International POPs Elimination Project

Fostering Active and Efficient Civil Society Participation in Preparation for Implementation of the Stockholm Convention

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Country situation report for Jordan

Badia Revival and Environment Protection Society

Jordan
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About the International POPs Elimination Project

On May 1, 2004, the International POPs Elimination Network (IPEN http://www.ipen.org) began a global NGO project called the International POPs Elimination Project (IPEP) in partnership with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP). The Global Environment Facility (GEF) provided core funding for the project.

IPEP has three principal objectives:

- Encourage and enable NGOs in 40 developing and transitional countries to engage in activities that provide concrete and immediate contributions to country efforts in preparing for the implementation of the Stockholm Convention;

- Enhance the skills and knowledge of NGOs to help build their capacity as effective stakeholders in the Convention implementation process;

- Help establish regional and national NGO coordination and capacity in all regions of the world in support of longer term efforts to achieve chemical safety.

IPEP will support preparation of reports on country situation, hotspots, policy briefs, and regional activities. Three principal types of activities will be supported by IPEP: participation in the National Implementation Plan, training and awareness workshops, and public information and awareness campaigns.

For more information, please see http://www.ipen.org

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Introduction

Stockholm Convention

The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants (POPs). The Convention has identified twelve POPs substances. It refers to nine chemicals used only as pesticides (Aldrin, Chlordane, Dieldrin, DDT, Endrin, Heptachlor, Hexachlorobenzene, Mirex and Toxaphene), two industrial chemicals: Polychlorinated biphenyls (PCBs) and Hexachlorobenzene (HCB) and four unintentional by-products (PCDD, PCDF, HCB and PCB).

The convention entered into force on February 17, 2004. Jordan signed the Convention on 18 January 2002 and ratified it on 8 November 2004. The POPs chemicals referred to in the Convention are listed in Annexes A, B, and C of the convention (Appendix 1). The requirements under the convention relating to the chemicals are stated in Article 3 (refers to the manufactured chemicals), Article 5 (refers to by-products) and Article 6 (refers to stockpiles and wastes of all twelve POPs chemicals).

Persistent Organic Pollutants

The term “Persistent Organic Pollutants” (POPs) is used to describe a class of toxic chemical substances that can harm human health and environment. POPs are long-lasting toxic substances that are produced and released into the environment by human activity. Some POPs are produced for use as pesticides; some are for use as industrial chemicals; and some are produced as unwanted byproducts of certain chemical and/or combustion processes. For more information about POPs mentioned by the Stockholm Convention see Table 1

Properties of POPs

POPs have the following properties:

- Produced and mobilized into the environment as a result of human activity.
- Potential to cause harm to human health and/or to the environment.
- Long life in the environment and not easily or quickly broken down when they are in air, in water, in soil and in sediments. They are persistent in the environment
- Become concentrated in the environment to levels of concern under circumstances where species accumulate POPs by eating smaller POPs-contaminated organisms.
- Travel long distances in the environment through air, water or migratory species, and accumulate at locations that are distant from the sources of release

Sources of POPs

Among these twelve POPs, some have been used as pesticides, some as industrial chemicals and some arise as unintentional by-products of chemical and/or combustion

processes. To some extent these categories overlap. For example, PCBs were produced as industrial chemicals in large quantities, but are also generated as unintentional by-products Hexachlorobenzene fits into all three categories; pesticides, industrial chemicals and unintentional byproduct.

POPs - Pesticides

There are nine pesticides. Their names and specific uses of these pesticides are given in Table 1

POPs - Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are a class of chlorinated hydrocarbons that have been widely used as industrial chemicals since 1930. There are 209 varieties of PCBs. The most commercial PCB applications are in the form of mixtures of varieties. Large quantities of PCBs were produced for use as a cooling and dielectric fluid in electric transformers and in large capacitors. These compounds have also been widely used as hydraulic fluids and as heat exchange fluids. PCBs applications have included use as a sealant, as paint additives, additives in some plastics, and as a component of carbonless copy paper. They can also be formed and released as unwanted byproducts in some chemical and combustion processes.

PCBs are linked to reproductive failure and suppression of the immune system in various wild animals, and severe human intoxication has occurred due to accidental consumption of PCB containing oils. The International Agency for Research on Cancer (IARC) classified PCB into Group 2B (possibly carcinogenic to humans). International production of PCBs ended in most countries by 1980. The major exception to this was in the former Soviet Union countries and some Central European countries. No country presently reports intentional PCB production.

POPs - Dioxins and Furans

Dioxins and Furans are two classes of chlorinated hydrocarbons. They have never been produced commercially or intentionally except in small quantities for laboratory purposes and/or as reference standards. There are 75 different dioxin congeners and 135 different furan congeners. IARC classifies one congener of dioxin as a group 1 carcinogen (human carcinogen). All others are carcinogenic in animals.

Dioxins and furans are generated as unwanted by-products in a variety of combustion and chemical process involving chlorine. The major sources include waste incinerators combusting municipal waste, hazardous waste, medical waste, sewage sludge etc. Incineration of medical wastes in small and poorly controlled incinerators was found to be a major source of dioxin and furans. Cement kilns firing hazardous waste and open burning of wastes may also generate dioxins and furans. Other dioxins and furan sources are: pulp and paper mills using chlorine bleach processes, certain thermal processes in metallurgic industry and chemical production processes involving chlorine.

Dioxins and furans are formed as byproducts in a wide range of processes. They are directly dispersed to the environment and may also be present in manufacturing processes such as extracting raw materials or preparing primary products.

Table 1: POPs pesticides and their uses.

Name of pesticide	Specific uses	Remarks
Aldrin	Used to control soil insects such as termites, corn rootworm, wireworms, rice water weevil, grass hoppers etc. and also to protect wooden structures from termites.	IARC - Group 3 (not classifiable as carcinogenic to humans)
Chlordane	Used as insecticide on agricultural crops including vegetables, small grains, maize, oilseeds, potatoes, sugarcane, sugar beets, fruits, nuts, cotton and jute, and also to control termites	IARC - Group 2B possibly carcinogenic to human)
Dieldrin	Used for control of soil insects	IARC -Group 3 (not classifiable as to be carcinogenic in human
Endrin	Used on field crops such as cotton, jute and grains as insecticides. It has also been used as rodenticide to control mice.	IARC -Group 3 (not classifiable as carcinogenic to humans)
Heptachlor	Used against soil insects, cotton insects, grasshoppers, crop pests and against termites.	IARC -Group 2B (possibly carcinogenic to humans)
Mirex	Used against ants and to control leaf cutters, harvester termites, mealy bug etc. It has also been used as a fire retardant in plastics, rubber, paint paper and electrical goods.	IARC -Group 2B (possibly carcinogenic to human)
Toxaphene	Used primarily on cereal grains, fruits, nuts vegetables and cotton. It has also been used to control ticks and mites in livestock,	IARC -Group 2B (possibly carcinogenic to human)
DDT	It is also an insecticide, intensively used for vector control in malaria eradication programme. During the second world war to protect the troops and civilians from the disease. Continues production in many countries for public health purposes.	IARC -Group 2B (possibly carcinogenic to human)
Hexachlorobenzene (HCB)	Used as a pesticide. It has been widely used as fungicide for seed treatment. It is also produced as an unintentional by-product in chemical industries and is present as an impurity and in combustion process too.	IARC -Group 2B (possibly carcinogenic to human)

Dioxins and furans are persistent in the environment and transfers can occur between media, e.g. from air to water through rain water and by run off from soil to water

reservoir. This type of transfer may also make an important contribution to human exposure to these organic compounds.

Assessment of POPs Issue in Jordan

Undesirable effects of POPs have become increasingly apparent in recent years in Jordan. Pesticides are by nature toxic to one or more forms of life. Chlorinated hydrocarbon pesticides are persistent and biological active chemicals, causing harmful side effects in the long run to humans and to the local as well as the global environment.

Pesticides

At present, there are about 300 imported and locally formulated pesticides referring to about 200 pesticides with common names in Jordan. These are registered through the registration committee in the Ministry of Agriculture. None of these pesticides are chlorinated hydrocarbon pesticides. At present, there is no manufacturing, formulation, import and legal use for any chlorinated hydrocarbon pesticides in Jordan.

Jordan has banned the production, import and usage of DDT in 1995 according to the Rotterdam Convention (PIC).

A Malaria Control Program had been setup in Jordan since 1959, with the aim of eradicating the disease from the country. It succeeded in achieving its objective in 1970. Since then, no local transmission cases have been registered, despite the detection and treatment of 150- 250 Malaria-infected expatriates annually and the occurrence of 33 Malaria cases caused by means of an expatriate in Ghour Al-Safi/ Kerak Governorate in 1990.

The program depended on the use of DDT during the period from 1959- 1970. It was sprayed twice a year indoors in the wetland areas of Jordan, once in March/ April and the second time in September/ October.

During the period 1970- 1991, the Program continued as a maintenance phase and depended on indoor spraying with DDT. In addition, Temephos, with a concentration of half part per million, was used for control of larvae on water surfaces by spraying the breeding sites of mosquitoes "Malaria vectors" once a week.

The last recorded usage of DDT in Jordan was in 1991, before the issuance of a resolution prohibiting its use for Malaria control in the year 1995.

The stockpiles of DDT stored at the Ministry of Health/ Malaria Division are:

DDT 75%: 9130 kg.
DDT 100%: 13015 kg.

The pesticide is kept in a separate store which nobody is allowed to enter. The pesticide is raised on top of a wooden base. One portion is packaged and kept in cardboard boxes;

the other is packed in nylon sacs which are badly packaged, which means that their traffic is impossible, though leakage could occur.

Currently, this issue presents the most significant one in Jordan because it is important to tackle it in an appropriate way, due to the likelihood of harm resulting from exposure to these pesticide quantities in stock.

Table 2 shows the target POP pesticides which were used for control of agricultural pests, date of prohibition, kind of pesticide, mode of action and their trade names.

Table 2: Annex A, Part I, Chemicals (POPs):

Common Name	Trade Name	Pesticide Group	Mode of Action	CAS. No	Date of Prohibition	Reason for Prohibition
Aldrin	Aldrex' * 'Octalene' *	Insecticide	Non-systemic insecticide with contact, stomach, and respiratory action.	309-00-2	29/10/1980	According to PIC
Dieldrin	Dieldrin ULV	Insecticide	Contact and ingested insecticide.	60-57-74-9	29/10/1980	According to PIC
Endrin	Endrex' * 'Mendrin' * 'Nendrin' *	Insecticide	Contact insecticide.	72-20-8	29/10/1980	Very toxic & according to PIC

Heptachlor	Drinox	Insecticide	Non-systemic insecticide with contact, stomach, and some respiratory action	76-44-8`	29/10/1980	According to PIC
Hexachloro-benzene		Fungicidal seed treatment	Selective fungicide. Acts by fumigant action on fungal spores.	118-74-1		According to PIC
Toxaphene (Camphechlor)	Toxaphin 40 EC, chompechor , strobane-T, Toxakil Magnum-44 ltox' *); 'Agronex Hepta' * 'Attac' *	Insecticide	Non-systemic, contact and ingested insecticide with some acaricidal action	8001-35-2	29/10/1980	According to PIC
Chlordane	Compound K	Insecticide	Non-systemic insecticide with contact, stomach, and respiratory action.	57-74-9	29/10/1980	According to PIC
Mirex	Dechlorane' * 'Mirex' *	Insecticide	Ingested insecticide	2385-85-5		Not used in Jordan

It can be concluded that Dieldrin was the greatest in use due to its control of desert locust, during the period from 1966-72. It was followed by BHC pesticide which was used for control of pests in stores and food stuff storehouses, as well as for control of household insects during the period 1966-85. Endrin was used from 1967-79 for control of aphids, rodents, worms, leaf hoppers, and thrips, and Toxaphene was used during the period 1968-76 for control of rodents worms, thrips, aphids and leaf hoppers. Heptachlor, on the

other hand, was used for control of cut worms, termites, and beetles on some crops such as barley, broad beans, cauliflowers, citrus, maize and tomatoes, as well as some ornamental plants, during the period 1967-77. It should be noted here that records show that no quantities of Mirex pesticide have been imported or used in Jordan.

Table 3 shows the detected quantities of stockpiles of POPs pesticides and places of their storage.

Table 3: Detected quantities of POPs pesticides and places of their storage.

Name of pesticide & its concentration	Stock quantity	Place of storage
DDT 100%	13015kg	Ministry of Health/ stores of the Malaria and Bilharzia Division
DDT 75%	9130kg	
Dieldrin	175 liter	Ministry of Agriculture/ Yajouz storehouse
Agrocide	60kg	Ministry of Agriculture/ Mafraq Directorate

PCBs

A working group was formed from relevant institutions to conduct a field survey and prepare a list of transformers which were manufactured and introduced into service before 1980. The team adapted a reasonable approach in order to achieve this objective. The first step was defining the parties and companies that own and operate old electrical transformers before that date, i.e. 1980. Then previous studies were reviewed followed by distributing a questionnaire to all concerned entities, such as power stations, transmission and distribution companies as well as large industrial establishments. The questionnaire included detailed information, such as the owner, location, capacity, country of origin and oil content (if known) etc., of potentially PCB-containing equipment. Moreover, in certain locations, a field test was carried out for electrical transformers only, using a simple test-kit provided by an international specialized company, i.e. DEXSIL, in order to check whether the employed oil is contaminated or free from PCBs compounds.

The working team carried out a preliminary survey, with the main aim of establishing a data base for entities and large industrial enterprises that might have some equipment require or dealing with oils based on PCBs. The results of this survey showed that only two entities at present do have transformers containing cooling oils with PCBs. These entities are CEGCo and Irbid Electricity Distribution Company (IEDCo). The survey, which was mainly oriented for electrical transformers that manufactured and installed before the year 1980, was divided geographically into three main regions:

1- Southern region: 10 substations in Aqaba Special Economic Zone Authority (ASEZA) were inspected using special screening test- kit and the final result of inspection was negative (i.e. no indication of presence of PCBs).

2- Middle region: which include Amman, Zarqa and Salt
There are 5 old transformers in Al-Hussein Thermal Power Station (HTPS), in Alhashemya, near Zarqa, contain about 11,000 kg of cooling oil; with PCBs base, including the standby quantity that kept in stores. The latter is estimated to be around 1500 kg.

Regarding Greater Amman area, a previous study, which was conducted by RSS, in early 1990s, was reviewed and its finding and conclusions were included in this study. The most important result is that all transformers within this region owned and operated by Jordan Electricity Distribution Company were free from PCBs.

In addition 4 transformers were identified in the National Electricity Power Company (NEPCo) that manufactured before 1980. NEPCo has conducted required tests and found that these transformers are free from PCBs.

3- Northern region: which includes Irbid, Mafraq, Jarash and Ajlun.
The working team has identified about 21 transformers that may contain PCBs, within this region, owned and operated by Irbid Electricity Distribution Company, as follows:

- Five transformers on operation, where oil changed after installation.
- Sixteen transformers are not working and kept in main stores of IEDCo.

Twenty samples using the special PCBs test-kit were taken and it was found that only 4 samples showed positive signs (i.e. transformers having identification Nos.13901 / 74001 /12401 / 21701) that may contain oils with a PCBs base. But it is worth noting that a comprehensive field study should be conducted as soon as possible in order to check old transformers in IEDCo. and elsewhere. Because there are no official records and designated maintenance staff that can show if IEDCo. added or mixed different types of cooling oils, it is estimated that about 1,500 kg of oil containing PCBs might be available in the company. This brings the total estimated PCBs in electrical transformers in Jordan to about 12,500 kg but there was no information available about the quantity of wastes or how it is stored. It is important to note that working electricity entities, in the energy sector in Jordan, do not have facilities for identification of PCB content and more important, is that the content of PCBs did not come into their consideration, yet. Again Jordan does not manufacture either electrical transformers, or dielectric fluids and all are imported from abroad.

Regarding ink and carbon paper, used by the local printing industry, and other materials and equipment, that considered as a potential for PCBs, are almost totally imported from the international market. Thus, the working team decided that there is no point to spend more time and effort in investigating such issues. However, it is wise that MoEnv would

start keeping records about imported materials, and equipment that might contain PCBs when beginning implementation of the NIP.

PCB content in the ship industry

On the sea-side, Jordan's total Gulf coastline is about 26 km; the Port of Aqaba, being the only shipping outlet to the sea, is of crucial importance to the Jordanian economy. The increase in the conveyance activities via Aqaba has made it the busiest port in the Red Sea basin after Suez in Egypt. The transport sector in Jordan is a single-mode system, relying principally on road transport. There are no water-ways or railways, with the exception of the Aqaba railway, which is used solely for conveying phosphate from mines in the southern part of Jordan to Aqaba. There is no ship breaking industry or even maintenance yards in Aqaba, with the exception of activities related to light boats, mainly used for tourists and fishing. An official letter and special questionnaire for ground and marine supporting equipment and vessels were sent to the Aqaba Ports Corporation and the reply confirmed that no PCBs based oils are used at present. It is difficult to estimate the quantity of PCBs, if there is any, from ship industry in Jordan at this stage. Thus, it is recommended that MoEnv should carry out a field study that addresses the PCBs problem in Aqaba.

PCBs in semi-closed and open systems

The present inventory does not include the use of PCBs in hydraulic fluids, adhesives, plastics and lubricating oils, etc. Such applications need more attention in the future activities in order to estimate PCBs content in semi-closed and open systems.

Prevention of PCBs production and use

PCBs, at present, are legally permitted only in the closed systems. According to the Stockholm Convention all equipment with PCBs must be removed from use by the year 2025 and the following preventative measures should be taken:

1. Limitation of import of equipment (mainly transformers and capacitors) containing PCBs-based oils.
2. Monitoring and control of imported equipment and machinery in order to make sure that all are free from PCBs.
3. Introducing new regulations which should include compulsory deadlines for replacement of all equipment with PCBs, and reporting system about damages and leakage from old transformers and other equipment.

Current stockpiles, PCBs waste and disposal sites

Stockpiles of PCBs comprises usable equipment, which is contaminated with PCBs, that is not working or taken out of service for major maintenance and the reserves of used and/or fresh fluids stored as stand-by in some of the power stations and electricity entities. PCB waste comprises old transformers and capacitors with PCBs that are not in use and will not be used in the future, waste liquid and solids (i.e. metal and non-metal as well as soil) that are generated due to leaks, and damaged equipment as well as cleaning facilities contaminated with PCBs.

In Jordan there is no identified site for the disposal of PCB waste, yet. Thus, a proper collection and disposal of PCBs waste is needed and should be adapted and enacted soon.

Unintentional Byproducts

Jordan prepared its second dioxin and furan (PCDD/PCDF) releases inventory report in 2005. The first report was issued in the year 2003 in the context of the Asian Project, in which the first draft of the "Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases" issued by UNEP Chemicals of 2001 was used. The base year for the first inventory was 2000. The second inventory report was issued in early 2005 and the base year was 2003. The first edition of the Toolkit of May 2003 was used in the second inventory.

The toolkit is used as a general form for estimating the quantities of dioxin and furan releases emitted from different probable sources. The main contents of the toolkit are:

1. Identification of the main categories of possible emitting sources as well as subcategories.
2. Quantification of these categories' contribution to the emission quantities. This contribution is based on an adversely proportional relationship between the source strength and the extent of control systems development. The relationship is expressed by the emission factors (E.F) developed in several developed countries by carrying out extensive research for different sources.
3. Identification of the environmental media (vectors) receiving such releases. These vectors could be air, water, land, products or residues. The release quantity that the vector receives depends on the strength and the nature of the emitting source.
4. Setting mathematical formula to calculate the annual releases from sources as follows:

Source strength (dioxin emissions / year) = (emission factor × activity rate)

Source strength is given in (µg TEQ/a),
Emission factor is given in (µg TEQ/t).
Activity rate is given in (t/a)

Where:
TEQ = Toxicity Equivalent.
µg = Microgram.
t = ton (weight of products, waste, fuel etc)
a = Annum (year).

The methodology followed in this inventory was based on the UNEP Chemicals Toolkit. The inventory was carried out with the following steps:

a) Forming the task force team representing the National Implementation Plan (NIP), Ministry of Environment, Ministry of Energy and Mineral resources, and specialized academics from some universities.
b) Reviewing the tasks that would be carried out by the team as stated in the project document associated with the Stockholm Convention.
c) Setting the work plan and discussing it with the project coordinator and with other task force team leaders working in this project.
d) Reviewing some similar project related reports to get the benefit of other countries' experience.
e) Identification of source categories and subcategories that will be dealt with when being applicable to Jordan.
f) Gathering, revising and categorizing the information and data as per illustrated in the UNEP Chemicals Toolkit and using the emission factors corresponding to the level of control technology existing in the various source activities.
g) Carrying out the final calculations using spread sheets provided in the Excel program which was provide with the Toolkit.
h) Preparing the draft report and discussing its contents with the project coordinator and the task force team leaders.
i) Issuing the final report.

Data and information were collected from different sources and by using different approaches including: questionnaires, field visits, interviews, formal and informal communications, scientific references, previous studies and statistics.

The following results were obtained and presented for each main source category and sub-category. It should be noted that the following results are presented as summary. The detailed explanation and calculations are presented in the final report of "Unintentional Chemical Production" issued by the Ministry of Environment, 2005

Table 4 summarizes the results of PCDD/PCDF releases.

Table 4: summary of the results of PCDD/PCDF releases

Cat.	Source Categories	Annual Releases (g TEQ/a)					Total	%
		Air	Water	Land	Products	Residue		
1	Waste Incineration	9.365	0.000	0.000	0.000	0.1	9.417	11.5
2	Ferrous and Non-Ferrous Metal Production	0.707	0.000	0.000	0.000	2.2	2.857	3.5
3	Power Generation and Heating	0.350	0.000	0.000	0.000	0.0	0.350	0.43
4	Production of Mineral Products	0.341	0.000	0.000	0.000	0.1	0.417	0.51
5	Transportation	2.353	0.000	0.000	0.000	0.0	2.353	2.88
6	Uncontrolled Combustion Processes	51.204	0.000	0.074	0.000	1.9	53.140	65.1
7	Production of Chemicals and Consumer Goods	0.000	0.001	0.000	0.345	0.0	0.350	0.43
8	Miscellaneous	0.002	0.000	0.000	0.000	0.0	0.046	0.06
9	Disposal/ Land filling	0.000	0.419	0.000	0.000	12.3	12.672	15.5
10	Identification of Potential Hot-Spots							
1-9	**Total**	**64.32**	**0.42**	**0.07**	**0.34**	**16.44**	**81.60**	**100**
	%	**79**	**0.51**	**0.09**	**0.42**	**20**	**100**	

Note that the UNEP Toolkit contains emission factors primarily derived from processes and practices in developed countries and substitution of its factors with those derived from the scientific literature or other government agencies can alter the source priorities as well as the total dioxin emissions per year. The result is that using the Toolkit can overestimate releases from some sources and underestimate releases from others. (Costner P, RAPAM, 2005, Estimating dioxin releases and prioritizing sources in the context of the Stockholm Convention, International POPs Elimination Project)

Efforts to deal with POPs

Jordan was one of the first countries in the Middle East to take prompt and appropriate decisions to protect human health and environment against the hazards caused from using chlorinated organic (POP) pesticides, as classified in the Stockholm Agreement (Annex A, Part I, Chemicals: POP pesticides include: Dieldrin, Aldrin, Endrin Heptachlor, Hexachlorobenzene, Toxaphene, Chlordane, Mirex), and Annex B, Part I, Chemicals: DDT). This is due to the fact that POP pesticides tend to accumulate in human and animal fat tissues and are of slow degradation in the various environmental elements.

Jordan, therefore, has taken unilateral measures by holding the use and handling of such pesticides since the early eighties for purposes of controlling agricultural pests, while allowing their use for control of disease vectors till 1995.

The government of Jordan is committed to manage POPs chemicals with the main aim of protecting its people and environment. As an active member of the international community, Jordan will also undertake essential measures for protecting the global environment from negative impacts of dissemination of POPs compounds through out the world. It will implement, in the future, most practical and appropriate activities concerning the prevention of spreading of POPs into the environment and eliminate POPs from local environment in compliance with the provisions of the Stockholm Convention.

It is anticipated that Jordanian environmental policy will take the following initiatives in order to achieve sound environmental management of POPs compounds in all sectors of the economy:

- Reduce the possibility of human exposure to POPs compounds.
- Eliminate intentional and unintentional releases of POPs into the environment by applying the principle of best environmental practices.
- Upgrade existing institutional and legal frameworks for proper management of POPs.
- Develop structures for a long-term monitoring programme of POPs residues in the biological and physical environment to determine the present status and to develop future trends.
- Ensure full inspection of suspected contaminated sites through field investigations and tests.
- Phase-out the use of POPs compounds as requested by the Convention.
- Eliminate existing stockpiles and wastes of POPs compounds in environmentally sound manner.
- Intensify public awareness campaigns about detrimental effects of POPs compounds to human health.
- Continue international cooperation on POPs management and information exchange.
- Develop efficient cooperation between stakeholders and the concerned governmental institution to promote successful solution to POPs problems.

Below is a table describing laws and procedures used to control POPs.

Brief Table of Legal Procedures and Mechanisms Currently Effective for the Control of Persistent organic Materials, and the Responsibility of Relevant Authorities:

Stage Name	Stage Description	Location	Outputs
Preparation of Customs Statement	Entering the customs statement data in the system, giving it a serial number and printing it.	- Data Entering Office - Immediate Authorization Office	Customs statement, registered and signed by the authorized person
Acceptance of Customs Statement	- Checking that the required records and documents have been completed - Checking that the statement has been saved on the computer - Signature verification - Defining the track of the statement by the system (red, green or yellow)	Reception Office	Customs statement stamped with the type of intake
A. Auditing of documents	Auditing the data against the enclosed documents which should be classified for the yellow and red tracks; subsequent auditing of the green track data after the of release goods	Clearance units and Inquiry Section	Clearance notice showing the fees issued by the authorized person's computer (if requested)
B. Actual inspection	Inspection of the red track shipments		
Fees payment and release of goods	Payment of due fees and fines, and printing the financial receipt and release permit	Accounting Section	Financial receipt and release permit

The government of Jordan has been always encouraged non-governmental organizations and private sector organizations to partner in developmental activities. There are a

handful numbers of NGOs are working in the field of environment and ecology. The NGOs are providing both information and services in making a safer environment and also contribute to wastes management of the country. The activities of the majority of NGOs in Jordan with regard to environment ranges from promoting a safe environment, preservation of nature and ecology, protection and improvement of environment and obviously raising public awareness.

Basically NGOs undertake environmental activities which could be categorized under the following the broad categories;

- to assist for protection of environment and ecology
- promote a safe environment
- help people remediate if required in protecting environment systems and ecology
- information dissemination on the adverse effects of hazardous wastes and chemicals
- organize people's participation in managing vulnerable environments
- Encourage the environmental awareness for the various sectors with the aim of creating national and individual interest in environmental issues.
- Co-operate with other environment societies to influence the decision- makers for preservation of natural resources in the Kingdom
- Support local industries through encouraging citizens to use recycled materials.
- Encourage the preparation of studies and research related to the natural environment; sponsor the positive opinions and trends in this respect; document results; enhance knowledge of the species of plants and place them under the hand of the public.
- Study and determine the source of consumer problems, as well as work with the official and national bodies and scientific institutions to overcome them.

Priority Actions related to POPs in Jordan

Pesticides

1. Define stockpiles of existing banned POPs pesticides and their quantities in various suspected places in Jordan
2. Label and repack of POPs pesticides properly
3. Store and /or dispose of pesticides stockpiles in an environmentally sound manner.
4. Trans-boundary movement of POPs pesticides should be clearly and precisely regulated and must comply with international conventions.
5. Train members of the customs department and enforce and monitor illegal POPs pesticides at points of entry to the country
6. The customs act should contain all POPs pesticides to impose banning their entry to the country.
7. Residues of POPs pesticides in commodities should be clarified in the exiting law by imposing ban on contaminated communities within certain criteria. Residues of POPs pesticides in soil, water and air should have certain maximum residual levels.

PCBs

The most feasible actions, concerning electrical equipment that contain PCBs and suspected polluted sites, are discussed in detail later on. It is anticipated that the government of Jordan, represented by the Ministry of Environment, will take the necessary actions in accordance with requirements of the Stockholm Convention, but upon availability of needed funds.

Unintentional Byproducts

1. Enforce the legislation concerning unintentional byproducts and emissions and issues needing further legislation.
2. Control of solid waste open burning, such as landfill fires, and looking for the best technical alternatives and the best environmental practices.
3. Manage medical wastes to avoid incineration and generation of POPs using appropriate waste sorting combined with non-incineration methods such as autoclaves.
4. Handle sludge of wastewater treatment plants.
5. Ensure safe storage of the PCBs and adopt safe elimination measures of the PCBs stockpiles and wastes
6. Extend the opportunities of POPs information exchange to include all the interested parties and individuals and strengthen the cooperation with the international community in regard of POPs information exchange.
7. Strengthen the involvement of different sectors in POPs management areas. This involvement can include private, academic and research sectors.
8. Raise sectoral and public awareness on POPs hazards, train POPs handlers on the safe handling procedures, and introduce POPs issues to the education process.