry of Health, the Ministry of Trade and Industries, the Factories Inspectorate of the Ministry of Employment and Social Welfare, the Ghana Standards Board and the Ghana Atomic Energy Commission). The Centre also works with international organisations and bodies (UNEP, UNITAR, IOMC, FAO, UNIDO, ILO, etc) to establish and maintain channels of co-operation and involvement.

1.3.7 Action Plan for Control and Management of Ozone Depleting Substances

1.3.7.1 Objective

To work with all sections of the community to achieve phasing out of Ozone Depleting Substances (ODS) by 2010.

1.3.7.1 Strategies

- planning, promoting and implementing programmes which will lead to the phasing out of the use of ODS and, where this is not immediately practicable, programmes which will substantially reduce consumption of these chemicals through improved servicing and maintenance of equipment and use of recycled chemicals
- establishing and implementing a comprehensive range of regulatory controls over the importation, use and recycling of ODS and the certification of refrigeration technicians
- working with customs authorities to restrict the importation of ODS
- working with other West African nations to prevent illegal cross-border traffic in ODS
- working with industry associations and retailers to promote the substitution of chemicals with low or zero ozone depleting potential (ODP) for ODS (e.g. methylene chloride in the flexible foam blowing industry and hydrocarbons in domestic refrigeration, subject to the application of suitable measures to ensure worker/user safety)

- working with the refrigeration industry to train and accredit technicians in the use of techniques and equipment which will minimise loss of ODS to atmosphere and in the collection and recycling of ODS from refrigeration and air conditioning systems
- working with the automotive industry to promote the reduction in leakage of ODS from car air conditioning systems and the use of recycled ODS or of alternative refrigerants
- working to ensure that Ghana's concerns and interests are appropriately reflected in all relevant Montreal Protocol fora.

1.3.7.2 Outcomes

- all Ghana's commitments as an Article V country of the Montreal Protocol are met
- substantial progress towards the national goal of eliminating imports of ODS by 2006 (four years in advance of commitments under the Protocol)
- establishment of a comprehensive range of regulatory controls to facilitate achievement of commitments under the Montreal Protocol
- effective enforcement of such regulations by EPA and customs
- continuing significant donor support for initiatives to implement the Protocol within Ghana
- all refrigeration technicians servicing domestic, commercial or industrial equipment trained and certified in a manner acceptable to EPA
- extensive substitution of low or zero ODP chemicals for ODS where these substitutes have been proven safe and effective.

1.3.7.3 Performance Indicators

- extent of reduction in imports of ODS
- extent of reduction in per capita annual consumption of ODS
- extent of substitution of low or zero ODP chemicals in priority areas such as domestic and commercial refrigeration and air conditioning
- percentage of refrigeration technicians trained and certified in a manner acceptable to EPA
- EPA's success in gaining donor support for projects to assist Ghana in implementing commitments under the Protocol
- extent to which any future changes to the Montreal Protocol or new international initiatives under the auspices of the Protocol take account of the particular circumstances and needs of Ghana and other African countries

1.3.7.4 Key Partnerships

Staffs of the Office work in collaboration with the National Committee on Ozone Depleting Substances (NACODS) and their colleagues in other Departments of the Agency, as well as customs staff to meet Ghana's commitments under the Montreal Protocol.

Equally critical to achieving national goals in this area are partnerships between EPA and various industry sectors and groups (such as the National Air Conditioner and Refrigeration Workshop Owners' Association*)* and with international agencies and donor bodies.

1.3.8 Policy and Frameworks for Preventing Accidents, Preparedness and Response

In order to ensure the protection of Life and the Environment Ghana has developed written guidelines for the safe transportation of hazardous materials in Ghana.

To ensure that the purchasing, transport, and handling, of materials are effectively managed to minimise risk to the safety and health of all personnel associated with operations and to protect the environment.

Transporters of hazardous materials will conduct their business responsibly and in a manner designed to proactively protect the health and safety of its employees, its customers and the public, while protecting the environment.

Purpose and aim of Guidelines

To ensure that transportation of hazardous materials in Ghana is conducted in a manner to protect human health and the environment.

- Compile a complete list of hazardous materials used in Ghana.
- Ensure that Suppliers and Contractors are in compliance with International Hazardous Material Regulations.
- Ensure that all Suppliers and Contractors have Hazardous Material Handling and Transportation systems, and that they comply with their policies.

The scope of Hazardous Material Transportation Safety will be limited to those operations which are within the scope of The United Nations Recommendations on the transportation of Dangerous goods, Australian Dangerous Goods Code, and of the hazardous materials regulations codified within Title 49, Code of Federal Regulations (49 CFR), International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods By Air (ICAO), International Air Transport Association Dangerous Goods Regulations (IATA), and the International Maritime Organization, International Maritime Dangerous Goods Code (IMDG).

Non-transportation related hazardous materials such as janitorial supplies and maintenance chemicals or equipment will not be included within the scope of these guidelines.

Definition

Hazardous material means a substance or material, which has been determined by the United Nations, to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

1.3.9 Emergency Preparedness, Response and reporting Procedure for Ghana

The major types of emergencies included in the procedure are as follows:

- Fire
- Explosion
- Spillage
- Emission of toxic/hazardous gases

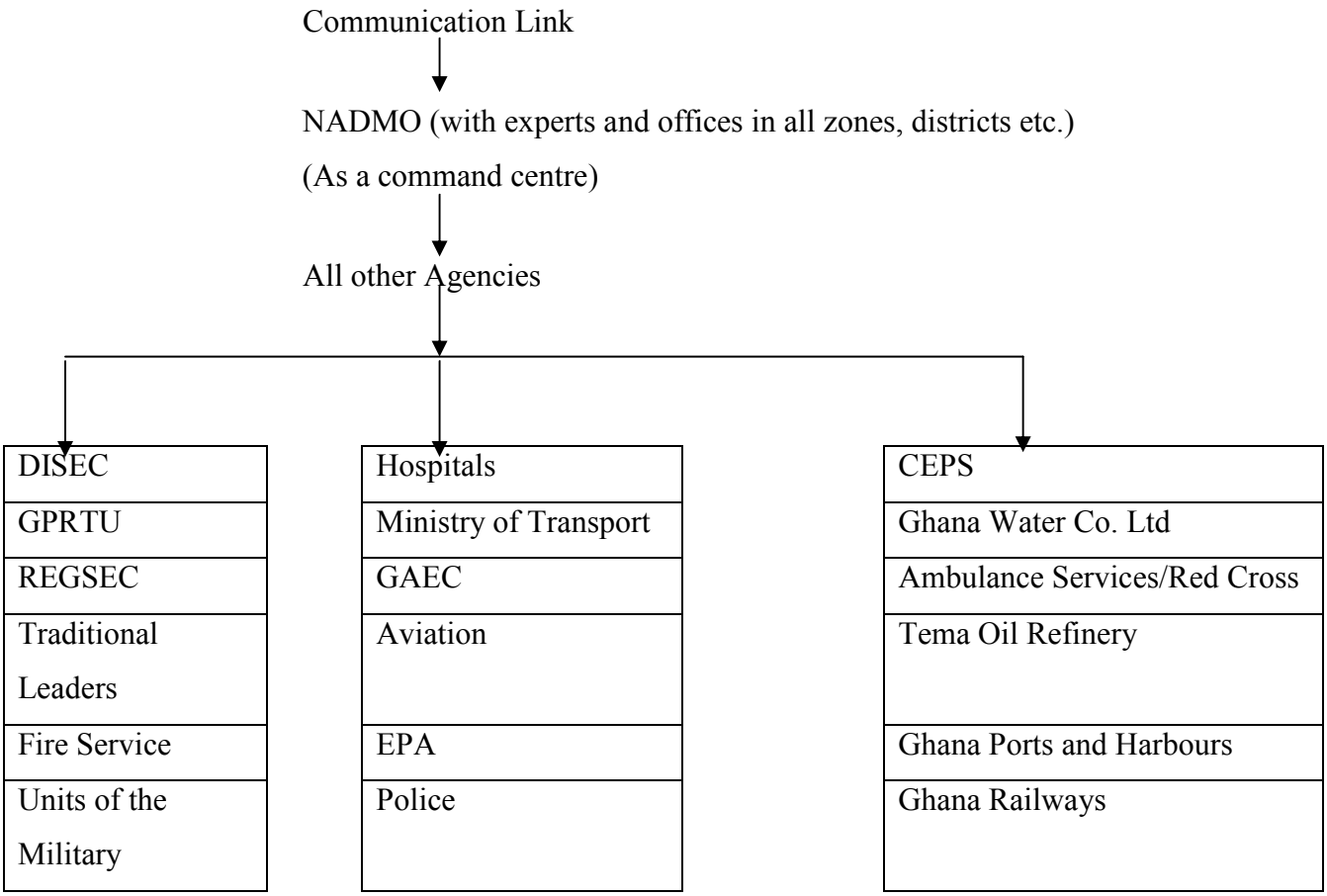
1.3.9.1 Levels / stages of emergency

There is a Tier-3 description of emergencies as follows:

- Level 1: Small and medium scale (e.g. within an organization/company) which can be handled by the internal Emergency Response Team (ERT)
- Level 2: Medium and large scale emergency requiring the assistance of Regional Security Councils (REGSECs) and District Security Councils (DISECs).
- Level 3: This is a large scale emergency or disaster requiring the assistance of national agencies coordinated by National Disaster Management Organization (NADMO).

Ghana, as a nation, is not properly resourced to effectively handle a national disaster or emergency of any kind.

1.3.9.2 Contingency Plan



1.3.9.3 Preparedness

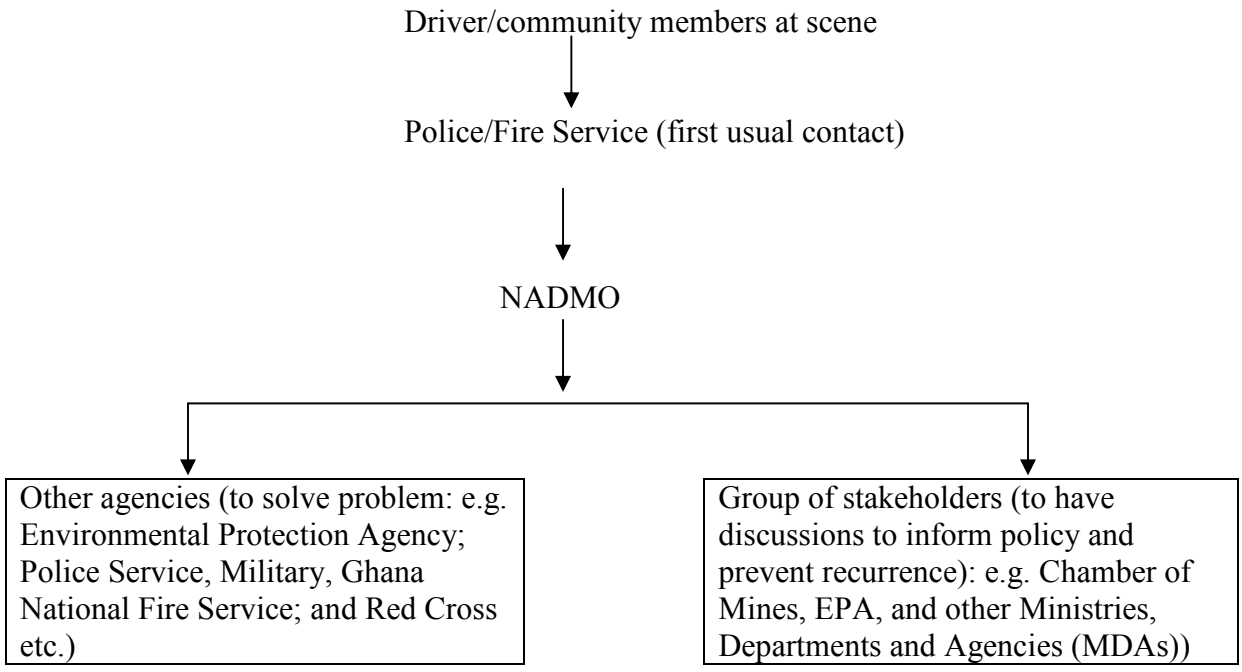
1. Training with certification of drivers and mates on driving symbols, chemical symbols, use of protective equipment, First aid and Fire safety.
2. Intensive education of handlers at all points (ports, drivers, companies involved)
3. Regular mock emergency drills

4. Better training of community First Aid representatives
5. Gradual education of community using children in schools (with the help of NCCE) and using dramas, and the assemblymen for the communities at large.
6. Limit the transportation of hazardous materials to certain times of the day (time to be decided by NADMO and sub agencies)
7. Drivers should report to nearest police station at each major stop so there is knowledge by authorities of hazardous materials in the area.
8. Ensure that safety/protective gear and equipments are worn/used at all times.
9. All hazardous substances should be properly contained in their respective containers, sealed and checked. There should be laid down ways of handling them on the containers for all to follow. EPA can enforce this by putting in their permit.
10. Transporting companies should register with the EPA for the sake of those who do not work with the Chamber.
11. MTU should be mandated to check certificates of training, driving and First Aid at different stops.
12. There should be a representative of the receiving company at the collection point (usually the harbour) to sign and go with the vehicle else the vehicle should not be allowed to leave.
13. All vehicles should have fire extinguishers in them. The vehicle itself should be in good shape for the nature of the journey. The driver should also be examined and should be dissuaded from embarking on the journey even if on medication.
14. Railway transport should be considered for haulage once the railway lines are fixed.
15. Government should also make available some funding available to institutions for the procurement of safety equipment, first aid and protective clothing. This should be included in the budget.
16. All stakeholders must create a desk for hazardous materials to ensure effective collaboration among institutions (sharing of knowledge)
17. All stakeholders must have individual Emergency Response Teams to complement that by NADMO.
18. NADMO should have a database on the equipments and functions of each stakeholder.
19. There should effective communication link (radio, phone etc.) among stakeholders established and coordinated by NADMO to ensure prompt response.
20. CEPS must work with EPA to inform importers of hazardous materials and to constantly monitor them.
21. EPA should have a specific unit to handle such emergencies.
22. Enforcement should be made possible by the EPA which should push for the adoption of these guidelines as Regulations, which will then go with sanctions.

1.3.9.4 Response

- In case of a national disaster, NADMO is first contacted.
- NADMO will then alert all other agencies so they know the cause and the appropriate measures taken.
- Actions to be taken include evacuation, isolation, quarantine, neutralization and others
- In the process of undertaking the action, safety gear should be worn and as such, vehicles, ports and receiving companies should have safety/ protective clothing and equipment.
- To make it easier in the event of the driver's inability to respond, an MSDS manual should be in the vehicle. Large, clear symbols of the chemical or material on the vehicle should be pasted on the vehicle. These two would help anyone who appears on the scene to know what it is and the steps to take before the right agencies arrive.
- If the driver or anyone in the vehicle is conscious after the incident, he/she should ensure that the community members stay away from the site, explaining to them the nature of the situation so they wait for the appropriate agency.

1.3.9.5 Reporting



1.3.10 Policies to Reduce Risks Posed by Lead, Mercury and Cadmium

Mercury is imported for use mainly in the mining sector and small quantities go to the health and education sectors.

- Due to lack of awareness the chemical gets into the environment during the mining process and uncontrolled disposal/combustion of mercury-containing waste;

- The various compartments of the environment (water, soil and vegetation) are significantly contaminated with the chemical;
- Fishes are significantly contaminated;
- Currently, there is no data on atmospheric contamination;
- There are no national threshold values of mercury for imported goods, water, food etc.
- There has not been any comprehensive nation-wide assessment of the impact of the chemical and its transformation in the environment; data available are from isolated studies;
- The pieces of legislation on mercury are inadequate and obscure. People are not aware of these laws;
- Regulatory bodies have the capability but lack the capacity and resources for the task.
- A nation-wide study of the levels of mercury in the Ghanaian environment (soils/sediment, water, plants and especially the air) should be instituted.
- Threshold values for mercury should be formulated for imported goods such as dry cells, and for food, drinking water etc. for the country.
- There is the need for capacity building in the regulatory institutions such as EPA, Minerals Commission, CEPS, Ministries, etc.
- There should be a clear policy on mercury in Ghana, right from the importation stage to the end user stage. Regulatory Institutions e.g. EPA, CEPS etc. and auxiliary ones e.g. the Police, Judiciary, etc. should be co-ordinated by one ministry preferably the Ministry of Trade and Industry or the Ministry of Science and Environment. Each identified institution would then know its role and also know who is to do what in checking mercury use.
- The PNDC Law 217 of 1989 should be amended to cover all mercury users in the country. The new law should also deal with mercury from the time it arrives at the port of entry to its final disposal
- The legal framework should be strengthened to include proper monitoring and enforcement of the law. Just writing it down is not enough; personnel dealing with mercury and law enforcers, police, lawyers and judges and the users of mercury should be made aware of the environmental impact and effects on health of mercury.
- The Minerals Commission, which already has programs awareness creation and education on the hazards of mercury in the mining areas, should be resourced to be able to reach out to the miners. District Assemblies, NGOs, Small Scale Miners Association, private FM stations and other stakeholders must be brought in to assist in disseminating the information to the affected people.
- It is also suggested that mercury could be considered as a “pesticide” due to its impact on the food chain. This will enable the Chemicals Control and Management Centre to put mercury on their priority list.

1.3.11 National Poisons Information Centre

The Poisons Information Centre set up under the Ghana Health Service has the following key functions:

- Assists health professionals in the diagnosis and management of poisonings from chemicals, toxins, venoms and drugs
- Provides information to health professionals on the toxic effects of poisoning agents
- Provides information to the general public on prevention and first aid management of acute poisoning
- Educates the general public on the damaging effects of chemicals on the environment
- Provides toxicological surveillance through data collection on chemical incidents, exposures and poisonings.
- Organises training on poisoning prevention and management for health workers and other relevant stakeholders including Pesticide Inspectors of PPRSD

1.3.12 **Implementation of Action**

ACTIVITIES	TARGETS	2009	2010	2011	2012	2013
Promote and encourage environmentally sound use of new and renewable sources of energy	10% of national energy consumption from renewable sources by 2012	✔	✔	✔	✔	✔
Create awareness on the health and environmental impacts of unsustainable consumption and production patterns	40% of the populace aware of the health and environmental impacts of unsustainable consumption and production patterns	✔	✔			
Promote the adoption of recycling and reuse techniques in industrial processes	Cleaner production centre established and operational by 2009	✔	✔	✔		
Develop a 10 –year framework of programmes in support of national initiatives to accelerate the shift towards sustainable consumption and production.	50% of industries implement cleaner production by 2012	✔	✔	✔	✔	✔
Promote networking at the sub regional, regional and international levels for information sharing		✔	✔	✔	✔	✔
Assess the current status of production facilities		✔	✔	✔	✔	✔
Facilitate the implementation of cleaner production in industries		✔	✔	✔	✔	✔
Establish a cleaner production centre		✔	✔	✔	✔	✔
Build industry capacity for the implementation of cleaner production		✔	✔	✔	✔	✔
Conduct baseline inventory and /or trends of ambient air quality in representative areas (residential, industrial and commercial) in all 10 regional capitals	An extensive database available on ambient air quality in all regional capitals for the development of control strategies by 2009	✔				

ACTIVITIES	TARGETS	2009	2010	2011	2012	2013
Develop and/or update air quality standards, guidelines and regulations (ambient air, industries etc)	Extensive data base on vehicular exhaust emissions levels available for the development of standards by 2008	✔				
Effective characterization of pollutant types, quantities and behaviour in air, water, soil and biota of Ghana	Regulations for control and minimization of airborne pollutants including vehicular emissions enacted and operational by 2010	✔	✔	✔	✔	✔
Develop baseline inventory of vehicular exhaust emission levels			✔			
Develop and implement vehicular exhaust emissions standards and regulations		✔	✔	✔		
Promote the use of renewable energy sources (e.g. bio diesel) Develop and implement an air quality management strategy	CFCs phased out by 2010	✔	✔	✔		✔
Create awareness on the dangers of ozone depletion to human health and implement programmes to phase out ODSs in Ghana	Create awareness on the Regulations to eliminate/reduce Ozone depletion enacted and promote compliance	✔	✔	✔		✔
Training of refrigeration technicians and engineers in code of good practice in refrigeration	Ozone friendly equipment/substances patronized by the general public	✔				
Collate water quality data from all stakeholders (2009)		✔				
Consultation with relevant stakeholders (2009)						
Development of MOUs with Stakeholders (2009)						

ACTIVITIES	TARGETS	2009	2010	2011	2012	2013
Monitor the status of water resources to update existing database						
Identify potential sources of pollution of water sources						
Evaluation of the effectiveness of existing responses aimed at prevention of pollution of water resources						
Provide information, education and environmental data on water resource pollution to inform the public						
Prevent and control water pollution by applying the Polluter Pays Principle,						
Ensuring the construction of treatment facilities for sewage and industrial effluents Develop a scheme with other stakeholders for groundwater monitoring		x				
Assess the level of industry compliance with EPA effluent quality guidelines and permit conditions (2009)						

5.0 CONCLUSIONS

The key areas earmarked for immediate follow-up in order to streamline and strengthen chemicals management, improve environmental quality and human health and include the following:

i. Improvement in capacity to collect, collate and disseminate information on chemicals management to facilitate making informed decisions with regard to chemicals management;

ii. Establishment of an Integrated Chemicals Management Information Systems (ICMIS);

iii. Intensification of programmes on education, awareness raising and training;

iv. Enhancement in monitoring capacity, hazard and risk assessment, interpretation and communication;

v. Increase in capacity for implementing and enforcement and compliance in chemicals management;

vi. Strengthening of technical infrastructure of laboratory, capacity of NGOs and training institutes;

vii. Research and development into environmentally friendly alternative chemicals at the local level;

viii. Adoption of suitable strategy for pollution prevention and waste minimization;

ix. Adoption of risk management policy, including evaluation of safer chemical alternatives and non-chemical options;

x. Strengthening of legislation to ensure the availability of safe and effective chemicals for use at all times;

xi. Promotion of cleaner production techniques in industry

xii. Implementation of the Polluter Pays Principle