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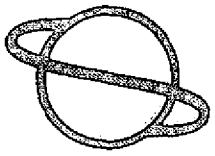
REPUBLIC OF ARMENIA

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Yerevan 2005



REPUBLIC OF ARMENIA

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Yerevan
2005

National Implementation Plan
for the Stockholm Convention
on Persistent Organic Pollutants

First published 2005

Prepared by the Government of the Republic of Armenia and UNIDO within the frames of UNIDO/GEF Project "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Armenia"

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The National Implementation Plan was developed based on the Article 7 of the Stockholm Convention signed on May 23, 2001 and entered into force on May 17, 2004. According to the provisions of the Convention, each Party shall develop and endeavour to implement a plan for the implementation of its obligations under this Convention.

This publication is composed of the full version of the National Implementation Plan.

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GOVERNMENT OF THE REPUBLIC OF ARMENIA

PROTOCOL DECISION

No. 1

January 13, 2005

On approval of the "List of actions implemented within the frames of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia during 2005-2010"

To endorse the "List of actions implemented within the frames of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia during 2005-2010".

PRIME MINISTER
OF THE REPUBLIC OF ARMENIA *ANDRANIK MARGARYAN*

January 18, 2005
Yerevan

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This publication was prepared in the frames of UNIDO/GEF Project "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Armenia" and is a result of support and collaborative effort of a number of experts from various Ministries and Agencies, as well as representatives of research institutions and non-governmental organizations (NGOs).

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for fulfillment of the
"National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia"

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FOREWORD

The last few decades have seen a dramatic growth in chemicals manufacturing and other human activities that result in the release of toxic pollutants. Many of these activities are essential to modern society, but can also pose a serious threat to human health and the environment.

Particularly challenging is a group of chemicals known as "persistent organic pollutants" (POPs). These highly stable compounds are used as pesticides or in industry. They are also generated unintentionally as the byproducts of combustion and industrial processes. POPs are a special problem because they: persist in the environment for a long time before they break down; travel for long distances to all parts of the globe, even remote areas thousands of kilometers from the nearest POPs source; accumulate in the tissue of most living organisms, which absorb POPs when they eat, drink water, or breathe air; and poison humans and wildlife, causing a wide range of toxic effects.

Since POPs circulate globally, no country acting alone can protect its citizens or environment from risk. Recognizing this, on October 22, 2003 the Government of the Republic of Armenia ratified Stockholm Convention "On Persistent Organic Pollutants" and proceeded to fulfillment of country obligations/commitments under this convention. One of such obligations is preparation of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia during 2005-2010", which was approved and endorsed by the Government of the Republic of Armenia.

We are aware that it is necessary to perform a hard work on: identifying uses, sources, and alternatives to POPs and the processes that generate them; building national capacities for managing and reducing POPs risks; developing effective technical guidelines; and financing risk-reduction projects. All of these actions must be taken in a manner consistent with the principles of sustainable development and fair trade.

Risks and solutions are known. The time to act is now: failure to do so could have hazardous consequences for present and future generations.

VARDAN AYVAZYAN
Minister of Nature Protection
Republic of Armenia

ABBREVIATIONS AND ACRONYMS

AC/DC	Alternating current/direct current
AMD	Armenian Drams
BAT	Best Available Techniques/ Technology
BEP	Best Environmental Practice(s)
CIS	Commonwealth of Independent States
CSC	Customs State Committee within the Government of the Republic of Armenia
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane (1,1,1-trichloro-2,2-bis (4–chlorophenyl)ethane)
DoES	Department of Emergency Situations within the Government of the Republic of Armenia
DoS	Department of Standardization, Metrology and Compliance of the Ministry of Trade and Economic Development
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOST	State Standard (in Former USSR and Russia)
GRA	Government of the Republic of Armenia
HCB	Hexachlorobenzene
HPP	Hydropower plant
NAS	National Academy of Science
NGO	Non-governmental organization
NIP	National Implementtaion Plan
NIS	Newly Independent States
NSS	National Security Service within the Government of the Republic of Armenia
NStatS	National Statistical Service
OCP	Organochlorine Pesticide
OPP	Organophosphorus Pesticide
PCBs	Polychlorinated biphenyls
PCDD/ PCDF	Polychlorinated dibenzo -p-dioxins and dibenzo-furans
PIC	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
POPs	Persistent Organic Pollutants
PRTR	Pollutant Release and Transfer Register
R&D	Research and Development
SRPP	State Regional Power Plant
TCB	trichlorobiphenyls
TEQ	Toxic Equivalent
TKP, TU	Technical Specifications (in Former USSR and Russia)
TPP	Thermal power plant

MoA	Ministry of Agriculture
MoD	Ministry of Defense
MoE	Ministry of Energy
MoFE	Ministry of Finance and Economy
MoFA	Ministry of Foreign Affair
MoH	Ministry of Health
MoJ	Ministry of Justice
MoNP	Ministry of Nature Protection
MoSE	Ministry of Science and Education
MoTC	Ministry of Transport and Communication
MoTED	Ministry of Trade and Economic Development
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
US	United States
USSR	Union of Soviet Socialist Republics
WTO	World Trade Organization
YCA	Yerevan City Administration
γ-HCH	Hexachlorcyclohexane
Σ	Summation sign

SI Units

g	gram
kg	kilogram
ha	hectare
m	meter
sq.km	square kilometer
L	Liter
mlrd.	milliard
mln.	million
mcg/kg	microgram/kilogram
mcg/L	microgram/Liter
mg/L	milligram/Liter

EXECUTIVE SUMMARY

In Stockholm on May 23, 2001 the Republic of Armenia signed the Stockholm Convention on Persistent Organic Pollutants, the main goal of which is to protect human health and the environment from Persistent Organic Pollutants (POPs). The Stockholm Convention on POPs was ratified by the National Assembly (Parliament) of the Republic of Armenia on October 22, 2003.

In accordance to the main provisions of the Convention on Persistent Organic Pollutants, each country that is a Party to the Convention (hereinafter: a Party) prohibits and/or takes legal and administrative actions required for elimination, restriction of production and use of chemicals listed in Annexes A and B to the Convention, as well as on reduction or elimination of POPs releases resulting from intended or unintended production, as well as releases related to stocks and wastes, containing POPs.

Stockholm Convention regulates 12 compounds: DDT, Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzo-p-furans (PCDFs), and polychlorinated biphenyls (PCBs).

Persistent organic pollutants present themselves organic compounds, which possess various degree of stability to photolysis, biological and chemical degradation. These substances are semi-volatile; this latter allows their long- distance transport through air flow to all parts of the globe, even to remote areas thousands of kilometers from the nearest POPs source.

POPs are mainly halogenated and are poorly water-soluble; however, POPs easily dissolve under the effect of lipids. Many of these substances were used and large quantities thereof are still applied all over the world and due to their stability in the environment, POPs possess the ability for bioaccumulation in adipose tissues and biomagnification.

Certain POPs can persist in the environment for years. In this connection the level of bioaccumulation increases 70 thousand times. As a result of biomagnification, organisms of the upper links of trophic chain are subject to much more intense POPs impact. POPs are able to cumulate in upper links of trophic chain and on penetration into human organism these pollutants exert unfavourable action to human health.

Scientists have confirmed the real threat for human and environmental health posed by persistent organic pollutants. Certain POPs might become the cause of oncology states incidence, affect reproductive and immune systems in several human generations.

Proceeding from POPs unfavourable impact and conscious of the need to take measures at national level to prevent adverse effects caused by persistent organic pollutants, the Ministry of Nature Protection of the Republic of Armenia in cooperation with UN Industrial Development Organization (UNIDO) and with the financial support obtained from Global Environment Facility (GEF) has prepared the National Programme "Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Armenia" (hereinafter: Programme).

Main goal of the Programme is to identify priority problems related to negative impact of POPs to environmental and human health, taking actions addressed at eradication of these problems in order to

ensure fulfillment of country commitments on Stockholm Convention on Persistent Organic Pollutants.

To achieve this goal, the following problems were set:

- Identification of main sources of contamination by persistent organic pollutants at industrial entities, energy facilities, in agriculture and other branches of industry;
- inventory taking on PCB-containing oils and equipment in energy sector, industry, etc.;
- inventory taking on Dioxin/ Furan main sources in industry and power sector;
- inventory taking on organochlorine pesticides stocks at warehouses and final disposal (burial) sites;
- taking inventory of POPs contaminated areas, as well as sites of former pesticides storehouses, dumps;
- monitoring of contaminated areas of industrial entities and energy facilities;
- determination of residual amounts of organochlorine pesticides, including dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), Lindane and PCBs in different environmental media (surface water, soil), as well as human and animal organism, ecosystems and foodstuffs;
- identification of imperfection in legislative basis and evaluation of institutional mechanisms for regulation of POPs issues (import, export, minimizing releases, disposal, decontamination, final disposal/ elimination);
- development of specific actions to reduce and eliminate persistent organic pollutants in the Republic of Armenia.

As a result of the developed Armenia "National Implementation Plan", the following priority lines were set on revealing and prevention of POPs impact on human health and environment:

- ◇ Improvement of legislative/ regulatory background for regulation of POPs relevant issues;
- ◇ Setting up institutional capacities/ structures and strengthening the interaction amongst concerned Ministries and Agencies aimed at revealing main sources of POPs-related pollution, reducing their releases and eliminating the most hazardous ones, investigating environmental contamination by POPs and taking joint actions for prevention of their impact on human health;
- ◇ Carrying out detailed Inventory on main sources of POPs and POPs-containing wastes;
- ◇ Inventory taking on PCB-containing oils and equipment in energy and industry sectors of the Republic of Armenia;

- Replacement of PCB-containing oils and equipment, which are currently exploited at different entities of energy sector and industry of Armenia, by PCB-free oils and equipment;
- Providing monitoring of POPs polluted/ contaminated sites, development of screening methods for POPs analyses with the purpose of initial/ preliminary assessment of local contaminations;
- Establishment of the Central Analytical Laboratory on POPs to ensure analyses and control on the environment;
- Environmentally sound elimination/disposal of PCB-containing oils and PCB-containing equipment, as well as existing stockpiles of obsolete pesticides;
- Implementation of sound/safe technologies, which exclude POPs generation, releases in industrial area/zones and the environment;
- Arrangement of epidemiological and statistical studies on POPs impact to human health and risk assessment;
- Carrying-out wide information and awareness raising activities on POPs problem in order to develop and establish an information system embracing issues on prevention of POPs harmful impact, as well as their after-effects for human and environmental health:
- Ensuring implementation of actions aimed to meet the objectives of Stockholm Convention;
- Extending and strengthening international cooperation relevant to POPs management, information exchange of data obtained as a result of R&D (researches, technical design developments), monitoring studies, Best Available Technology (BAT) and Best Environmental Practice (BEP).

1 INTRODUCTION

The Republic of Armenia ratified the Stockholm Convention on Persistent Organic Pollutants (POPs) on October 22, 2003.

Overall goal of the Stockholm Convention is protection of human health and the environment from Persistent Organic Pollutants (POPs). The Convention emphasizes the precautionary approach set forth in Principle 15 of the Rio Declaration on Environment and Development.

Stockholm Convention identifies and sets forth main aims, principles and elements, which should be used by the Parties, when developing joint Programmes and control measures on POPs. The Convention is aimed at POPs:

a) *which are intentionally produced and used;* such as pesticides (Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene) and industrial chemicals (PCBs and Hexachlorobenzene (HCB)

b) *which are unintentionally produced and released* from anthropogenic sources, including Dioxins, Furans, PCBs and HCB.

POPs are capable to migrate for long distances from the initial source and are able to persist in the environment for long years and even decades. POPs have the ability to accumulate in environmental media (soil, water, and air), food-stuffs, and adipose tissues of animals and humans (breast milk of nursing mothers).

According to main provisions of the Convention on Persistent Organic Pollutants, each Party prohibits and/or takes legal and administrative actions required for elimination/ reduction of POPs production and use, export and import thereof, as well as actions to minimize or prevent POPs releases.

Nine substances listed in **Annex A** to the Convention are subject to prohibition for production and use, except the validly specified, stipulated cases. In accordance with **Annex B**, production and use of DDT is strictly limited, though it is used in some countries with humid climate for vector control over a number of infectious diseases carriers. It should be mentioned that majority of these substances was banned in Armenia beginning with 1970 in accordance with the Order of the Former USSR Ministry of Health. Import and export of intentionally produced POPs is allowed only with the purpose of their environmentally sound disposal.

Releases of unintentionally produced substances listed in **Annex C** must be constantly minimized in order to achieve their complete elimination, where possible and appropriate. By the provisions of Convention it is recommended to use the BAT and BEP, which presupposes application of the newest up-graded technologies, paying first-priority attention to alternative processes, methods and practice, in case of which generation and releases of POPs are prevented, while the existing POPs are replaced by the alternative less toxic substances.

It should be noted that according to Stockholm Convention provisions, the active efforts aimed to ensure environmentally sound replacement and disposal of PCB-containing liquids and equipment should be put forth in the shortest possible time no later than 2028, under the condition that the time limit may be reconsidered by the Conference of the Parties.

Stockholm Convention also presupposes identification and safe management of POPs stocks.

Wastes containing POPs, wastes composed of or contaminated with POPs should be disposed in a manner that the contained in POPs were destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants.

In cases when this is not the ecologically preferable option or if the content of POPs is low, wastes must be otherwise disposed of in environmentally sound manner. Actions on neutralization, which can result in reuse of POPs, are strictly prohibited. As to transboundary movements of wastes, the appropriate international rules/regulations, standards and instructions should be taken into consideration in accordance with the provisions of the Basel Convention

Stockholm Convention calls for the Parties to develop National Implementation Plans on POPs, which will reflect observance of the obligations stipulated by the Convention.

National Implementation Plans should be submitted to the Conference of Parties within the period of 2 years post the Stockholm Convention enforcement.

In addition, the Convention sets a number of obligations, as well as actions, which are encouraged for approval/ acceptance by the Parties, including designation of the National Focal point, encouraging information exchange, maintenance of technical assistance, facilitating awareness raising, public education and participation, stimulation of research and development, monitoring and periodic submission of reports.

Proceeding from the goals of the Stockholm Convention and recognizing, at the national level, the necessity to take measures on prevention of the harmful impact of POPs the Ministry of Nature Protection of the Republic of Armenia has prepared the National Implementation Plan (NIP) figuring out national priorities on POPs issues, key tasks and main trends for activity aimed at application stoppage, reduction of releases/emissions and elimination of the stocks of POPs-containing wastes.

In the past Armenia was characterized as a country with developed industry and agriculture. Amongst different industrial branches the leading part belonged to machine-building industry, ferrous and non-ferrous metal processing, chemical, and petrochemical industry, ferrous and non-ferrous metallurgy, as well as industry of building materials. There functioned major enterprises on production of calcium carbide, hydrate of sodium, chlorine, hydrochloric acid, sulfuric and nitric acids, chloroprene rubber

and latexes, nitrous fertilizers, glass, chemical fibre, and plastics; many of them were sources of Dioxin and Furan releases.

The analysis of activity performed by industrial enterprises, considering the technology level and existing equipment in use, allowed to qualitatively characterize the emission factors of unintended products - Dioxins/Furans, as well as to give their quantitative evaluation.

Identification of the probable emission sources of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzo-p-furans (PCDFs) (Dioxins/ Furans) allowed to evaluate the emission scales for these substances from all the identified sources in a period of 1985-2001.

Energy sector, which is nowadays amongst the leading in the Republic of Armenia and is one of the main sources of environmental pollution by POPs, in particular, by such substances as polychlorinated biphenyls (PCBs) in the content of mineral oils used in different types of electric equipment (power transformers,-turbines,-electric-valves,-switch-keys-and-closing-switches-of-high-voltages,-automatic volume compressors, etc.).

However, besides the energy sector, oils are widely used in different branches of industry and in household appliances (lifting gears, transformers, compressors of different types, etc.). According to the inventory carried out at different industrial entities and facilities of energy sector in operation/service, there are about 18 thousand tons of PCB-containing oils. Oils-containing equipment is also one of the leading sources of POPs releases to the environment and, in particular, is a source of polychlorinated biphenyls. Therefore, the problem of PCB-containing oils and equipment replacement, as well as disposal/elimination thereof is of importance and urgency for Armenia

Armenia was always characterized by a developed agricultural production and was amongst the regions with intense pesticide application. Summary area load of pesticides averaged 9-35.5 kg/ha, exceeding many-fold the average All-Union levels of pesticide application. Likewise all the republics of the Former USSR, organochlorine pesticides were widely applied in Armenia till the prohibition thereof in 1980s.

As a result, there emerged the problem of areas contaminated by organochlorine pesticides (agricultural lands, former pesticide storehouses, pesticide burials, dump sites, etc.); to this latter signify data of the analyses performed in different environmental media.

The problem of inappropriate for use obsolete pesticides, which are subject to ecologically sound elimination, is of no less urgency.

Within the frames of the National Implementation Plan monitoring was performed on POPs residual amounts (PCBs and organochlorine pesticides) in environmental media (surface waters, soil, and bottom sediments), food, samples of breast milk taken from inhabitants of Aragatsotn marz as a rural region of Armenia. In the frames of the Programme 745 analyzes were performed. Samples analyzed for residues of organochlorine pesticides made 469; 276 samples were analyzed for PCBs.

In the Republic of Armenia there exists the system of legislative and institutional regulation on chemicals, including POPs. Regulation and control at different stages of chemical life-cycle is performed by appropriate state governance structures, local authorities of self-government, as well as

organizations within the frames of existing laws and other legal acts. Organizations, which manufacture and use chemicals, research institutes and NGOs are involved in this process.

State structures within the responsibilities assigned by legislation execute regulation of chemicals and wastes, including POPs, jointly with the appropriate intra-structural subdivisions, commissions within their jurisdiction, as well as other appropriate organizations.

The Ministry of Nature Protection of the Republic of Armenia is an authoritative body of executive power in the sphere of management on chemicals, as well as hazardous and other wastes, including POPs. Ministry of Health, Ministry of Trade and Economic Development, Ministry of Agriculture, Ministry of Finance and Economy, Ministry of Energy, Customs State Committee, National Statistical Service, city administrations and local rural communities are also involved in the process of POPs management.

Key approach in concern of POPs is carrying-out actions on prevention, minimizing of the harmful impact of POPs to the environment and human health, strengthening the efficiency of preventive measures aimed to reduce generation of POPs.

Main responsibilities for development/ preparation of NIP on implementation of the Convention on POPs were laid upon the Ministry of Nature Protection. NIP development/preparation was performed with the active participation of all the stakeholders, including representatives of industry, energy sector, healthcare system, agriculture, research institutes, and NGOs.

Expert groups were formed to solve different specific problems related to NIP development. In the process of NIP preparation the workshops were held with participation of different ministries, agencies, economy sectors, research institutes and NGOs. Workshops were aimed to discuss national strategy and implementation of actions on POPs reduction/elimination in the Republic of Armenia.

The document thus developed is an action plan for further 5 years and involves measures and actions dealing with legal/ legislative, economic and institutional regulation of POPs issues, the main goal of which is POPs disposal/elimination (Annex 1). Inasmuch as POPs make only a small part of chemicals, which require control and monitoring from the point of view of their possible impact on human health and the environment, POPs-related problems are considered in the NIP as a separate component of chemicals and wastes management to a degree, which would facilitate implementation of specific obligations under the Stockholm Convention. The activity on POPs should be integrated in the general strategy for chemical safety, protection of human health and the environment from the impact of toxic chemicals.

Moreover, NIP strategy entirely corresponds to the national strategy of sustainable development and programmes aimed at harmonization of economical, ecological and social aspects of development, at poverty reduction.

A number of regulating/legislative documents, which ensure implementation of the Stockholm Convention, were developed and approved by the Government of the Republic of Armenia in the process of POPs National Implementation Plan fulfillment (Annex 2).

Research findings obtained due to studies performed within the frames of the Programme were

presented at numerous international scientific conferences and published in international transactions (Annex 3).

The state of the environment significantly affects the health status, life conditions and safety/ security of different layers of population. A greater part of the population in Armenia is actively engaged or directly depends on agricultural activity, in the process of which the population is exposed to pesticide impact, including the effect of obsolete, inappropriate for use and prohibited ones. Contamination of agricultural lands and food-stuffs by pesticide residues poses threat for the environment and human health. Therefore, the issues on management of persistent organic pesticides should not be considered as problems of exceptionally ecological significance.

One of important ideas of the NIP is as follows: improvement of ecological conditions by decreasing the gravity of problems dealing with POPs and creation of stable instruments for environmental management will facilitate economic growth and poverty reduction.

NIP development will also facilitate the increase of ecological safety/ security in concern of POPs and POPs wastes, efficient environmentally sound disposal/ destruction of POPs wastes, prevention of their harmful impact on human health, provision of healthy environment.

The structure of the NIP is as follows.

Chapter 2 embraces country background information, general socio-demographic, political, economic, ecological data and information on management system in the sphere of the environment.

Chapter 3 presents description of NIP strategy elements in Armenia, including the Policy statement, Implementation Strategy with the description of measures and action plans according to types of activity, proposals and priority lines aimed at strengthening of the existing capacity, implementation mechanisms, evaluation, and up-dating of NIP.

2 COUNTRY BASELINE

2.1 Country Profile

2.1.1 Geography and population

The Republic of Armenia is a small mountainous country; the 90% of the territory is at the height of 1,000 m above the sea level and higher. Average height above the sea level reaches 1,800 m.

Armenia is a typical mountainous country located in the South-Western Asia; it borders Georgia in the North, Azerbaijan in the North-East, East, and South-West, Iran in the South; in the West Turkey is the neighboring country.

The territory of the Republic of Armenia makes only a small part (10%) of the large Armenian Highland and has a complex geological structure and a diverse relief. Total area of the country makes 29,740 sq km: 46.8% agricultural lands; 12.7% - forests and 5.6% - surface waters; 34.9% - other acres.

The largest lake in Armenia is Sevan, the fresh waters of which are considered a natural reservoir of drinking water for the entire region. The rivers of Armenia are mountainous and shallow.

Armenia is characterized by the mountainous continental climate, remarkable for its dryness. By the geographic zone, Armenia belongs to the northern latitudes of subtropics.

Ethnic breakdown: 96% of population is Armenians. Minorities: Russians, Yezides, Kurds, Assyrians, Greeks, Ukrainians, Jews and others.

As to January 1, 2003 resident population of the Republic of Armenia made 3 210.3 thousand persons, incl. males: 1 543.6 thousand; females: 1 666.7 thousand. Urban population of the Republic achieves 2 062.2 thousand persons. In Yerevan, the capital of the Republic of Armenia, 1 102.0 thousand persons reside. Population of the rural areas makes 1 148.1 thousand persons.

Changes of economic situation in Armenia due to the transition from previously existing system of centralized planned economy towards the new market relations brought forth a decrease of general well-being of population and polarization of definite layers of the society by their incomes. During the last years a high level of unemployment is registered mainly due to individuals who are forced to stand idle or take leave without payment. The real number of unemployed exceeds the number of those officially registered.

In September 2003, unemployment official level achieved 9.8%, while during the period of January - September 2003 it was 10.2%: in females this index made 13.4%, in males - 6.2%.

It is difficult to evaluate the level of unemployment amongst the rural population, because, due to land reform in the Republic of Armenia, agricultural production turned to be entirely private-ownership.

2.1.2 Political and economic profile

The Republic of Armenia is a sovereign, democratic, social, rule of law state. In the Republic of Armenia power lies with the people. The state power is administered pursuant to the Constitution and the laws based on the principle of separation of the legislative, executive and judicial power.

The Constitution of the Republic of Armenia was adopted on July 5, 1995 as a result of nation-wide referendum. The Constitution is the main Law of the Republic of Armenia, and is the guarantee of independent democratic society, based on the supremacy of social justice and law.

The Republic of Armenia has a system of presidential rule. The President ensures compliance with the Constitution, normal operation of the legislative, executive and judiciary authorities, and serves as the guarantor of sovereignty, territorial integrity and security of the country.

In accordance with territorial and administrative division the Republic of Armenia is divided into 11 marzes (regions), including the capital city of Yerevan that has a status of a marz (with 12 districts/ circuit communities), 47 urban and 871 village communities.

Armenia was always characterized by its developed industry and agriculture. In the Republic of Armenia, there are substantial resources of such treasures of the soil as natural fossils and minerals as tufa, marble, pumice, perlite, limestone, basalt, and salt. Coal, iron, bauxites, copper, molybdenum, gold, silver, lead, and zinc are also extracted. There is a great diversity of precious and semi-precious stones.

During the last 10 years, the economic development in Armenia took place towards formation of free market economic relations. In Armenia during 1990 - 1993, an extreme decrease of Gross Domestic Product (GDP) was registered, making more than 53%. The most abrupt decrease of GDP that exceeded the corresponding index in NIS/CIS countries more than 6-fold was registered in 1992: it achieved 42%.

Economy revival and GDP growth turned to be observed only since 1994; the tendency of GDP increase preserved in 2003 as well. Thus, in January - December 2003 the volume of GDP in current prices made 1 618 577.0 million Armenian Drams (AMD), while the rate of its growth as compared with the same period of FY 2000 made 113.9% versus 112.9% in January - December 2002.

In January - December 2003 GDP per capita in current prices was 504.0 thousand AMD or US$ 871, while in 2002 the corresponding index made 422.6 thousand AMD or US $737.

In the Republic of Armenia, GDP growth was generally ensured by the growth of 5 major branches:

industry, agriculture, construction, trade and transport. As a whole, due to these branches the growth of added value production was ensured by 116.1%, while their share in GDP structure increased by 1.7 percentage items as compared to 2002.

Basic parameters of macro-economics and its characteristic changes on years are presented in Table 2.1.

Table 2.1: Major characteristic changes of macroeconomics, 1992-2003

Economic Indices		1998	1999	2000	2001	2002	2003
GDP, actual prices (mln US$)		1892.3	1845.5	1911.6	2116.4	2376.3	2804.8
GDP growth rates	Compared to the previous year, %	107.3	103.3	105.9	109.6	113.2	113.9
	Deflator, as % to previous year	110.7	100.1	98.6	104.1	100.7	104.6
GDP per capita, US$		498.7	485.6	502.7	659.1	739.9	873.4
GDP per capita, AMD		251768.2	259798.9	271197.8	309343.6	358649.0	505507.5
GDP physical volume index per capita compared to previous year, in %		107.1	103.1	105.8	109.6	113.3	113.9
Currency rate: equivalent of 1 $ US expressed in AMD		504.89	535.06	539.53	555.07	573.35	578.77

Table 2.2: Share of private sector in GDP

Years	Overall GDP (in %)	Specific gravity of private sector in the GDP (in %)
1990	100	11.7
1991	100	32.7
1992	100	36.7
1993	100	46.2
1994	100	49.7
1995	100	51.7
1996	100	63.3
1997	100	67.9
1998	100	74.5
1999	100	79.0

During the period of establishing free market relations, in Armenia the conditions were generated, which resulted in priority of private/individual sector in economy. Dynamics of the private sector development for the last period testifies to increase of its contribution in GDP (Table 2.2).

The share of private/individual sector in spheres of agriculture and trade made 98% and 97%, accordingly.

The privatization of agriculture in Armenia began in 1991. After privatization, the reduction of sowing areas was stated by more than 20 %. On the basis of former collective farms, state farms, inter-economic and other agricultural enterprises by January 1, 1999 there were organized about 350 thousand farms and collective farms, which on the property rights were given 447 thousand hectares of agricultural lands, i.e. 64.1% of grounds of agricultural assignment (without pastures).

2.1.3 Profiles of economic sectors

Previously, Armenia was characterized by its developed industry and agriculture. The leading part belonged to machine-building industry, metal processing, chemical, and petrochemical industry, ferrous and non-ferrous metallurgy, as well as industry of building materials. There functioned major enterprises on production of calcium carbide, hydrate of sodium, chlorine, hydrochloric acid, sulfuric and nitric acid, chloroprene rubber and latexes, production sites for nitrous fertilizers, glass, chemical fibre, and plastics (see Table 2.3).

Table 2.3: Allocation of direct funds in Armenia (as of 1969)

Branches of industry	Direct funds, %
Energy (power energy industry)	24.6
Non-ferrous metallurgy	12.3
Chemical and petrochemical industry	16.7
Machine-building industry and metal working	18.9
Timber industry, woodworking industry, pulp-and-paper industry	1.2
Industry of building materials	7.4
Glass industry and industry of porcelain /faience goods	0.5
Light industry	7.5
Food industry	9.4

The cities of Yerevan and Vanadzor were great centres of chemical industry. Major mining, mining-and-processing and metallurgical enterprises were located in towns of Alaverdi and Zangezur. Non-ferrous metallurgy was one of most important branches of industrial development. Since early 1970s the development of ferrous metallurgy has began in Armenia. The plant of "Pure Iron" was established in Yerevan and the "Centrolit" plant in Charentsavan. In 1980s Armenia exported ample quantities of synthetic rubber, carbon acids, concentrates of molybdenum and copper, motor vehicles, etc.

Thanks to the availability of highly qualified specialists, non-metal consuming branches (industry of electronics and radio industry, motorcar construction, instrument-making and machine tool construction) developed. Development of radio-technical and electronic industry was characterized by especially highest rates: creation of mathematical machines, production of mobile/portable electrical power plants, alternating current generators, engines of various calibre, compressors, hydro-pumps, passenger elevators, wires, cables, electric bulbs, various electrical-type measuring instrument, automobiles, automated lift trucks, etc.

There was an intense development of mechanical engineering, specialized in production of devices required for machine-tool construction and automation; the number of enterprises increased producing milling, grinding machines, metal-cutting, stone-processing and other machines, compressors and pumps, presses, clocks and watches, gems for precise devices, artificial corundum, artificial diamonds for tools, jewelry.

Major plants were located in Yerevan ("Armelectroplant", Machine-tools plant, Electric bulbs plant, Cables plant, Automobile plant "ErAz"), in Gyumri (microelectromotors plant, grinding machines plant, press-forging plant); in Charentsavan (boring machines' plant, toolmaker, "Centrolit"), and in Vanadzor (precision tools' plant).

Chemical industry of Armenia involved, in the main, the following industrial complexes:

1. acetylene production complex (production of chloroprene rubber and latexes, production sites for hydrate of sodium, hydrochloric, acetic, formic, and propylene acids, vinyl acetate, polyvinyl alcohol, acetyl cellulose, plant of mechanical rubber goods);

2. production complex of calcium cyanamide, ammonia for nitrous fertilizers, melamine, cyanuric acid and cyanurate melamine, carbamide;

3. complex based on utilization of sulphur dioxide of copper-smelting production (production of sulfuric acid).

Major ore-mining/processing enterprises, mining, and smelting plants were located in:

1. **Alaverdi** (copper-chemical industrial complex);
2. **Kadjaran** and **Agarak** (copper and molybdenum industrial complex)
3. **Kapan** (copper-ore processing industrial complex)
4. **Yerevan** (aluminum production plant; plant for production of pure gold)
5. **Vardenis** (gold-ore industrial complex)
6. **Ararat** (gold-enriching factory.

Armenia has at its disposal great resources of various building materials of unique volcanogenic types of rock: tufa, pumice-stone, perlite, limestone, granite, marble, basalt, etc. Having such a basis, the industry of building materials developed very intensely. The production involves building blocks, lightweight fillers, cement, marble, flame-resistant products, asbestos-cement pipes and plates/slabs, perlite, bentonite. The main industrial capacities are located in towns of Artik, Ararat, Hrazdan, Aragats, Toumanyan, and Idjevan.

Wide-scale production of glass, crystal, and flame-resistant bricks was established in Toumanyan, Yerevan, Byureghavan, Armavir, and Arzny.

Significant part belonged to the light industry, as in the Republic there functioned about 70 major enterprises for production of cotton, woolen and silk clothes, production of textiles (knitted wear, woolen goods), shoe-wear, leather goods, carpets, and variety of other consumer goods. The plants are located in Yerevan, Gyumri, Vanadzor, Goris, Stepanavan, Gavar and Idjevan.

However, due to the dissolution of the Former USSR and the resulting overall crisis in the post-soviet region, the industry of Armenia also underwent crucial /cardinal changes: there was the deep economy crisis, resulting from the disintegration of coherently functioning planned economy and well-established economic relations, many large and small enterprises ceased their activity. There began emigration of the considerable proportion of able-bodied citizens, this latter affected the economic situation of the country as well.

At present the industry of Armenia is based on its own mineral products, treasures of the soil and agricultural raw materials. Fuel, ferrous metals, and auxiliary raw materials are brought from abroad.

The growth of GDP is conditioned by the growth of such basic branches as industry, construction, agriculture, transport and communications, trade and public catering.

Manufacture of industrial production in Armenia is carried out according to the following basic sectors: processing industry, mining industry; production and distribution of electric power, gas and water.

In the Republic of Armenia in January - December 2003 according to reports received from 2053 industrial organizations, as well as according to evaluation of the activity of managing subjects of small business, there was manufactured industrial production, making in current prices 423 717.4 mln. AMD; there was realized production for the sum of 418 417.6 mln. AMD, including: in the countries of CIS - for 51 513.2 mln. AMD, in other countries - for 97 863.9 mln. AMD. The index of physical volume of industrial production made 114.9 % in 2003.

In the structure of industrial production according to sectors of manufacture, the basic share belonged to processing industry: 66.8 %; manufacture and distribution of electric power, gas and water made 22.2 %, share of a mining industry was 11.0 % (January -December 2003).

Manufacturing industry of Armenia includes such kinds as chemical industry, iron and steel industry, manufacture of non-metal mineral products, manufacture of rubber and plastic goods/products, manufacture of machines, equipment, as well as electrical machines and equipment (power transformers, generators, electric motors, etc.), and also manufacture of foodstuff, etc.

In mining industry the extraction of metal ores is basic and the share of it in this branch of production makes (94.9 %).

In Yerevan there are located such large factories, as joint-stock company "Nairit", joint-stock company "Polyvinylacetate", factory of chemical reagents, factory of vitamins, factory of varnishes and paints, factory of technical rubber goods and tires factory. In Vanadzor a large-scale chemical enterprise "Prometej-KhimProm" CJSC ("Prometheus" Chemical Production enterprise) is located.

In Yerevan is manufactured 40-54 % of all industrial production. The specific gravity of provinces (marzes) of Armenia from the point of view of industrial production is presented in Table 2.4. Recently a shift of the industrial manufacture to the districts of the Republic is observed, especially to Armavir, Kotaik marzes. There is also a reduction of density of industrial manufacture in Yerevan, as the capital.

Table 2.4: Specific gravity of marzes/regions of Armenia in industrial production, (%)

Marzes/Regions of Armenia	1990	1993	1995	1997	2002
Yerevan	53.9	41.8	43.4	39.2	46.8
Aragatsotn	1.04	0.41	0.32	1.5	1.5
Ararat	3.16	5.64	2.85	5.1	9.4
Armavir	4.54	2.59	4.91	11.4	7.1
Gegharkunik	4.61	2.69	2.84	4.2	2.5
Lory	10.31	4.31	3.88	4.9	4.9
Kotaijk	11.65	34.65	27.59	22.0	14.1
Shirak	4.85	2.6	2.89	3.8	3.2
Syunik	3.79	3.81	10.42	5.2	8.6
Vajots Dzor	0.25	0.21	0.33	1.1	0.9
Tavush	1.97	1.35	0.54	1.6	1.0

Overview of the industrial and agricultural sectors and the structure of GDP according to key industries are presented below (Tables 2.5-2.7).

Table 2.5: Overview of the Industrial and Agricultural Sectors

Sector	Contribution to Gross Domestic Product (%)	Number of Employees	Major Products in each Sector
Industrial / Manufacturing Sector	26.31	169,600	1*
Mining and Extraction	1.72		2*
Agricultural Sector	29.86	570,000	3*
TOTAL		739,600	

1* - electric energy;

- products of machinery construction, electric engines, pumps, compressors, cables, wires, mobile/portable electric stations, etc.;
- products of ferrous metallurgy: rolled aluminium, rolled copper, aluminium foil;
- products of chemical industry: synthetic rubber, tyres, paintwork materials, hydrate of sodium, synthetic washing detergents, etc.;
- products of timber industry, woodworking industry, pulp-and-paper industry; saw-timber, parquet, industrial wood, furniture;
- products of industry of building materials: cement, clinker, "gadge" (local type of alabaster), tufa, concrete, asbestos- cement slabs;
- products of light industry: cotton fabric, woolen and silk clothes, carpets, knitted fabrics, etc.;
- products of food industry: meat-and-milk products, bread and confectionery, canned goods, flour and cereals/groats, meat, cooked meats/sausages, strong and soft drinks, etc.;

2* - concentrates of copper, zinc, molybdenum;

3* - meat, milk, eggs, cereals, potatoes, vegetables, melons and gourds, horticultural crops, grapes, tobacco.

Table 2.6: Dynamics of GDP according to key industries (in % to previous year)

Branches of Production/ Industry	2001	2002	2003	2004
Gross Domestic product (GDP) – total:	**109.6**	**112.9**	**113.9**	**110.5**
GDP in main prices including:	***108.8***	***112.6***	***114.6***	***110.8***
Industry	103.8	114.2	115.4	102.1
Building industry /civil engineering	114.5	144.6	144.4	113.4
Agriculture	111.6	104.4	104.3	114.5
Transport and communications	116.0	106.0	108.2	117.0
Trade and catering	115.5	115.6	114.5	110.5
Net taxes for products (with the deduction of grants/subsidia)	117.1	113.8	108.0	102.4

Table 2.7: Gain/increase and structure of GDP according to key branches of economy

Branches of Production/Industry	Degree of influence on GDP increase (in % points)		GDP structure (in %)	
	2003	2004	2003	2004
Basic branches:	**11.5**	**7.7**	**73.3**	**74.4**
including:				
Industry	2.9	0.4	19.9	19.7
Civil engineering/construction	5.6	2.1	15.5	15.3
Agriculture	1.0	3.1	21.3	22.5
Trade and catering	1.5	1.1	10.7	11.0
Transport and communications	0.5	1.0	5.9	5.9
Other branches	1.6	2.2	17.6	17.2
Net taxes for products (with the deduction of grants/subsidia)	0.8	0.2	9.1	8.4

Substantial part of gross output produced in Yerevan relates to chemical and petrochemical industry, machine building industry and metal working, as well as food and feed mill industry (table 2.8).

Table 2.8: Specific gravity of branches of industry in the gross output produced in Yerevan (Statistical Yearbook of Armenia, 2001)

Branches of Industry	Portion in gross output, %			
	1985	1990	1995	1997
Energy sector (power industry)	1.9	1.6	6.9	16.0
Non- ferrous metallurgy	-	-	-	-
Chemical and petrochemical industry	9.7	5.3	8.4	10.1
Machine building industry and metal working	34.3	36.8	20.1	14.8
Timber industry, woodworking industry, pulp-and-paper industry	2.3	2.4	0.9	0.7
Industry of building materials	3.6	2.7	3.5	2.1
Glass industry and porcelain /faience (highly glazed pottery) goods' industry	0.1	0.2	0.1	0.1
Light industry	22.4	23.7	10.5	2.8
Food industry	17.8	13.8	24.0	30.1
Flour-and-cereals industry and feed-mill industry	2.0	2.0	14.1	18.3

Table2.9: Structure of Industrial Production according to Main Branches, % to total (Armenia, Statistical Yearbook 2004)

Branches of Industry	1999	2000	2001	2002	2003
Overall volume of industrial production	**100**	**100**	**100**	**100**	**100**
including:					
Power industry/	32.0	30.2	28.3	24.3	19.5
number of plants(entities)	92	93	91	97	99
Ferrous metallurgy	0.1	0.1	0.1	0.1	0.0
Non-ferrous metallurgy	6.0	10.6	13.7	16.8	21.7
Chemical and petrochemical industry /number of enterprises	2.9	3.4	2.8	2.2	2.0
	43	43	86	92	94
Machine building industry and metal working / number of enterprises	3.1	3.7	4.6	4.2	4.8
	249	256	268	269	291
Timber industry, woodworking industry, pulp-and-paper industry / number of enterprises (entities)	0.3	0.6	0.8	0.9	1.0
	50	54	90	99	121
Industry of building materials/ number of enterprises (entities)	3.2	2.2	2.4	3.0	3.3
	123	128	160	171	184
Glass industry and porcelain / faience industry	0.2	0.2	0.3	0.3	0.3
Light industry /	1.3	1.3	1.4	1.2	1.2
number of enterprises (entities)	18	19	18	16	29
Food industry /	39.4	38.5	37.1	37.1	36.6
number of enterprises (entities)	329	359	593	670	769
Flour-and-cereals industry and feed-mill industry	4.2	2.3	1.6	2.3	2.6
Printing industry	1.1	1.4	1.5	1.3	1.5

In 2003, as a whole, the growth of industrial production manufacturing was marked. Thus, in January - December 2003 as to the basic types of chemical industry production, there was a 25.1 % increase of manufacturing of paintwork materials; chemical and pharmaceutical production increased by 8.9 %, manufacturing of plastic products has increased by 6.7%.

In iron-and-steel industry of Armenia in 2003 the growth of industrial manufacture was also marked: manufacture of rolled aluminum increased 82.4-fold, aluminum foil - 77.8 %, copper as copper concentrate by 8.6 %, however manufacture of converter copper decreased by 3.7 %.

Agricultural production was always a developed one in Armenia. Both crop production and husbandry production originate from small, medium and big farms, at which the owner of a farm and all the member of his family work. At these farms 45.1% of total employed population of Armenia is engaged (data available for 2002).

In 2003 total agricultural production (in current prices) made 410.1 milliard AMD that exceeded the level of 2002 by 4.3 %. The growth of total production of agriculture was conditioned by an increase of both total production of main agricultural cultures (except for grain cultures and grapes), and production of cattle breeding. The growth of total crop production in 2003 made 4.4 %. Total production of cattle breeding exceeded the level of 2002 by 4.2 %.

The economic parameters of agriculture of the Republic of Armenia for 2003 according to regions (marzes) are presented in Table 2.10.

Table 2.10: Gross output in agriculture by marzes (regions)

Marzes	Gross output, in mlrd AMD		Specific gravity, %	
	2003	2004	2003	2004
Yerevan	5.7	6.5	1.4	1.3
Aragatsotn	30.3	36.3	7.4	7.2
Ararat	54.2	66.1	13.2	13.1
Armavir	58.5	74.6	14.3	14.8
Gegharkunik	59.1	71.6	14.4	14.2
Lory	43.9	55.4	10.7	11.0
Kotayk	36.9	44.4	9.0	8.8
Shirak	40.2	48.4	9.8	9.6
Syunik	39.4	49.4	9.6	9.8
Vajots Dzor	18.4	23.7	4.5	4.7
Tavush	23.5	27.7	5.7	5.5
Total:	410.1	504.1	100.0	100.0

2.2 Institutional, Policy and Regulatory Framework

2.2.1 Environmental policy, sustainable development policy and general legislative framework

Since 1990, a process has begun to establish the new legislative system in Armenia. Since that time, a number of laws and by-laws regulating various spheres of activity were adopted. Amongst the approved legislative acts, various problems dealing with the sphere of environmental protection are regulated by 24 laws and about 700 by-laws. The substantial part of documents regulates also the implementation of commitments/ responsibilities of the Republic of Armenia imposed/taken in the frames of international agreements and conventions.

The process planned in the sphere of chemicals and wastes management, including that of POPs, is determined by such global strategic documents as Agenda 21, Declaration on Sustainable Development adopted at the World Summit on Sustainable Development (Johannesburg, 2002) and by the state environmental policy of the Republic of Armenia.

Solution of the problem on improvement and strengthening of institutional mechanisms of management on chemicals and wastes, including POPs, require stage-by-stage approach; this latter is conditioned by formation of distinct policy in this area, as well as by the necessity to improve legislation.

The principles of state regulation dealing with issues of environmental protection are allocated by the article 10 of Constitution of the Republic of Armenia, according to which "The state shall ensure the protection and reproduction of the environment and the rational utilization of natural resources".

Despite the lack of a Law on Chemicals, in the Republic of Armenia problems of chemicals and waste management, including the Persistent Organic Pollutants (POPs), are governed by a number of legal acts and appropriate international conventions, regulating the area of nature protection.

One of the principles established by the Stockholm Convention "On Persistent Organic Pollutants" runs that:

"States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States of areas beyond the limits of national jurisdiction" and provides any sovereign State with the possibility to regulate the problems of POPs management, proceeding from national and regional peculiarities in accordance with policy drawn in this specific country and in accordance with the legislation adopted in the frames of the policy.

Major legal document in the sphere of Environmental Protection is the law adopted by the National Assembly (Parliament) of Armenia in 1991: "Fundamentals of the Republic of Armenia Legislation on Nature Protection". Article 72 of this document states:

- Maximum allowable levels (standards) of harmful impact on environmental and human health are approved and changed by the State authoritative bodies in this branch, - Ministry of Nature Protection and Ministry of Health of the Republic of Armenia;
- The frames of these standards involve the applicable norms of chemical substances exerting detrimental impact on the environment, maximum allowable levels of chemical substances in foodstuffs, as well as maximum allowable levels of chemical substances used in agriculture.

Article 27 states: "expenses connected with waste decontamination are imposed on industrial, agricultural, and municipal entities, at which they were generated".

Regulation of chemical substances including POPs is also governed by a number of laws and legal acts of the Republic of Armenia.

2.2.2 Roles and responsibilities of Ministries, Agencies and other governmental institutions involved in POPs life cycles (from source to disposal, environmental fate and health monitoring)

Regulation of chemicals and wastes, including POPs, is performed by the following state structures of the Republic of Armenia:

- Ministry of Nature Protection;
- Ministry of Health;
- Ministry of Agriculture;
- Ministry of Trade and Economic Development;

- Department of standardization, metrology and compliance confirmation at the Ministry of Trade and Economic Development;
- Ministry of Energy;
- Ministry of Defense;
- Ministry of Finance and Economy;
- National Statistical Service at the President of the Republic of Armenia;
- Marzpetarans (Authoritative bodies at regions) and Yerevan city administration.

The frames of responsibilities of the local bodies of self-government (municipalities) in the sphere of Nature Protection are stated in Article 45 of the Law of the Republic of Armenia "On local self-government".

According to the Law of the Republic of Armenia "On Public Organizations", numerous public organizations facilitate settlement of the problem on prevention of the harmful impact of chemicals and wastes, as well as POPs, in particular, exerted to the environment and human health.

In concern of legal and natural persons, who use chemicals, including POPs, by a number of laws and legal instruments regulating the sphere of nature protection, norms, standards and limitations are established, the rights and responsibilities are imposed for prevention or minimization of the harmful effect of chemicals and wastes, as well as the extent of responsibility for performance of these duties.

◆ Ministry of Nature Protection of the Republic of Armenia: Institutional Instruments on Regulation of Chemicals and Wastes, including POPs

➔ Legal regulation

In accordance with the No.1237-N Decision of the Government of the Republic of Armenia dated August 8, 2002 to create the State governing authority "Administration of the Ministry of Nature Protection of the Republic of Armenia" and the legal act "On approval of the statute and structure of the Administration of the Ministry of Nature Protection of the Republic of Armenia", the Ministry of Nature Protection performs studies, state accounting/inventory of entities and regulation/standardization of substances having harmful impact on the environment, including:

- Accounting/inventory of chemical production and use, industrial and household wastes generated on the territory of the Republic of Armenia, as well as enterprises potentially subject to industrial accidents;
- Classification of produced and used chemicals, industrial and household wastes generated on the territory of the Republic of Armenia according to the degree of their hazard and record-keeping of the State Registry;
- Expertise assessment of Safety Passports of hazardous industrial entities;
- Carrying out state expertise of environmental exposures/ impacts;

- Control in concern of requirements envisaged by legislation of the Republic of Armenia on Nature Protection.

➔ Institutional Regulation

In accordance with the Decision of the Republic of Armenia (No.1237-N of August 8, 2002), the Ministry of Nature Protection in the frames of its responsibilities, regulates problems dealing with chemicals and wastes, including POPs, through the following structural and special dedicated departments and organizational bodies.

↳ Department of Hazardous Substances and Wastes Management

The Department of Hazardous Substances and Wastes Management, as a structural subdivision of Ministry of Nature Protection administration of the Republic of Armenia in the frameworks of its responsibilities regulates the problems dealing with chemical and wastes, including POPs.

The Department of Hazardous Substances and Wastes Management performs the following:

- Working out concepts and strategy, as well as programs aimed at management of chemicals and wastes, including POPs;
- Working out drafts of the legislative acts on chemicals and waste management, including POPs;
- Accounting the production and use of chemicals, including POPs, as well as industrial wastes generated on the territory of the Republic of Armenia;
- Analysis of risks degree at enterprises, on the territory of which there is production, use of chemicals and wastes, which are potentially subject to industrial accidents, as well as inventory/accounting of a.m. enterprises;
- Coordination of activity on issues dealing with chemicals and wastes management, as well as classification of chemicals produced and used and wastes generated on the territory of Armenia, according to degree of hazard.
- Expertise of Safety Passports for the hazardous industrial entities.

↳ "Environmental Impact Monitoring Center of Armenia"

The "Environmental Impact Monitoring Center of Armenia" by means of regimen observations is carrying out studies on the quality of country surface waters, including qualitative and quantitative determinations of such POPs as DDT, DDE, α- and γ-HCH (Lindane) (Decision of the Government of the Republic of Armenia: No.411 of March 6, 2003).

↳ State Inspection for Nature Protection

State Inspection for Nature Protection executes control in respect of fulfillment of norms and regulations presupposed by the legislation of the Republic of Armenia ensuring environmental protection, in particular, in concern of POPs.

- **Ministry of Health of the Republic of Armenia: Institutional Instruments on Regulation of Chemicals and Wastes, including POPs**

Ministry of Health of the Republic of Armenia performs:

- Working-out and approval of sanitary standards, norms and regulations;
- Carrying-out measures and actions to improve health status of the general population
- Arrangement of hygienic researches on the impact of environmental factors to the public health, etc.

Ministry of Health of the Republic of Armenia, in the frames of responsibilities assigned by legislation, regulates the issues relevant to chemicals and wastes, including POPs through the appropriate structural and designated subdivisions and organizations:

- **State hygienic and anti-epidemic inspection of the Ministry of Health of the Republic of Armenia;**
- **Research Institute of Environmental Hygiene and Preventive Toxicology at the Ministry of Health of the Republic of Armenia;**
- **Research Institute of General Hygiene and Occupational Diseases after N.B. Hakobyan at the Ministry of Health of the Republic of Armenia.**

- **Ministry of Agriculture of the Republic of Armenia: Institutional Instruments on Regulation of Chemicals and Wastes, including POPs**

Ministry of Agriculture of the Republic of Armenia performs:

- fight against quarantine diseases of agricultural crops grown and extremely dangerous organisms, as well as management and carrying out quarantine limitations;
- control on safety of food-stuffs, as well as over observation and compliance of phytosanitary and veterinary norms

Issues dealing with chemicals, including POPs are also regulated by the following structural and appointed subdivisions and organizations of the Ministry of Agriculture:

- **Interdepartmental commission on registration of chemical, biological plant protection means and biologically active substances in the Republic of Armenia;**
- **State inspection on quarantine of plants at the Ministry of Agriculture of the Republic of Armenia;**
- **State Inspection for veterinary medicine and cattle breeding;**
- **State Plant Protection Service.**

Ministry of Trade and Economic Development of the Republic of Armenia: Regulation of Chemicals and Wastes, including POPs

Ministry of Trade and Economic Development of the Republic of Armenia is working out policy on development of the production complex of the Republic of Armenia. The Ministry is engaged in problems of development and realization of research, technological and innovational policy in the sphere of science and technology. The Ministry facilitates development, import and export of high technologies and their implementation in national economy, elaborates measures/ actions on industrial development of information technologies, works out and fulfills measures on development and regulation of the inner market of goods and services, as well as establishes norms and regulations on safety-in-work and executes control on implementation of their requirements.

◆ Ministry of Finance and Economy of the Republic of Armenia: Regulation of Chemicals and Wastes, including POPs

Ministry of Finance and Economy of the Republic of Armenia is engaged in ensuring provision of international collaboration in the sphere of macro- and micro-economic policy, facilitates fulfillment of obligations of the Republic of Armenia on international agreements.

◆ Ministry of Energy of the Republic of Armenia: Regulation of Chemicals and Wastes, including POPs

Ministry of Energy of the Republic of Armenia works out strategy of stable and sustainable development in the area of energy, assuring safety and reliability of energy supplies, programmes and actions for their implementation, and ensures elaboration and application of economic and legal mechanisms of reasonable use of local energy resources.

◆ Local governing bodies (municipalities) of the Republic of Armenia: Regulation of Chemicals and Wastes, including POPs

Local governing bodies

- Participate in elaboration of governmental programmes on protection of Nature and Environment and, in the frames of their responsibilities, ensure realization thereof at the areas entrusted;
- Perform control on execution of environmental legislation /regulations at the areas entrusted and, in case of infringement, notify the appropriate authorities.

The general conclusion is as follows: the existing institutional, organizational, technical, financial and human potential of Ministries, Agencies, and other governmental institutions involved in POPs problems is limited and there is a need for foreign technical and financial assistance to ensure efficient management of chemicals and wastes, including those regulated by Stockholm Convention, as well as other Conventions in this sphere.

2.2.3 Relevant international commitments and obligations

The Republic of Armenia has a close co-operation with the world community in various spheres, including the issues of environmental protection and human health. At the World Summit on Sustainable Development (Johannesburg, 2002) great attention was devoted to discussion of problems on protection of the environment and human health. At the World Summit Johannesburg Declaration was adopted on sustainable development and recommendations for submission to the UN Assembly General.

Armenia also actively participates in international organizations and agreements on management of chemicals and wastes.

The Republic of Armenia signed and ratified a number of international environmental Conventions and Agreements, for which the Ministry of Nature Protection is the national focal point (see Table 2.11).

Table 2.11

No.	Conventions (dates and places of adoption)	Convention Status		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
1.	"Convention on Wetlands (Ramsar, Iran, 1971)", – The Convention on Wetlands of International Importance especially as Waterfowl Habitat			Armenia acceded to Convention according to the request of November 6, 1993
2	The Rio de Janeiro Convention on Biological Diversity, 1992	June 5, 1992	March 31, 1993	May 14, 1993
	Cartagena Protocol on Biosafety (Montreal, January 29, 2000)		March 16, 2004	April 30, 2004
3.	Framework Convention on Climate Change (New York, 1992)	June 13, 1992	March 29, 1993	May 14, 1993
	Kyoto Protocol (Kyoto, 1997)		December 26, 2002	April 25, 2003
4	UNECE Convention on Long-range Transboundary Air Pollution (Geneva, 1979)		May 14, 1996	February 21, 1997
	- Protocol on Heavy Metals (Aarhus, 1998)	December 14, 1998		
	- Protocol on Persistent Organic Pollutants (Aarhus, 1998)	December 14, 1998		
	- Protocol to Abate Acidification, Eutrophication and Ground-level Ozone Formation (Gothenburg)	November 30, 1999		

No.	Conventions (dates and places of adoption)	Convention Status		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
5	UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991)		May 14, 1996	February 21, 1997
	Protocol on Strategic Environmental Assessment (Kiev, 2003)	May 21, 2003		
6	UNECE Convention on the Transboundary Effects of Industrial Accidents (Helsinki, 1992)		May 14, 1996	February 21,1997
	- Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents (Kiev, 2003) to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) and Convention on Transboundary Impact of Industrial Accidents (1992)	May 21, 2003		
7	Convention to Combat Desertification (Paris, 1994)	October 14, 1994	June 23, 1997	July 2, 1997
8	Convention of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, 1989)		March 26, 1999	September 30, 1999
9	Convention for the Protection of the Ozone Layer (Vienna, 1985)		April 28, 1999	September 30, 1999
	-Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987)		April 28, 1999	September 30, 1999
	- London Amendments to the Montreal Protocol (London, 1990)			October 22, 2003
	- Copenhagen Amendments to the Montreal Protocol (Copenhagen, 1992)			October 22, 2003
10	UNECE Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus, 1998)	June 25, 1998 May 21, 2003	May 14, 2001	August 1, 2001

No.	Conventions (dates and places of adoption)	Convention Status		
		Date of signing	Date of ratification by the National Assembly	Date of registration at UN Secretariat
	- Protocol on Pollutant Release and Transfer Registers (Kiev, 2003)			
11	Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International trade (Rotterdam, 1998)	September 10, 1998	October 22, 2003	November 26, 2003
12	Convention on the Protection and Use of Transboundary Watercourses and International lakes (Helsinki, 1992) Protocol on Water and Health (London, 1999)	June 17 , 1999		
13	Stockholm Convention on Persistent Organic Pollutants (Stockholm, 2001)	May 23, 2001	October 22, 2003	November 26, 2003
14.	Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques (Geneva, 1976)		December 4, 2001	May 15, 2002
15.	Convention on the prohibition of the development production, stockpiling, transfer, use of chemical weapons and on their destruction (Chemical Weapons Convention)	March 19, 1993		January 27,1995
16.	European Landscape Convention (Florence, 2000)	May 14, 2003		February 18, 2004
17.	Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)			September 5, 1993 Armenia notified on its succession

The Republic of Armenia is a member of various International Organizations, the active collaboration with which is established via the national Focal Points (Ministries and/or by contact persons, precisely). Armenia participates in the process of international regulation of chemicals (Table 2.12).

Table 2.12: Participation of the Republic of Armenia in International Agreements/ Procedures Related to Chemicals Management

International Agreements	Primary Responsible Agency	Relevant National Implementation Activities
Agenda 21 - Commission for Sustainable Development	National Council on Sustainable Development of the Republic of Armenia, the membership of which is approved by the Governmental Decision No. 1102 of July 25, 2002	"National Conception on Sustainable Development of the Republic of Armenia" is elaborated, the main concepts and approaches of which were approved at the Nationwide Conference "Rio + 10" that was organized by the Government of the Republic of Armenia and UNDP; Country Report was prepared for the World Summit on Sustainable Development, Johannesburg, 2002
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC)	Ministry of Nature Protection	Information Exchange, submission of national data (Questionnaires, Reporting Materials)
Stockholm Convention on Persistent Organic Pollutants	Ministry of Nature Protection	Implementation of Armenia National Programme "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) Information Exchange, submission of national data (Questionnaires, Reporting Materials)
Convention on Transboundary Effects of Industrial Accidents	Ministry of Nature Protection	Information Exchange, submission of national data (Questionnaires, Reporting Materials)
The Protocol on Civil Liability and Compensation for Damage Caused as a result of Transboundary impacts of Industrial Accidents on Transboundary Waters to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention, 1992) and the Convention on Transboundary Impact of Industrial Accidents (1992)	Ministry of Nature Protection	Information Exchange, submission of national data (Questionnaires, Reporting Materials)
FAO Code of Conduct (voluntary procedure)	Ministry of Agriculture	Information Exchange, submission of national data
Montreal Protocol on Substances that Deplete the Ozone Layer	Ministry of Nature Protection	Information Exchange, submission of national data as Annual Reports
UN Recommendation for the Transport of Dangerous Goods	Ministry of Transportation and Communications	Information Exchange, submission of national data
Basel Convention	Ministry of Nature Protection	Information Exchange, submission of national data (Questionnaires, Annual

International Agreements	Primary Responsible Agency	Relevant National Implementation Activities
		Reports)
GATT/WTO agreements (related to chemicals trade)	Ministry of Trade and Economic Development	Information Exchange, submission of national data within the frames of the signed multilateral Information Exchange, submission of national data Agreements: "Technical Barriers", License for Import", "Sanitary and Phytosanitary Regimen", etc.
Convention on the prohibition of the development production, stockpiling, transfer, use of chemical weapons and on their destruction (Chemical Weapons Convention) (November 30, 1992)	Ministry of Foreign Affairs	Information Exchange, submission of national data
Regional/ Subregional agreements	NIS/CIS countries Agreement on Control over Transboundary Movements of Hazardous and other Wastes	Information Exchange, submission of National Data

2.2.4. Description of existing legislation and regulations addressing POPs (manufactured chemicals and unintentionally produced POPs)

At present the legislative basis in the sphere of management on chemicals and wastes, including POPs, requires further strengthening and improvement. In the Republic of Armenia there is no "Law on Chemicals".

Regulation of issues on management of chemicals and wastes, including POPs in the Republic of Armenia is executed by a number of the following laws and other legal acts aimed at prevention of the harmful impact of chemicals and wastes to the environmental and human health:

- Republic of Armenia Law "On Waste" (No. 159-N of November 24, 2004);
- Governmental Decision of the Republic of Armenia (No. 97 dated December 8, 1995) "On the order of regulating the import, export and transit transportation of hazardous and other wastes over the territory of the Republic of Armenia"
- "Lists of regulated and non-regulated wastes, hazardous properties thereof, documents on the procedure of applications, notices and disposal/ removal" approved by the Ministry of Nature Protection Order No. 96 of August 10, 1999; Agency act);

- Decision of the Government of the Republic of Armenia No.874-A "On approval of the "Republic of Armenia List of hazardous wastes" (dated May 20, 2004);

- Decision of the Government of the Republic of Armenia "On applying changes to the Decision of the Republic of Armenia No.97 of December 8, 1995 and on approval of the Republic of Armenia List of prohibited hazardous wastes" (No.1093-N; dated July 8, 2004);

- Governmental Decision of the Republic of Armenia (No. 97 of March 2, 2000) "On ensuring fulfillment of the Republic of Armenia obligations on Basel Convention on Control of Transboundary Movements of Hazardous Wastes and Their Disposal";

- Decision of the Minister of Nature Protection of the Republic of Armenia "On recognizing the Department of Hazardous Substances and Waste Management at the Administration of the Ministry of Nature Protection of the Republic of Armenia as the focal point for information exchange with the Secretariat of the Stockholm Convention" (No.104-A of April 23, 2004);

- Protocol Decision of the Government of the Republic of Armenia "On approval of the National Profile on Chemicals and Waste Management" (No. 26 of July 8, 2004);

- Decision of the Government of the Republic of Armenia "On implementation of the Republic of Armenia obligations on Stockholm Convention signed May 23, 2001" (No. 1483-N dated October 29, 2004);

- Decision of the Government of the Republic of Armenia "On implementation of the Republic of Armenia obligations on Rotterdam Convention signed September 10, 1998" (No. 1508-N dated October 29, 2004);

- Decision of the Government of the Republic of Armenia "On approval of the List of actions to implement Republic of Armenia obligations under a number of International Environmental Conventions (No. 1840-N of December 2, 2004);

- Protocol Decision of the Government of the Republic of Armenia "On approval of the "List of actions implemented within the frames of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia during 2005-2010" (No. 1 of January 13, 2005).

- Decision of the Government of the Republic of Armenia "On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia" (No. 293-N of March 17, 2005);

- Decision of the Government of the Republic of Armenia "On establishment of the State non-commercial organization "Waste Research Center" (No. 670-N of May 19, 2005).

- Republic of Armenia Law "On expertise of environmental impacts";

- Republic of Armenia Law "On Licensing";

- Decision of the Government of the Republic of Armenia No.121-N of January 30, 2003 "On the order of licensing for activity on processing, treatment, storage, transportation, and placement of hazardous wastes in the Republic of Armenia";

- Decision of the Prime Minister of the Republic of Armenia "On approval of the membership and order of activity of inter-departmental commission on licensing of activity on recycling, treatment, storage, transportation and placement of hazardous wastes in the Republic of Armenia" (No. 46-N of February 5, 2004);

- Republic of Armenia Governmental Decision No. 902 of December 31, 2000 "On prohibition for transportation of certain goods through customs borders of the Republic of Armenia according to customs regimen";

- Decision of the Prime Minister of the Republic of Armenia "On setting-up the working group on regulation of the issues dealing with destruction of obsolete, inappropriate-for-use chemical plant protection substances and working-out action plan for destruction thereof" (No. 452-A of September 22, 2003);

- Decision of the Government of the Republic of Armenia No. 526-A "On approval of measures ensuring security of obsolete pesticides burial and on assigning funds from Republic of Armenia state budget for FY 2004" (dated April 22, 2004);

- Law of the Republic of Armenia "About maintenance of sanitary - hygienic security of the population";

- Law of the Republic of Armenia "About the Lake Sevan";

  - Republic of Armenia Governmental Decision No. 57 of January 24, 2002 "On approval of the list of substances, biogenic elements, heavy metals or compounds thereof and other substances having negative impact on ecosystem of Lake Sevan";

- Law of the Republic of Armenia "On Payments/Fees for Nature Use and Nature Protection";

- Law of the Republic of Armenia "On rates of Environmental Fees";

  - Republic of Armenia Governmental Decision No. 702 of November 11, 1998 "On approval of the Statute of Safety Passport of an industrial entity in the Republic of Armenia";

- Republic of Armenia "Law on Plant protection and quarantine";

  - Decision of the Republic of Armenia No.18 of January 11, 2001 " On approval of the

personal membership of Interdepartmental Commission on registration of chemical, biological means of plant protection and biologically active substances";

- Decision of the Government of the Republic of Armenia No.12 of January 8, 2002 "On approval of the order of State registration of plant protection means"
- "List of chemical and biological plant protection means allowed for application in the Republic of Armenia" approved by the Ministry of Agriculture of the Republic of Armenia (Order No. 198-N of November 18, 2003; Agency act);

- Republic of Armenia Code on Underground Resources;
- Republic of Armenia Code on Water;
- Republic of Armenia Code on Land;
- "Republic of Armenia Code on Administrative Violations";
- Republic of Armenia Criminal Code;
- Republic of Armenia Law "On arrangement of checks at the organizations functioning on the territory of the Republic of Armenia".

The analysis of the existing legislative and other legal acts on POPs allowed to reveal the following problems:

- The legislation of the Republic of Armenia does not specifically apply to POPs, in practice it regulates issues dealing with the use of chemical plant protection means (without regard to industrial chemicals), it does not regulate unintended POPs or those generated as by-products and does not refer to the Best Available Techniques (BAT) and Best Environmental Practice (BEP);
- The existing legislation does not directly define the obligations/ responsibility of state and private sectors in concern of POPs management during the entire life-cycle from the production to destruction, as well as remediation of POPs polluted sites;
- The legal basis is lacking for POPs inventory taking and monitoring, as well as for regular appropriate reporting.

Summarizing the above mentioned, it is possible to conclude that the existing institutional, organizational, technical, financial and human potential of Ministries, Agencies, and other governmental institutions involved in POPs problems is limited and there is a need for foreign

technical and financial assistance to ensure efficient management of chemicals and wastes, including those regulated by Stockholm Convention, as well as other Conventions in this sphere.

The analysis of the existing system of POPs management and control revealed the following problems concerned with the requirements of the Convention:

- Insufficient coordination and communication between various ministries and agencies, institutions (ecological and sectoral) on POPs issues, their limited abilities to include ecological problems in National and sectoral Plans for Development;
- The existing laws and plans are poorly executed or are not carried out at all because of inadequate funding and insufficient administrative and legal support /maintenance;
- Inefficient communications with general public and lack of public involvement in the process of decision making;
- Disagreement/ discrepancy of responsibilities taken in concern of POPs related tasks and the financial resources provided for implementation of the undertaken obligations;
- Inadequate technical equipment of laboratories and inefficient coordination of the systems on monitoring and control at different ministries and agencies;
- Lack of connections between information systems of different agencies involved in chemicals and wastes management; thus setting limits on information required for decision making.

2.2.5. Key approaches and procedures for POPs chemical and pesticide management including enforcement and monitoring requirements

State structures within the limits of the legislatively assigned responsibilities execute regulation of chemical substances and wastes, including POPs, together with appropriate structural sub-divisions, subordinated and other organizations.

The Ministry of Nature Protection is a plenipotentiary authorized body of executive power in the field of management on chemicals, as well as hazardous and other wastes, including POPs. In the process of management on chemicals, hazardous and other wastes, including POPs are also involved: the Ministry of Health, Ministry of Trade and Economic Development, Ministry of Agriculture, Ministry of Finance and Economy, Ministry of Energy, Customs Committee, Marzpetarans (Regional *administration*).

The key approach in respect of POPs is realization of measures directed at prevention, reduction of the harmful impact of POPs on environmental and human health.

However, it should be mentioned that due to imperfection of the legislative and regulating-methodic basis for POPs issues regulation, as well as limitations of financial resources in the Republic of Armenia there is a number of problems relevant to POPs regulation, including inter alia:

- Lack of a unified body responsible for activity coordination, information exchange, carrying-out complex investigations on protection of the environment and population against the impact of POPs, as well as responsible for decision making on POPs issues at the national level;
- Existence of enterprises/ entities, which present themselves sources of POPs releases;
- Occurrence of contaminated areas including dump sites scattered all over the territory of the Republic of Armenia, as well as former storehouses of pesticides, including organochlorine ones;
- Occurrence of POPs-contaminated areas around the industrial enterprises and energy sector facilities;
- Occurrence of stockpiles of obsolete pesticides, including organochlorine ones;
- Presence of a former burial place for final disposal of obsolete and unfit for use pesticides, the significant amounts of which make obsolete organochlorine pesticides;
- Existence of PCB-containing mineral oils used in various types of the equipment, which are subject to replacement and destruction in ecologically sound manner;
- Existence of PCB-containing equipment used in energy sector and various branches of industry of Armenia; such equipment is also subject to replacement and destruction in accordance with ecologically sound methods;
- Absence of the analytical laboratory on POPs aimed to execute constant monitoring, analysis and control on the state of the environment.

2.3 Assessment of the POPs Issue in the Republic of Armenia

2.3.1 Assessment with respect to Annex A, part I chemicals (POPs pesticides): historical, current and projected future production, use, import and export; existing policy and regulatory framework; summary of available monitoring data (environment, food, humans) and health impacts.

In the Republic of Armenia neither in the past there was, nor at present there is any manufacturing of chemical substances included in the Annex A, Part I of the Stockholm Convention. Some of the listed chemicals, for example, such as Mirex and Toxafen were never used in agriculture of the republic as means of fight against the pests and plant diseases.

Table 2.13: Volumes of applied Organochlorine Pesticides by regions of Armenia (as of 1983)

Region	Amounts applied, in tons	OCPs as % of total
Abovian	8.88	5.9
Azizbekov	0.4	0.5
Amasia	0.4	6.7
Ararat	170.2	1.2
Ashtarak	0.35	0.03
Akhuryan	2.3	3.4
Gugark	0.7	9.7
Eghegnadzor	0.75	0.1
Ijevan	7.06	1.18
Masis	1.67	0.6
Nairi	2.3	0.2
Noemberyan	6.0	0.5
Hoktemberian	13.0	0.3
Sisian	0.1	0.1
Spitak	0.1	0.2
Talin	1.4	0.3
Tumanyan	0.85	0.2
Shamshadin	12.8	1.2
Shahumyan	0.6	0.3
Echmiadzin	2.3	0.1
TOTAL in Armenia	**129.66**	

Likewise all the Republics of Former USSR, organochlorine pesticides were widely used in Armenia until 1986. Armenia was always characterized by the well-developed agricultural production. Till 1980s, the republic was amongst the regions with intense pesticide application. Total area load of pesticides averaged 9 - 35.5 kg per hectare; this value manifold exceeded average all-union levels of pesticide application. The volumes of organochlorine pesticides used in 1983 are presented in Table 2.13 according to regions of Armenia.

In Armenia since 1960s the problems arose in concern of environmental pollution by persistent organic pollutants, as persistent organochlorine pesticides (OCPs) were in all-round, extensive use. The reason for such large scale application of OCPs was conditioned by the universal, multipurpose character of these compounds.

According to data obtained due to studies performed by the country sanitary service in 1960s it was revealed that such OCPs as DDT and HCH, including Lindane (γ-HCH), were determined in food especially in foodstuffs of animal origin. It was found out that in Armenia the load of OCPs per 1 hectare of arable lands made 8.4 kg. The load of OCPs per capita made 1.72 kg. In the districts of Ararat Valley these values made 21.1 kg and 5.3 kg, appropriately.

Statistical data signify that in 89% of all cases DDT residues were revealed in soil; HCH was found in 39.8% of cases. In samples of water of open reservoirs these values made appropriately 61% and 24.7%, in feed crops and formula feeds the amounts were 71.7% and 42.5%, while in foodstuffs residues made 80.7% and 37.7%.

According data available for 1970s-1980s, the levels of DDT and HCH were as follows:

- in soils: 0.2-0.06 mg/kg,
- in samples of water from open reservoirs the level was at 0.021 mg/L and 0.01 mg/L,
- in water from artesian wells: 0.11 mg/L and 0.07 mg/L,
- in formula feeds: 0.38 mg/kg and 0.25 mg/kg,
- in foodstuffs of animal origin: 0.44 mg/kg and 0.1 mg/kg,
- in foodstuffs of plant origin: 0.21 mg/kg and 0.14 mg/kg.

Studies held in 1960s in different regions of the Soviet Union in concern of levels of OCP pollution of various environmental media became the basis for decision-making on banning application of DDT as an agricultural pesticide in USSR, including Armenian Republic, since 1970.

In Armenia since 1970, the use of the extremely hazardous organochlorine pesticides was prohibited according to the Order of Minister of Health of the Former USSR. List of banned pesticides includes compounds falling under the action of Rotterdam and Stockholm Conventions (Table 2.14). Since 1980 the area for HCH application was narrowed in the sphere of prevention and fight against pests and diseases of food crops. The decision was also adopted in 1980 to stop application of HCH in the area of water collection basin around the lake Sevan.

Table 2.14: List of pesticides banned for use in Armenia

Name	Production/Use	Date of banning
DDT	No production/ no use	1970
Aldrin	No production/ no use	1970
2,4,5-T	No production/ no use	1970
Chlordimephorm	No production/ no use	1978
Dieldrin	No production/ no use	1985
Dinoseb	No production/ no use	1986
Heptachlor	No production/ no use	1986
Pentachlorophenol	No production/ no use	1986

After the above mentioned actions studies for the content of DDT and HCH in water of Sevan Lake, tilt/sludge and in muscle tissues of fish demonstrated that:

- According to data available for 1980, DDT was determined in Sevan water averagely at 0.0004 mg/L (Small Sevan) and 0.0003 mg/L (Bigger Sevan).

- In the tilt (bottom sediment) DDT was determined at 0.01-0.037 mg/kg, HCH at 0,57-1.46 mg/kg (as of 1980-1983).

- In muscle tissues of white-fish ("syg") DDT was detected at 0.2 mg/kg, DDE at 0.1 mg/kg and HCH at 0.2 mg/kg (as of 1980-1983).

- In muscle tissues of khramulya fish, which is fatter than syg, DDT was revealed at 0.006 mg/kg, DDE at 0.027 mg/kg and HCH at the level of 0.001 mg/kg (as of 1980-1983).

Only officially registered substances and those included in the "List of chemical and biological means of plant protection allowed for application in the Republic of Armenia" are allowed for import to and sale at the territory of Armenia. The List involves names of 185 chemical and biological plant protection means, amongst which there are no chemicals included in Annex A, Part I of Stockholm Convention.

However, despite the prohibitive actions taken since 1970s, the residual amounts of organochlorine pesticides continue to be revealed in environmental media, foodstuffs, and human organism till present.

The following was revealed as a result of monitoring studies held in 2002-2003 on residue amounts of Annex A, Part I chemicals. Hexachlorobenzene (HCB) in waters of open reservoirs was revealed in the range of 0.005-0.056 mcg/L. Average content of these substances made 0.006-0.036 mcg/L. In bottom sediments no HCB residues were revealed. In soils around the transformer stations HCB was revealed at 0.018 mcg/kg in 1 sample. In waste waters from sewage collectors HCB was found at 0.016mcg/L in 1 sample.

In 2003, HCB residue amounts were also determined in water samples from water supply network of cities Yerevan and Vanadzor. In 9 out of 12 samples of water collected in Yerevan HCB was revealed within the range of 0.0001-0.0078 mcg/L. On the average the content made 0.0028 mcg/L. In Vanadzor the residues of HCBs averaged 0.005 mcg/L.

Data obtained due to monitoring of 2002-2003 on HCB residual amounts in foodstuffs from different marzes (regions) of Armenia signify to the presence of this pesticide:

- HCB content in eggs was within the range of 0.008-4.54 mcg/kg. Average content made 0.26-4.54 mcg/kg.

- In samples of meat HCB ranged 0.028-9.16 mcg/kg (on the average: 0.0072-2.73 mcg/kg).

- HCB residues in samples of milk leveled to 0.009-0.74 mcg/L (average: 0.025-0.21 mcg/L).

- In samples of cheese the compound was revealed at 0.1-15.65 mcg/kg, making on the average 0.1-11.09 mcg/kg.

In 2002-2003, monitoring was also carried out in order to determine residual amounts of Heptachlor in surface waters and food stuffs (eggs, meat, milk and cheese) from different marzes of Armenia. It was found that in surface waters Heptachlor ranged 0.034-0.17 mcg/L (averagely 0.074 mcg/L). Heptachlor residues in samples of food were as follows: in eggs the residues made 0.023- 0.12 mcg/kg (average: 0.0064-0.06 mcg/kg), in meat at 0.024-4.23 mcg/kg (average 0.024-3.31 mcg/kg); in

samples of milk Heptachlor was revealed in the range of 0.023-0.12 mcg/L (average content made 0.06-0.097 mcg/L). In samples of cheese Heptachlor was not revealed, except 1 sample, in which the content made 0.153 mcg/kg.

2.3.2 Assessment with respect to Annex A, Part II chemicals (PCBs)

Energy sector is one of the main sources of environmental pollution by POPs and, in particular, by such compounds as polychlorinated biphenyls (PCBs), which might be contained in oils used in electrical equipment of various types (power transformers, greasing/lubricating systems; rectifiers, high voltage switches and breakers, compressors, etc).

In Armenia at present, the energy complex is one of the leading production sectors. Therefore, there is an urgent problem to assess/ evaluate the state of the environment in concern of the use of oils probably containing PCBs in electrical equipment.

In order to identify and take the Inventory of PCB-containing oils and equipment existing in the republic the following was carried out:

- identification of the types of equipment exploited in energy complex and other fields of national economy (asphalt plants, boiler departments, medium and small-sized industrial complexes, etc.), which can be filled with PCB-containing oils;
- inventory of the identified types of equipment with indication of the trademark/brands and production date;
- more precise specification and verification of types and quantities of oils contained in exploited equipment of the energy complex and other spheres of national economy, as well as evaluation and inventory thereof;
- accounting/registration, evaluation and inventory of oils intended for recharge/re-filling in the equipment;
- accounting/registration, evaluation and inventory of mineral oils, which are subject to destruction.

It should be mentioned that out of 70,000 tons of trichlorobiphenyls (TCB) produced in Former USSR (Russian Federation), 40,000 tons were used in production of industrial capacitors and 30,000 tons were used in production of household capacitors, which were manufactured only in Armenia and then distributed to the republics of the Former USSR (Russia, Byelorussia, Ukraine, Lithuania, Latvia).

Main consumers of capacitors manufactured in Armenia were radio-engineering plants of Kaunass, Vilnius, Riga, Minsk, Moscow, Lvov, Zaporozhie, Voronezh and Kiev.

Totally 10 million film capacitors and 50 million electrolytic capacitors of the following types were produced:

- K-50-7; K-50-16; K-50-35; K-50-17; K-50-18; K-50-37; K-50-60

As a result of the Inventory of equipment (condensers and transformers) taken in various branches of country economy it was revealed that PCB-containing equipment was on the assets of enterprise/entities of:

- Energy sector;
- Industrial enterprises;
- Inhabited settlements;
- Entities of public catering and technical service.

In energy sector of Armenia an inventory/ accounting for oils and equipment probably contaminated by PCBs was taken in subdivisions of energy system, which produce, transmit and distribute the electric energy. As a result, the amounts of oils in the equipment were revealed, their types and the annual amounts required for recharges.

According to the Inventory carried out in energy sector of the Republic of Armenia, there are about 17,000 tons of oils, which are filled in currently functioning energy power facilities of State Distribution Power Stations and HPPs (power transformers, rectifiers/converters, high voltage switches and breakers, compressors, etc.). The revealed amounts of oils, which probably contain PCBs, are subject to replacement with subsequent destruction in environmentally sound manner.

It was revealed that in the energy system of the Republic of Armenia there are the following types and amounts of oils:

- T-1500 type transformer oil: 16,254.5 tons;
- TP-30 and TP-22 type turbine oil: 773.9 tons;
- Compressor oil: 1.4 tons.

The average annual amounts of mineral oils required for refilling/ recharges make:

- 1,278.36 tons of transformer oils;
- 151.2 tons of turbine oils;
- 3.3 tons of compressor oils.

Oil switchers/breakers and transformers at industrial entities, in settlements, at entities of public catering and technical service were also taken into account, as they might probably contain PCBs.

In Armenia, the number of enterprises with installed transformers makes 3,582; including:

- 2,552 in industry;
- 500 in inhabited settlements;
- 352 in entities of public catering;
- 75 in technical service;
- 103 in other organizations.

In Armenia, large-scale exploitation of transformers took place in the Soviet period, since 1965 up to

1991. The studies revealed that there were installed and exploited only transformers manufactured exceptionally in the Former Soviet Union (mostly of Russian Federation production).

Technical servicing of transformers was performed in accordance with the approved Instruction ODV-14D-21. According to this instruction, only oils produced in Russia were used (and are still being used) in transformers; the trademarks/brands include: TE-500, TE-100, TE-1500 (GOST *[State Standard]* 982-68 TKP; TU *[Technical Specifications]*-38-101-181-75).

Besides the energy sector, mineral oils are widely used in various branches of industry and for domestic demands (lifting mechanisms, transformers, different types of compressors, etc.). According to data of the Inventory, there are about 1624 tons of oils at various industrial entities (outside the energy sector), including:

- 1157 tons in industry;
- 226 tons in inhabited settlements;
- 241 tons at entities of public catering and technical service, etc.

It should be mentioned that, in general, there was no possibility to take into account the precise period during which the transformers were exploited.

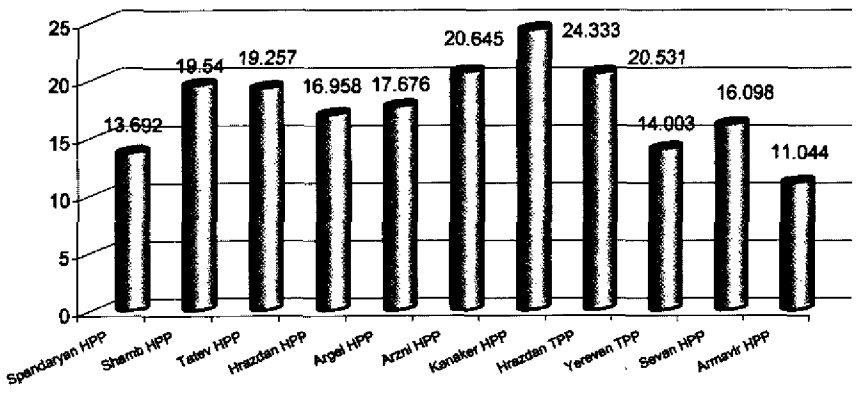
The equipment containing mineral oils contaminated by PCBs also present one of the main sources of POPs releases to the environment, and in particular, it is a source of polychlorinated biphenyls.

The problem to replace and destruct PCB-containing oils and equipment is of high importance and urgency for Armenia. Analysis of information obtained by expert groups in concern of the use and storage of the equipment and wastes, probably containing PCBs, as well as an approximate preliminary evaluation of PCB releases allowed determining the following:

- Existing amounts of oils in the Republic of Armenia;
- Amount of oils used in industry and energy sector;
- Location of enterprises having equipment probably containing PCBs;
- Distribution according to regions and indication of geographic location of phased-out PCB-containing equipment, as well as PCB-containing wastes;
- Distribution according to regions and indication of geographic location of currently used and reserve PCB-containing equipment;
- Sites of PCB releases (spillages, leakages) in the process of technology operations.

There was determined the content of PCBs in oils used in exploited transformers of energy sector of Armenia. The revealed levels of PCBs in used oils varied within the range of 11.0 and 24.3 mg/L.

Figure 1: PCBs in used oils from transformers* of energy sector, Armenia, 2003 (in mg/L)

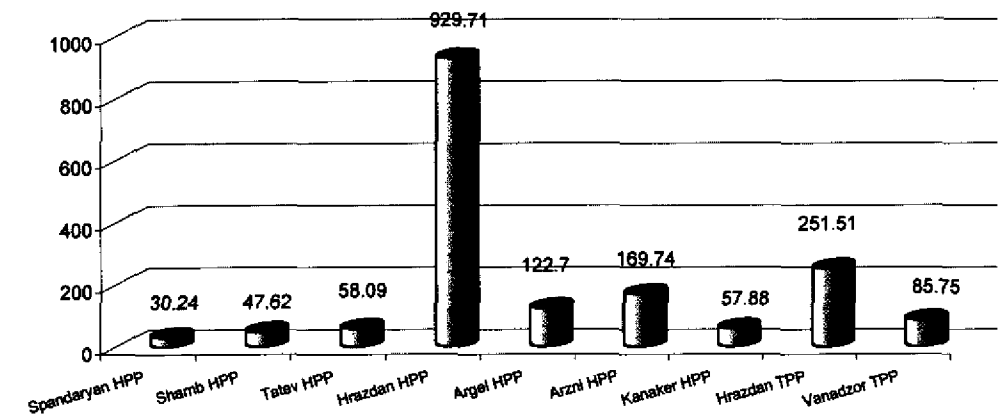


* transformers, which were refilled/recharged by PCB-free oils since 1991

In order to study the degree of environmental pollution by PCBs, monitoring study was performed for their residual amounts in surface waters and Sevan Lake, bottom sediment and food-stuffs. Soil samples were taken in the vicinity (from underneath) of electrical equipment of HPPs and TPPs, as well as samples of water from the near-by water basins and flowing rivers and studied for the residual amounts of PCBs. In order to reveal PCBs, totally 276 samples of soils, water, bottom sediment, food-stuffs were analyzed for PCBs content.

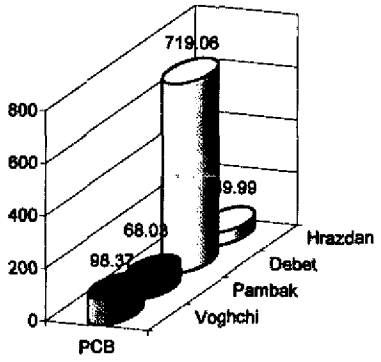
In soil samples from the territory of hydro- and thermal power plants the residual amounts of PCB were determined to amount up to 929.0 mcg/kg.

Figure 2: Average PCBs content in soils adjacent to transformers and oil facilities of HPPs & TPPs: Armenia 2002-2003 (mcg/kg)



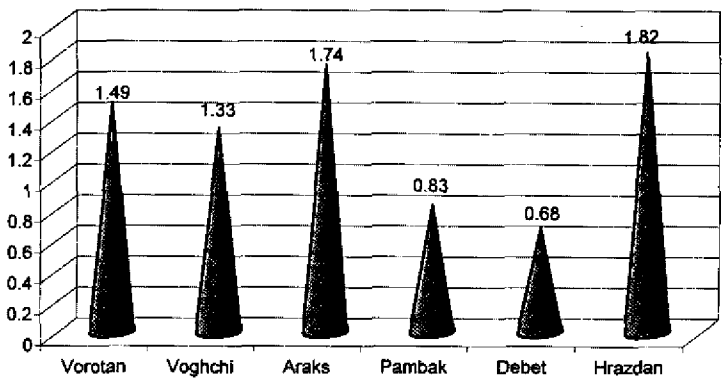
In samples of bottom sediments PCB residues were determined to amount 719.1 mcg/kg.

Figure 3: Average PCB content in bottom sediments: Rivers of Armenia, 2002-2003 (mcg/kg)



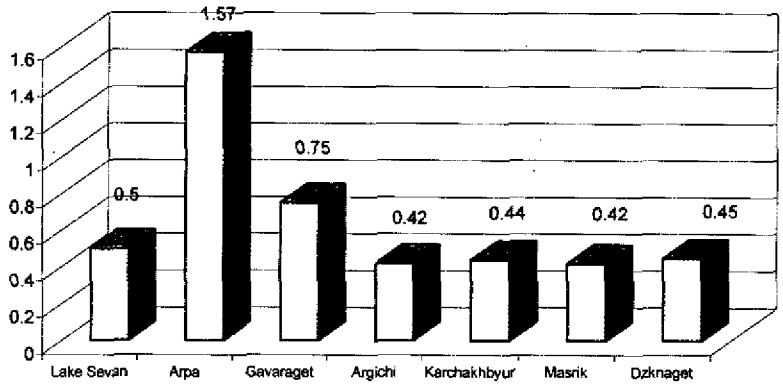
In samples of surface waters the levels of PCB determination ranged 0.68-1.82 mcg/L.

Figure 4: PCB Content in surface waters: Rivers of Armenia, 2002-2003 (mcg/L)



In waters of Sevan Lake and rivers feeding it the residual amounts of PCBs were determined up to 1.57 mcg/L.

Figure 5: PCB content in waters of the Lake Sevan and Rivers feeding it: Armenia, 2002-2003, mcg/L



2.3.3 Assessment with respect to Annex B chemicals (DDT)

In Armenia until 1980 Chlorobenzene was manufactured on the bases of such industrial enterprise as "Nairit" plant and was mainly used as solvent. Production of Chlorobenzene annually made 6,000 tons. Chlorobenzene was also initial /raw material for production of DDT, the limited amounts of which were manufactured until 1962 at "Khimreactiv" ("Chemical Reagents") plant for application in Armenia only: production made 50 tons per year.

Since 1970, DDT application was prohibited in the Former USSR and in Armenia as well. However, there is an evidence of illegal/ illicit use of POPs pesticides by owners of small- and medium size farms in Armenia.

Despite the prohibitive actions taken, the residual amounts of DDT continue to be revealed in environmental media (soil, surface water, water of Sevan Lake), foodstuffs and human organism. According to data of the Monitoring, the frequency of POPs (Lindane, DDE) determination made 87-97 % in samples of breast milk taken from feeding mothers in rural regions of Armenia.

Figure 6: Average POPs concentrations in breast milk: female inhabitants of rural region, Armenia,1993-2001, mg/L

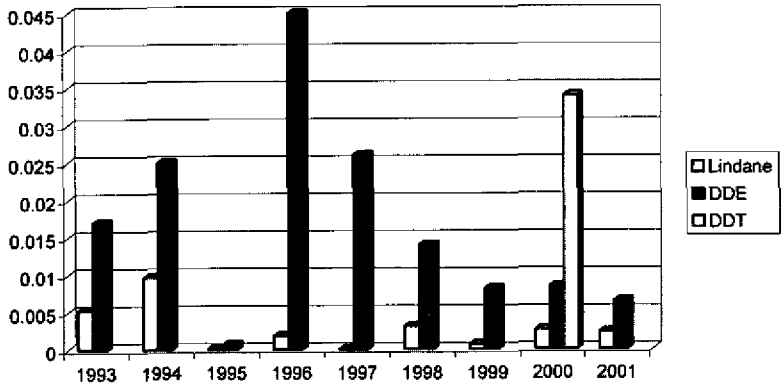
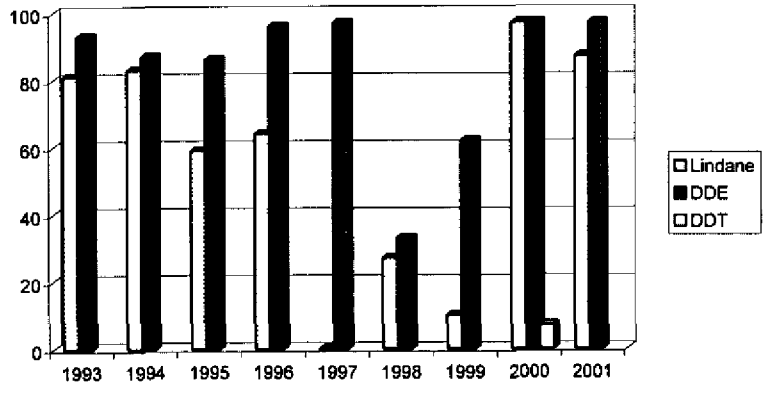


Figure 7: POPs determination frequency in breast milk, Armenia, female inhabitants of rural region, Armenia,1993-2001, %



Monitoring studies were carried out in order to determine the levels of POPs residues in foodstuffs of animal origin.

POPs content was determined in meat, eggs, milk, and cheese from Syunik, Ararat, Armavir, Aragatsotn, and Lori marzes (regions) of the Republic of Armenia. The above mentioned foodstuffs were taken from private farms. Meat (beef and pork) was bought at the markets of the above-mentioned regions. Samples of traditional (brine) Armenian cheese were taken from fat and low-fat kinds prepared from cow and sheep milk (Tables 2.15-2.19).

Table 2.15: Average POPs content in eggs, 2002-2003, mcg/kg

Sampling site	Heptachlor	Σ HCH	Σ DDT	HCB	PCB
Syunik, Megri district	NR*	1.72	6.03	0.26	NS**
Lori, Alaverdi district	0.04	0.12	0.48	1.47	2.78
Lori, Gugark district	0.006	0.07	0.75	0.41	1.61
Ararat, Artashat district	NR	1.53	2.29	0.04	NS
Armavir, Echmiadzin district	NR	0.71	2.29	4.53	NS
Aragatsotn, Ashtarak district	NR	1.01	2.46	NR	NS

*Hereinafter: NR - not revealed; **NS - not studied

As it is obvious from data presented in the table, all investigated pesticides are present in eggs. The findings also testify to fresh application of DDT and HCH.

At present sources of Heptachlor penetration in the environment are not cleared out. Some data is available that in some countries this compound is used in a cable industry (as an insecticide). Heptachlor is not applied in Armenia.

Hexachlorobenzene was found out in almost all investigated egg samples that testifies either to the use of this compound in agriculture of Armenia, or to the presence of conditions favorable for its penetration into the environment from other sources containing Hexachlorobenzene.

It is necessary to note that samples of beef and pork were taken for analyses of meat. Such an approach to sampling allows us to compare data depending on type of meat, as different types of meat contain different amount of fat and, appropriately, different concentrations of POPs.

Table 2.16: Average POPs content in samples of meat, 2002-2003, mcg/kg

Sampling site	Heptachlor	Σ HCH	Σ DDT	HCB	PCB
Syunik, Meghri district	0.22	2.15	5.24	0.86	NS
Lori, Alaverdi district	0.024	1.57	1.1	0.43	13.86
Lori, Gugark district	0.28	0.72	2.97	2.72	25.74
Ararat, Artashat district	NR	1.76	1.19	0.07	NS
Armavir, Echmiadzin district	0.38	0.45	1.27	NR	NS
Aragatsotn, Ashtarak district	3.31	1.5	4.63	0.66	NS

Likewise, the study on eggs, all tested POPs were also revealed in samples of meat. It was stated that pork, as fattier sample of meat contains higher levels of POPs, as compared to samples of beef. This phenomenon is more precisely expressed in researches for PCBs contents in meat.

Samples of milk and cheese were selected and taken from country farms. Data is presented in Tables 2.17-2.18.

Table 2.17: Average POPs content in samples of milk, 2002-2003, mcg/L

Sampling site	Heptachlor	Σ HCH	Σ DDT	HCB	PCB
Syunik, Meghri district	0.06	1.61	2.657	0.21	NS
Lori, Alaverdi district	NR	0.58	0.42	0.10	5.15
Lori, Gugark district	NR	0.17	0.29	0.025	4.53
Ararat, Artashat district	NR	2.3	2.61	0.07	NS
Arnavir, Echmiadzin district	NR	0.4	0.37	NR	7.45
Aragatsotn, Ashtarak district	0.10	0.1	0.48	NR	NS

Table 2.18: Average POPs content in samples of cheese, 2002-2003, mcg/kg

Sampling site	Heptachlor	Σ HCH	∑ DDT	HCB	PCB
Syunik, Meghri district	NR	3.59	12.73	0.66	NS
Lori, Alaverdi district	NR	1.11	0.64	11.09	11.94
Lori, Gugark district	NR	0.63	2.92	4.63	63.86
Ararat, Artashat district	0.15	2.85	0.85	0.1	NS
Arnavir, Echmiadzin district	NR	3.83	0.35	NR	NS
Aragatsotn, Ashtarak district	NR	5.83	3.37	4.22	NS

The results of study on samples of cheese have shown that residual amounts of Persistent Organic Pollutants are found out in almost all samples, except Heptachlor, which was determined only in one case (in a sample taken from Artashat district).

For a comparative hygienic evaluation of data obtained on pollution of animal origin foodstuffs, we present below data obtained as a result of 1970 monitoring study of foodstuffs of animal origin (Table 2.19).

Table 2.19: DDT levels in some foodstuffs of animal origin, Armenia, 1970, mcg/kg

Foodstuffs	Pesticide	Number of regions involved in study	Average content in positive samples	Average content in samples	Pesticide Detection % in samples
Eggs	DDT + DDE	15	0.77	0.72	92.4
Meat, meat products	DDT + DDE	15	0.32	0.24	92.4
Milk, dairy products	DDT+ DDE	15	0.24	0.15	92.4
Foodstuffs of animal origin	HCH	15	0.104	0.038	36.4

As in scientific publications data is available on the pollution of drinking water by pesticide residues (DDT, HCH) and PCBs, we decided to study the content thereof in drinking water supply systems of Yerevan, Vanadzor and Akhtala. Findings obtained as a result of these studies are presented in Table 2.20.

Table 2.20: Average POPs content in samples of drinking water from Yerevan, Vanadzor, Akhtala, 2003, mcg/L

Sampling point	Heptachlor	Σ HCH	Σ DDT	HCB	PCB
Yerevan	NR	0.0028	0.0013	0.0028	0.37
Vanadzor	NR	0.01	NR	0.005	0.063
Ahtala	NR	0.003	NR	NR	NR

Data given above testify that the water supply system is polluted by pesticides and PCBs. For comparison see below information obtained due to 1970 monitoring of artesian wells pollution by organochlorine pesticides (Table 2.21). In Ararat Valley of the Republic of Armenia 23 artesian wells were selected. Water sampling was performed in 2 levels: up to the depth of 15-20 m and at level of 15-20 m.

Table 2.21: Average DDT content in water samples from artesian wells in Ararat Valley, 1970, mcg/L

Water	DDT (at the level of 15-20m)	DDT (up to 15-20 m)	% of determination
Series 1	0.11	0.2-0.5	100
Series 2	0.07	-	45.4

It should be mentioned that, on the main, the revealed levels of POPs residual amounts in environmental media (soil, surface waters), foodstuffs of both plant and animal origin are mainly within the limits of hygienic standards.

2.3.4 Assessment of releases from unintentional production of Annex C chemicals (PCDD/PCDF, HCB and PCBs)

It is known that unintended generation and emission of polychlorinated dibenzo-p-dioxins (PCDD) and dibenzofurans (PCDF), Hexachlorobenzene (HCB), and polychlorinated biphenyls (PCB) takes place during the thermal processes in presence of organic matter and chlorine as a result of incomplete burning and chemical reactions.

In order to obtain background information on types of economic activity in the Republic of Armenia, as well as to reveal and evaluate the processes and branches, which are potential sources of dioxins and furans releases into the environment, the analysis was performed at 354 industrial enterprises of Armenia.

Taking into account the technology level of enterprises functioning in Armenia, as well as the state of technological equipment, the factors of emission were characterized. Quantitative characteristics of sources of dioxin/ furan releases was done in accordance with the "Standardized Toolkit for identification and Quantification of Dioxin and Furan Releases" prepared by UNEP Chemicals.

Quantitative evaluation on intensity of sources of releases was done by means of calculations. Data obtained for releases of dioxins/furans are presented as g TEQ/year (Tables 2.22-2.23).

Table 2.22: Comparative data on PCDD/PCDF calculated emissions in the Republic of Armenia, g TEQ/ year

Year	Air	Water	Soil	Produce	Residue	Total
1998	2,1449	16.475	-	0.0629	30.2772	48,96
1999	1.8163	11.165	-	0.0187	21.6582	34,6582
2000	28.355	12.415	43.346	0.0283	65.8140	149,9583
2001	5.4868	5.269	0.834	17.5	22.9388	52,0286

As it is obvious from the Table, in 2000 emissions of PCDD/DF were observed above the "peak" (150 g TEQ/year); this latter was explained by industry increase evident since late 1999.

Based on the performed preliminary evaluation of industry and certain branches, it was revealed that in Armenia there are a number of categories of sources of unintentional generation and emission of dibenzo-p-dioxins and dibenzofurans, Hexachlorobenzene, and polychlorinated biphenyls. Main sources are as follows:

- Thermal processes in metallurgy industry/ metal manufacture
  - Production of ferrous metals;
  - Production of non-ferrous metals (copper, aluminum);
- Chemical industry;
- Cement production;
- Lime production;
- Glass production;
- Asphalt mixing/ production;
- Burning of fossil fuel (HPPs, boiler departments of communal/ municipal engineering facilities);
- Uncontrolled ignition/ inflammation of wastes at dumps, etc.

The preliminary analysis of industrial activity of enterprises of the Republic of Armenia allowed to evaluate the potential sources of PCDD and PCDF releases, as well as to obtain real view and to evaluate the scales of releases/ emissions of these substances from all the identified and quantified sources during the period of 1985-2001.

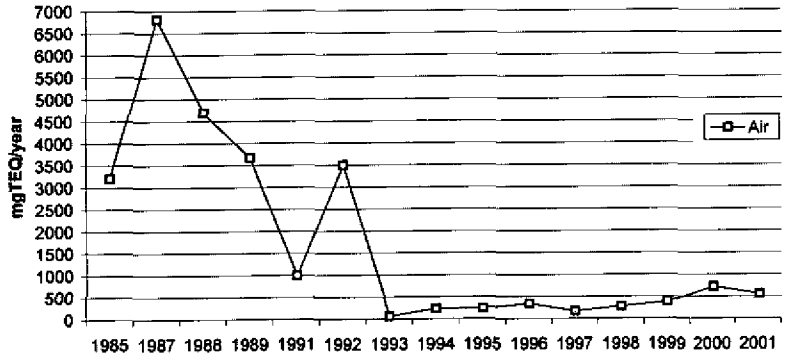
The figures below reflect the levels of dioxin/furan releases into air and residue in case of burning/combustion of hazardous wastes (wastes from chloroprene and acetylene production) in a period of 1985-2001.

Table 2.23: National Register on Calculated Releases of PCDDs/PCDFs in the Republic of Armenia

Part	Source Categories	Annual Emissions (g TEQ/year)									
		2001					2000				
		Air	Water	Soil	Product	Residue	Air	Water	Soil	Product	Residue
I	Ferrous and non-ferrous metal production	1.601	-	-	-	0.666	1.533	-	-	-	0.811
II	Production of mineral products	0.0899	-	-	-	0.0008	0.0957	-	-	-	0.0007
III	Production of chemicals, Consumer goods	-	-	-	17.5	-	-	-	-	0.0283	-
IV	Miscellaneous	0.075	-	-	-	0.165	0.0002	-	-	-	-
V	Waste combustion	0.5469	-	-	-	1.406	0.7155	-	-	-	1.8401
VI	Uncontrolled combustion processes	3.174	-	0.834	-	0.834	25.99	-	43.346	-	43.346
VII	Disposal (Landfill)	-	5.269	-	-	19.867	-	12.415	-	-	19.8
VIII	Power generation and heating	No data	No data	No data	No data	No data	0.021	0	0	0	0,0162
	TOTAL	**5.4868**	**5.269**	**0.834**	**17.5**	**22.9388**	**28.355**	**12.415**	**43.346**	**0.0283**	**65.8140**

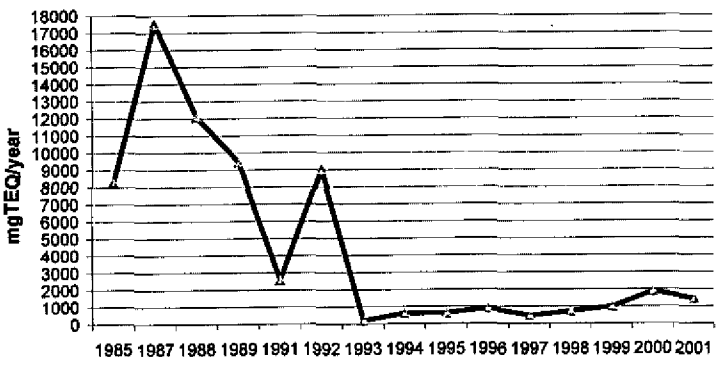
Part	Source Categories	Annual Releases (g TEQ/year)									
		1999					1998				
		Air	Water	Soil	Product	Residue	Air	Water	Soil	Product	Residue
I	Ferrous and non-ferrous metal production	1.326	-	-	-	0.484	1.131	-	-	-	0.69
II	Production of mineral products	0.0968	-	-	-	0.0009	0.0631	-	-	-	0.001
III	Production of chemicals, Consumer goods	-	-	-	0.0187	-	-	-	-	0.0629	-
IV	Miscellaneous	0.0003	-	-	-	-	0.0002	-	-	-	-
V	Waste combustion	0.3722	-	-	-	0.9571	0.2696	-	-	-	-
VI	Uncontrolled combustion processes					No data					
VII	Disposal (Landfill)	-	11.165	-	-	20.2	No data	16.475	No data	No data	29.00
VIII	Power generation and heating	0.021	0	0	0	0.0162	0.021	0	0	0	0.0162
IX	Transport	No data	No data	No data	No data	No data	0.66	0	0	0	0
	TOTAL	**1.8163**	**11.165**	**-**	**0.0187**	**21.6582**	**2.1449**	**16.475**	**-**	**0.0629**	**30.2772**

Figure 8: Emission of Dioxins/Furans into Air in case of hazardous wastes combustion, 1985-2001



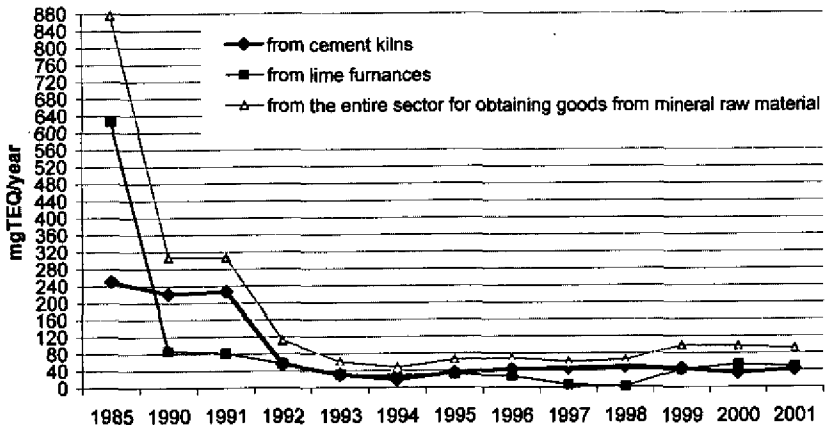
Maximum PCDD/PCDF release in case of burning of hazardous wastes was registered in 1987 (6.8 g TEQ/ year into air and 17.5 g TEQ /year in residue). However, since 1993, the level of releases never exceeded 1g TEQ/year.

Figure 9: PCDD/PCDF Emission in Residue (due to burning hazardous wastes), 1985-2001



Production sites of cement and lime were the main sources of PCDD/PCDF releases in Armenia. In 1985 releases from these sources made 875 mg TEQ/year, while in 1999 it was 96 mg TEQ/year.

Figure 10: PCDD/PCDF Releases from the Facilities for Production of Goods from Mineral Raw Material, 1985-2001



During the last 10-15 years it is observed that the industrial enterprises of Armenia are functioning at no full-scale capacity, bringing forth significant decrease of POPs releases from industrial sources.

However, similar tendency is not characteristic for non-industrial sources, for example, such as household burning of fossil fuels (gas, timber), burning of wastes, tyres at home, etc.

Due to energy and economical difficulties of the recent 10-15 years the prevailing majority of population was forced to warm up apartment houses by any burning material, in particular, paper, timber, domestic wastes, kerosene, diesel-fuel oil, plastics, footwear, clothing, tyres, various technical (mineral) oils, including worked out oils, rubber, etc. The majority of schools use kerosene or diesel oil for heating the classrooms. All this causes extreme worsening of in-door air quality, as well as air pollution by dioxin/furan emissions.

At present, the ratio of industrial and non-productive sources is more and more shifted towards significant increase of releases from non-industrial sources.

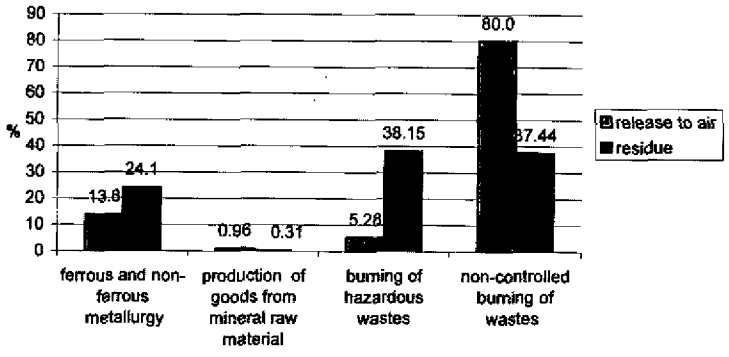
According to assessment/ evaluation of 2000-2001, uncontrolled burning of wastes is the main source of PCDD/DF emissions to air; it makes 58.2-91.8% of summary annual volume of PCDD/DF emissions (Table 2.24).

Table 2.24: Calculated annual PCDDs/ PCDFs Releases to Air (%)

Sources	2000	2001
Production of ferrous and non-ferrous metals	5.41	28.9
Production of goods from mineral raw materials	0.34	1.62
Burning of wastes	2.53	9.89
Uncontrolled processes of burning	91.84	58.17
Miscellaneous	0.0002	1.35
Production of electric and thermal energy	0.021	No data available

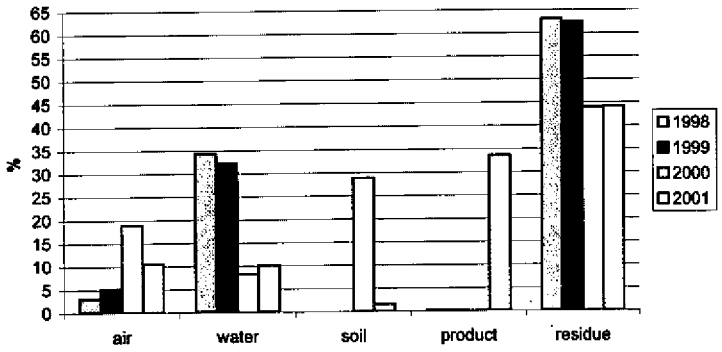
The analysis of PCDD/PCDF releases distribution according to main sectors of industry also revealed that the highest emission levels are observed in case of uncontrolled burning of wastes.

Figure 11: Dioxin / Furan Emissions: Distribution according to Major Sectors of Industry (average values, 1998- 2001)



The analysis of PCDD/PCDF emissions distribution according to environmental media demonstrated that the main part belongs to residues of production.

Figure 12: Dioxin/Furan Emissions: Distribution according to Environmental Media



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

The problem of polluted areas and stocks of inappropriate pesticides, including obsolete/expired pesticides is of top-priority for the Republic of Armenia. The available preliminary data testify to various degrees of pollution at the territory of Armenia by persistent organic pollutants (organochlorine pesticides, PCBs), as well as on the presence of stocks of obsolete/expired pesticides unsuitable for application, including those from the class of organochlorine compounds.

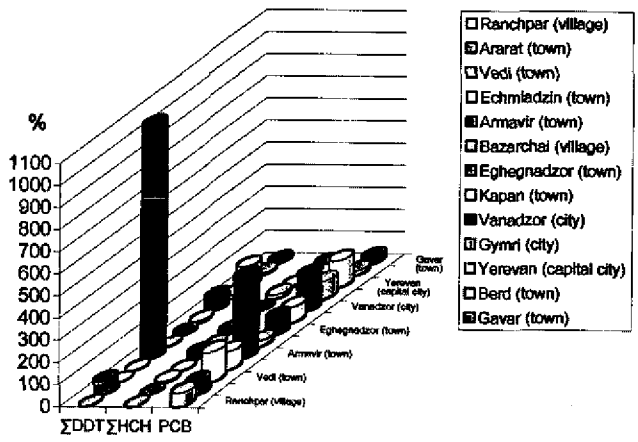
The territories of the enterprises of energy power sector (SRPPs, HPPs) and adjoining sites are mostly polluted. Territories of urban and village dumps are also polluted, the number of such dumps achieves 474 (excluding unorganized places of waste dumps). According to data of the Ministry of Health in Armenia now there are 45 urban and 429 village waste dumps, which, in the majority, do not correspond to the sanitary requirements: that is all urban and 368 village dumps.

Table 2.25: PCBs in soils of waste dumps (2002-2003, mcg/kg)

No.	Location of the dump site	PCB levels (mcg/kg)
1.	Ranchpar (village)	63.327
2.	Ararat (town)	59.404
3.	Vedi (town)	137.863
4.	Echmiadzin (town)	84.623
5.	Armavir (town)	369.877
6.	Bazarchai (village)	25.817
7.	Eghegnadzor (town)	79.362
8.	Kapan (town)	72.354
9.	Vanadzor (city)	163.643
10.	Gyumri (city)	81.821
11.	Yerevan (capital city)	123.292
12.	Berd (town)	22.340
13.	Gavar (town)	29.384

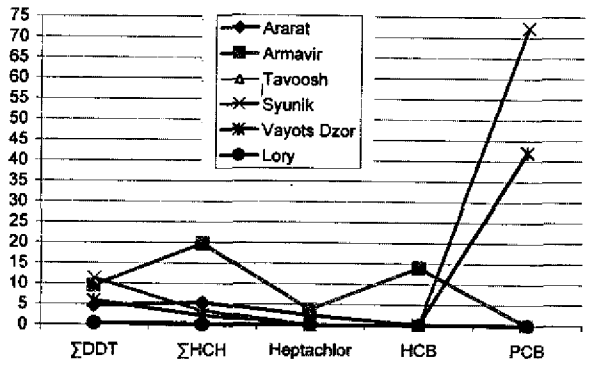
The results of soil monitoring performed at waste dumps located in different regions of Armenia signify to presence of PCB residual amounts, which vary in the range of 22.3 - 369.9 mcg/kg (Table 2.25).

Figure 13: POPs residual amounts in soils of waste dumps, mcg/ kg



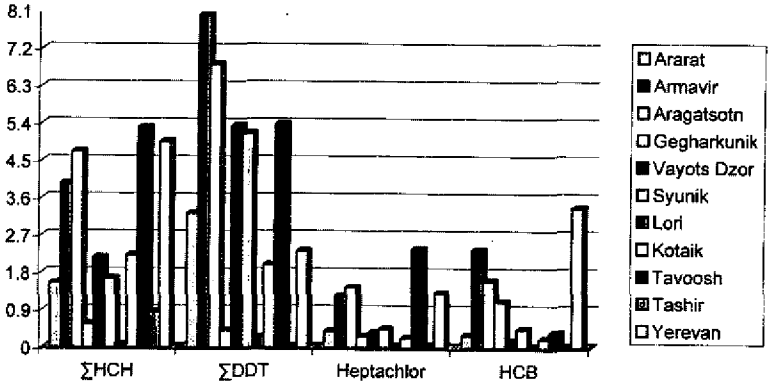
Besides, till 1990s there were more than 600 warehouses of chemical means of plant protection "Armselkhozkhimia" ("Armenian Agricultural Chemistry"), at which pesticides were stored and wherefrom these chemicals were distributed to facilities/farms. Data of monitoring on soils of the territories of former warehouses (premises) testify to the presence of residual amounts of Organochlorine Pesticides in soils of these territories.

Figure 14: POPs residual amounts in soils of former pesticide warehouses, 2002, mcg/kg



On the average, the levels of organochlorine pesticides revealed in soils are not high. However, the problem is that monitoring was not held at all the contaminated sites. Therefore, it is necessary to perform a comprehensive inventory of POPs contaminated areas in order to have their appropriate ranking/ rating.

Figure 15: Residual amounts of organochlorine pesticides in soils of marzes /regions of Armenia, mcg/ kg



At present the state of contaminated territories (areas of enterprises of energy complex, waste dump sites, former pesticide storehouses) is of high importance for Armenia. Both organized and non-organized waste dump sites, which are scattered all over the territory of Armenia present themselves sources of environmental pollution by dioxins/ furans; this latter cannot but cause alarm and concern. Due to periodically occurring foci of low-temperature ignition and smoldering of wastes followed by generation of dioxins/ furans, these areas present hazard.

Owing to the fact that at present final disposal (burying) of hazardous wastes at the municipal dumps is the most prevalent mode for their disposal, these dump sites scattered all over the territory of Armenia can be considered anthropogenically emerged "hot spots".

From contaminated areas POPs penetrate to different environmental media (ground and surface waters, air), plants, agricultural produce, and then by trophic chains POPs residues penetrate into human organism.

The problem of banned and obsolete pesticides became urgent already since late 1970s, when there arose the problem of elimination/withdrawal of banned and obsolete pesticides (mainly organochlorine ones) accumulated at the territory of Armenia. In early 1980s the special place was approved and allotted for pesticides burial near Bardzrashen village. At the territory of the organized burial place about 500 tons of obsolete pesticides were buried (finally disposed), of which the volume of banned organochlorine pesticides made 250 tons.

The complexity of the problem dealing with the obsolete pesticides burial is worsened by the fact that the site allotted for burial is located in the zone of active landslide processes, which can cause damage/crippling and a possible "breakthrough" of the contents ("innage") and subsequent penetration of residues of buried obsolete pesticides, including organochlorine ones, into the environment resulting in environmental pollution.

In order to take measures on improvement of ecological situation in the vicinity of the burial a preliminary evaluation was performed on the costs of activity required for ensuring the ecological safety of the burial.

As a result of the activity performed by the Ministry of Nature Protection there was prepared and then approved the Decision of the Government of the Republic of Armenia "On approval of a list of measures ensuring safety of pesticides burial and assigning financial resources of state budget of the Republic of Armenia for FY 2004" (No. 526-A of April 22, 2004). Implementation of measures was entrusted to the Department of Emergency Situations at the Government of the Republic of Armenia, to which in accordance with the approved Decision 8 504.7 thousand AMD will be assigned at the expense of the reserve fund of the Government of the Republic of Armenia.

Coordination and control on implementation of measures is laid on the Ministry of Nature Protection of the Republic of Armenia.

The List of measures ensuring safety of pesticides burial embraces the following:

1. Study on the landslides at the territory neighbouring with the burial of obsolete pesticides;

2. Study aimed to examine the concrete construction of the burial of pesticides and determine its integrity;

3. Fencing of the burial of obsolete pesticides and reconstruction of drainage/ water catchment system around it;

4. Study on contamination of soils and ground waters adjacent to the burial.

Solution of the problem on remediation of polluted areas and wastes dump sites is of prime significance and urgency for Armenia. The problem is more than serious due to the fact that its solution requires a continuous period of time and is complicated by the limited financial resources.

At present, the following is urgent for the Republic of Armenia:

- Identification/ clarification of the amounts of obsolete pesticides stocks on the territory of Armenia;
- Resolving the problem of ecologically sound final disposal of obsolete pesticides;
- Cessation to exploit PCB-containing oils and equipment;
- Remediation of contaminated areas (dump sites, former storehouses of pesticides);
- Restoring the integrity and ensuring safety of the burial.

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

At present, in the Republic of Armenia there does not exist and it is not planned to create industrial capacities on manufacture of chemical substances listed in the Annexes A and B. The application of these substances: DDT, Aldrin, Dieldrin and Heptachlor was forbidden in different years, beginning with 1970.

In Armenia since 1994, there arose an unfavourable epidemiological situation, when cases of such disease as malaria were registered, which initially bore external ("imported") character, but by 1997 have got a character of epidemic outburst and have captured almost one third of the territory of the country. Treatment of open water reservoirs and premises was used as antiepidemic measure for prevention and control of malaria. Despite the complex situation in the Republic of Armenia in concern of malaria prevalence, DDT was not used for fight with disease carriers. Solfat was used for treatment/decontamination of premises, Alfa-cypermethrin was applied for sheds, and bactoculicide was used to treat open water reservoirs.

Proceeding from this, at present the Republic of Armenia has no requirements for submission of the written notice for registration of any specific kind of exemptions for chemical substances listed in the

Annexes A or B according to provisions of the Stockholm Convention, Article 4 "Registry of specific exemptions".

2.3.7 Existing programmes for monitoring releases and environmental and human health impacts

The functions to implement programs on monitoring and study of the impact of various chemicals, including organochlorine ones, on human health and the environment is stated in authorized documents of the Ministry of Nature Protection and Ministry of Health, as well as in those of a number of research institutes.

However, due to the existing complicated socio-economic conditions of the period of transition, as well as lack of financial and technical resources the volume of environmental researches performed recently has extremely narrowed, even carrying-out special programmes aimed at monitoring and study of the impact exerted to human health and the environment became difficult.

Such a situation is explained by the fact that owing to deterioration of financial position and, connected to it, weakening of analytical / technological basis, the scope of supervision was strongly limited in concern of persistent organic pollutants, in particular of the residues of organochlorine pesticides and their metabolites. During the last years, actually no monitoring studies on POPs were carried out; therefore, no up-dated information was available on the levels of pollution of soils, surface waters, and foodstuffs by POPs for the last years.

The research institutes carry out scientific investigations to study the harmful influence of some groups of chemicals used in manufacture and agriculture (pesticides) on human health. The volume of performed researches is also limited for the known reasons of insufficient financing.

Study on the current status of the environment and gathering of the newest up-dated information on existing levels of pollution by POPs all over the Republic of Armenia became possible due to implementation of the National Project on Persistent Organic Pollutants carried out jointly with UNIDO.

Within the frames of this Project monitoring studies were carried out for the residual amounts of polychlorinated biphenyls and organochlorine pesticides in environmental objects (surface waters, soil, and bottom sediments), foodstuffs and breast milk samples taken from inhabitants of rural areas of Armenia. Within the frames of the above-mentioned project POPs impact on the state of human health was also investigated, the analysis performed in concern of the influence of organochlorine pesticides on health status of the inhabitants of rural area of the country, and analysis of the influence of dioxins and furans on a status of health in workers from an enterprise manufacturing chloroprene rubber.

In order to determine POPs content in different environmental and biomedia 504 samples were taken, of which 228 were analyzed only for residues of organochlorine pesticides and 35 samples for PCBs, while the rest 241 samples were studied for the residues of both organochlorine pesticides and PCBs.

Within the frames of the Programme 745 analyses were performed: 469 samples were analyzed for residues of organochlorine pesticides and 276 samples for PCBs.

The results of monitoring performed on residual amounts of POPs in water and ecosystem of Lake Sevan, surface waters, soil, foodstuffs, bio-media (breast milk) testify to their continuing circulation in environmental objects (media) and biomaterial (bio-media). The residual amounts of determined POPs are insignificant; however, chronic long-term exposure to and intake by human organism can become the reason of morbidity increase in population, the clinical manifestation of which, due to polytropic character of the effect exerted by pesticides, including organochlorine pesticides, is non-specific and is hardly diagnosed. Therefore, it is important to study the health status of population of Armenia in concern of pesticides application, in particular of organochlorine ones.

Summary results of epidemiological studies and available clinical data testify to unfavourable impact of persistent organic pollutants on health status in professional workers, in particular, workers of chloroprene, mining and smelting production in Armenia.

However, for development and realization of the national strategy on minimization and liquidation of POPs, in order to make the final decisions and to carry out measures on improvement of the environment it is necessary to perform long-term researches and study both the presence of POPs and their levels in human organism and environment, as well as POPs impact on human health and the environment.

According to Article 11 of the Stockholm Convention "Research, development and monitoring" the Parties within the frames of their capabilities should carry out the appropriate scientific research & development, monitoring in concern of persistent organic pollutants. The successful realization of similar researches will be promoted by the use of experience gained in the given area by the developed countries, as well as obtaining the technical assistance for national capacity building and strengthening.

2.3.8 Current level of information, awareness and education among target groups; existing systems to communicate such information to the various groups; mechanism for information exchange with other Parties to the Convention

Modern-day level of knowledge in general public concerning the potential risk associated with chemicals and wastes, including POPs, is insufficient and require further raising.

In the system of higher education certain issues dealing with POPs are involved in the scope of curricular of state and non-state operated institutes of higher education of Armenia.

Primary knowledge on POPs is obtained at the level of moderate ecological education in the process of learning such subject as chemistry, which is most likely of a general character.

At the pre-school level no analogous education related to ecology and POPs is carried out. At this level family upbringing of children and formation of new mentality on ecologically clean nutrition and healthy life-stile in parents are more important.

No education embracing POPs problems and programming maintenance at the level of post-graduate ecological education and training of general public is performed. This is mainly conditioned by the fact that the structure of continuing and consistent, step-by-step ecological education is not ultimately formed. However, in the Republic of Armenia there are all the necessary legal/legislative and scientific and educational prerequisites for efficient use of national capacities and the potential to raise the knowledge and awareness in general public, various professional groups, scientific and technical personnel.

Various groups of population: both occupationally exposed cohorts and those having no professional relation to issues relevant to manufacturing / application of chemicals and wastes (workers, farmers, students, schoolchildren, women) are ill-informed/ unaware and have no sufficient information on the unfavourable impact of various chemicals and pesticides, as well as on the consequences of their improper application to the status of human health and environment.

Therefore, it is necessary to raise the level of awareness in general population, and, first of all, in occupationally concerned groups - workers and farmers, in respect of such issues as measures and safety precautions at work with chemicals and pesticides, to raise knowledge and awareness of public concerning the risks for environment and health, which can be posed by chemicals and wastes, including POPs.

In order to improve the situation it is necessary to prepare and include in educational programs of schools and higher educational institutions subjects dealing with issues on harmful impact of hazardous chemicals, including POPs, on human and environmental health and, carrying-out special educational and training programmes for wide layers of population.

Development and realization of educational and socio-educational programs relevant to POPs, as well as their consequences and alternatives for human health and environment, especially for women, children and least educated persons will promote also awareness raising and education of general public.

Materials dealing with issues on management of chemicals and wastes, in particular, that of POPs in Armenia are periodically published in mass media. However, such information carries irregular character. Similar problems require wide coverage in periodical publications, as well as in TV and radio programmes.

In order to achieve knowledge increase in owners of small and medium-size farms of the Republic, it might be rather useful to organize and carry-out special socio-educational training programs on safety/security measures of work with chemical plant protection means, acquaintance with possible/probable symptoms of poisoning due to handling of pesticides, measures of poisonings prevention, rendering first medical aid. The increase of knowledge both in workers, and general public will be promoted also by preparation and publication of popular scientific - methodical and visually evident materials.

Certain work on public awareness raising in concern of potential risk, health and safety challenges relevant to chemicals and wastes, in particular with POPs, is carried out by NGOs, which have active participation in discussions and decision making of POPs problems in Armenia.

However, it is necessary to allocate questions of chemicals and wastes management, in particular, POPs management, in a separate nation-wide problem of inter-sectoral, interdepartmental character. Raising POPs problem this way, would undoubtedly, promote attraction / enhancement of attention of the Government to the given problem.

Awareness raising on POPs challenges amongst concerned Ministries, Agencies/departments and general public at the national level would create favorable conditions for solution of questions, while the obstacles can be successfully overcome by joint efforts of the parties, involved in the given process.

2.3.9 Relevant activities of non-governmental stakeholders

At present more than 853 NGOs are registered, of which more than 159 organizations are engaged in problems of ecology and environment in Armenia.

The activity of the majority of non- governmental ecological organizations is aimed to facilitate preservation of healthy environment and natural resources, to promote its improvement and protection, to settle ecological problems, to promote increase of ecosystems stability, public awareness raising in concern of ecological problems, improvement of ecological education in general population.

Basic directions of activity performed by environmental NGOs are as follows:

- to render assistance for protection of human and environmental health against the harmful impact of hazardous chemical substances and wastes;
- to study the behaviour of hazardous chemicals and wastes in the environment and their impact on human health;
- to reveal sources of environmental pollution by hazardous chemicals and to take inventory thereof on the territory of Armenia;
- to gather information on amounts of hazardous chemicals in air, surface waters, foodstuffs and assessment of their impact on human health;
- to analyse the international experience in the field of processing, neutralization and destruction of wastes, collection of information on cleaner technologies and development of proposals/suggestions;

- to widely circulate the knowledge and information on adverse influence of hazardous chemicals and wastes on human and environmental health;
- to draw up and publish information materials, brochures and manuals about hazardous chemicals and wastes;
- to organize cooperation with international non-governmental ecological and scientific organizations.

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

In the Republic of Armenia, there functions the adjusted technical infrastructure for realization of versatile sanitary - chemical, sanitary - hygienic, analytic chemical researches, as well as researches on determination and identification of unknown chemicals. These researches are carried out by a number of accredited bodies of certification and accredited test laboratories.

In order to arrange sanitary - chemical, sanitary - hygienic, analytic chemistry researches, as well as in performance of the basic provisions of the Republic of Armenia Law "On maintenance of uniformity of measurements in the Republic of Armenia" the Department of standardization, metrology and compliance confirmation at the Ministry of Trade and Economic Development of the Republic of Armenia carries out accreditation of certification bodies for production, services, systems, quality, as well as test laboratories of various Ministries and Departments. In Armenia 20 bodies of certification and 93 test laboratories are accredited on the basis of data available from the Department of standardization, metrology and compliance confirmation.

The accredited laboratories carry out determination of the residual amounts of various chemicals, including, persistent organic pollutants (organochlorine pesticides, polychlorinated biphenyls) in environmental media (air, soil, and surface waters), foodstuffs and agricultural produce with the aim to prevent their possible adverse impact on human and environmental health.

It is necessary to note, that in the Republic there are highly qualified experts and the good methodical basis is established for realization of monitoring on POPs and PCBs in environmental and biological media. Proceeding from the long-term practice and work experience, the chemists-analysts have proved the choice of the scientific - methodical approaches for analytical researches performed, as well as current up-dated methods of laboratory researches on POPs in the objects of environment.

At the same time it is necessary to specify that the technical infrastructure of analytical laboratories, working in Armenia and conducting researches on assessment/ evaluation of POPs existing levels is already obsolete and requires perfection and radical improvement according to the international standards.

In this respect, the problem is brought in the foreground: equipment up-grading at the accredited test laboratories of various Ministries and Agencies by modern labware, devices, and chemical reagents, as well as accreditation/certification of the laboratories. Taking into account the urgency of POPs problem, strengthening of the technical infrastructure for assessment/ evaluation of levels of POPs-related pollution is especially important.

The necessity to radically strengthen the technical infrastructure for POPs assessment/ evaluation is justified/ indicated by the results obtained due to monitoring studies on determination of POPs residual amounts in environmental and biomedia, which testify to their proceeding circulation; this latter, undoubtedly, is a consequence of pollution of the territory of Armenia by POPs.

Therefore, with the purpose to create the constant system of environmental monitoring and to develop database it is expedient to organize the Central Analytical Laboratory on POPs for realization of the analysis and control over the state of environment. POPs Central Analytical Laboratory, the activity of which should be coordinated by the Ministry of Nature Protection of the Republic of Armenia, will carry out constant monitoring of POPs residual amounts in environmental and biomedia, foodstuffs, both imported to and exported from Armenia, that becomes especially urgent in connection with the accession of the Republic of Armenia to the World Trade Organization.

The establishment and equipment of analytical laboratory according to the international standards, as well as obtaining international accreditation would allow Armenia to participate in more successful cooperation with various international Programs and Projects on POPs problem.

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

The results of studies for residual amounts of organochlorine pesticides and PCBs in environmental media (surface waters, waters of Sevan Lake and rivers feeding it), as well as in food (meat, cheese, milk) produced in different regions of Armenia signify to their contamination by POPs. In particular: Lindane levels in water varied within the range of 0.02-0.38 mcg/L; DDT - 0.02-1.97 mcg/L. PCB levels in samples of food ranged 4.5 - 15.7 mcg/kg.

Figure 16: Organochlorine pesticides content in water samples of rivers, Armenia, 2002-2003, mcg/L

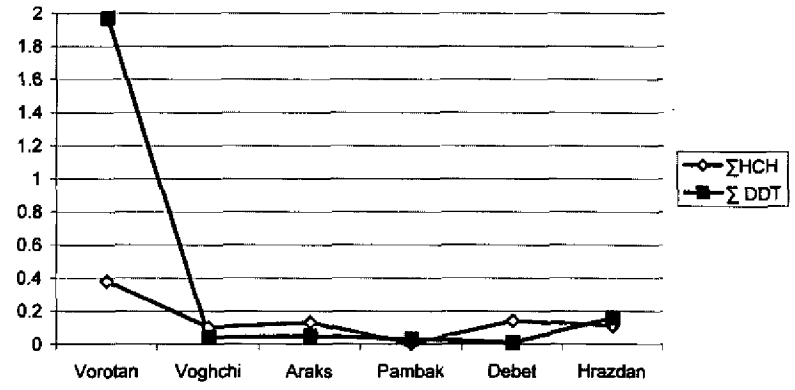


Figure 17: Organochlorine pesticides content in waters of Sevan Lake and rivers feeding it (2002-2003, mcg/L)

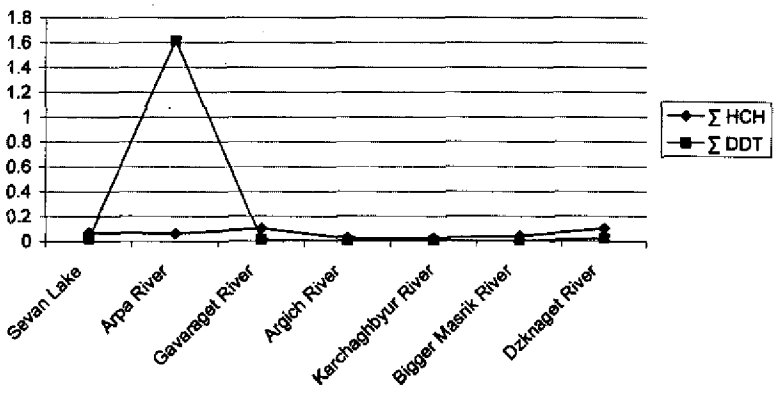


Figure 18: PCB content in samples of food, regions of Armenia, 2002-2003, mcg/kg

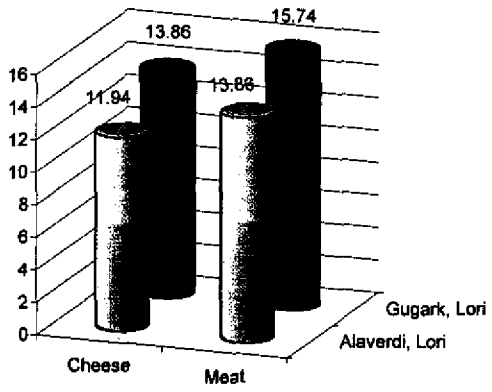
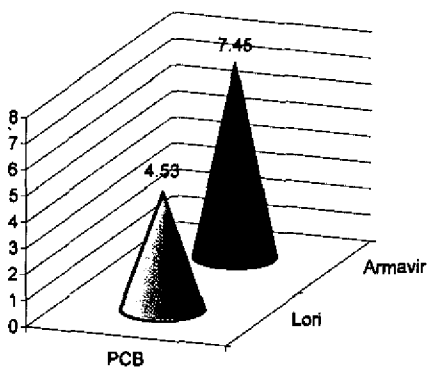


Figure 19: PCB content in milk according to regions of Armenia, 2002-2003, mcg/L



According to data available for 1988-1991, high level of correlation was revealed due to researches aimed to study the impact of pesticides on the health status in rural population of Armenia. The study was bases on the analysis of correlation dependence between the level of organochlorine pesticides application and the spread of diseases amongst population of agricultural regions, some environment-related diseases: bronchial asthma, neoplasms, and anomalies of development.

Research outcomes confirm the fact of unfavourable impact of the applied pesticides, in particular, of organochlorine pesticides on the health status of the inhabitants of agricultural regions of Armenia.

Highest level of correlation was revealed between the group "Organochlorine pesticides" and "Miscellaneous" and all population groups (adults, children) based on the analysis of obtained Spearman rank-order correlation coefficients for area and population loads (figures 20-21).

Figure 20: Dependence of area load and indices of disease spread/prevalence according to groups of pesticides (1988-1991, %)

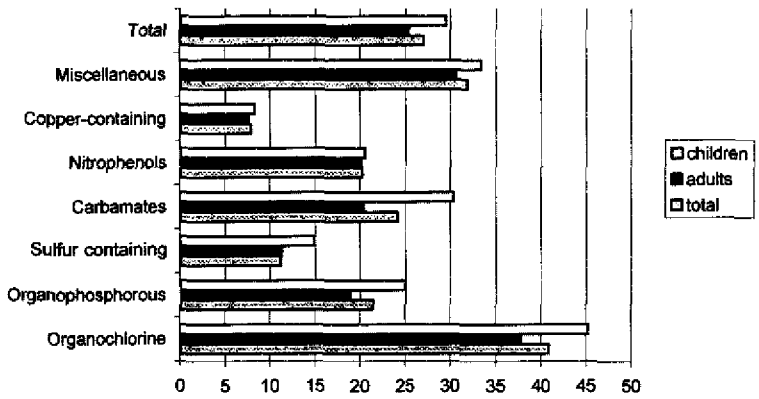
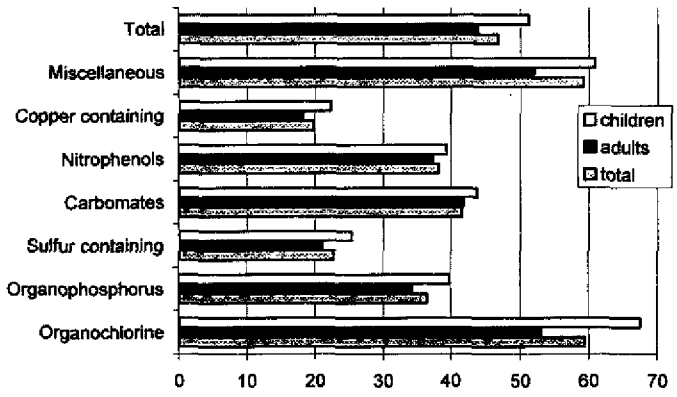


Figure 21: Dependence of population loads and indices of disease spread/ prevalence according to pesticide group (1988-1991, %)



In concern of the group of organochlorine pesticides the researches revealed also high confident relation with some environment-related diseases; moreover, correlation dependence with indices of area load is more expressed (Figures 22-24).

Figure 22: Correlation dependence of areal load and indices of environmental-related diseases by pesticide groups, 1988-1991, %

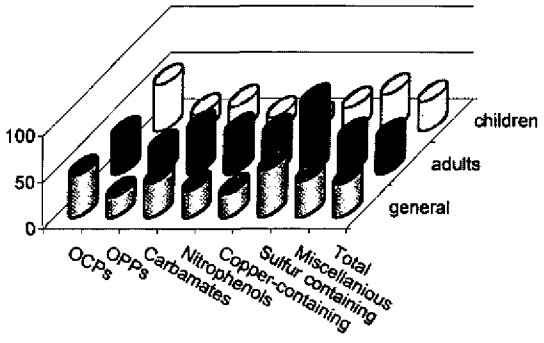


Figure 23: Correlation dependence of areal load and indices of environmental-related diseases by pesticide groups, 1988-1991, %

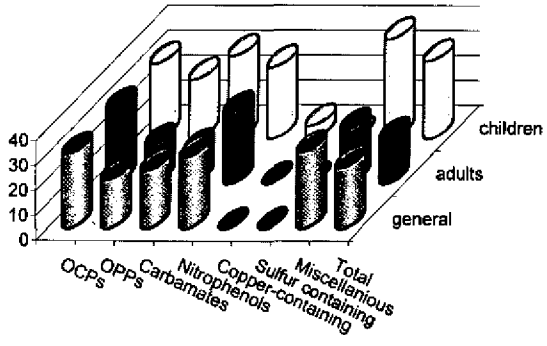
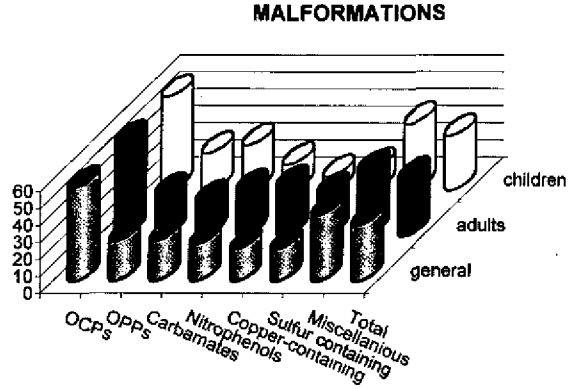


Figure 24: Correlation dependence of areal load and indices of environmental-related diseases by pesticide groups, 1988-1991, %



2.3.12 Details of any relevant system for the assessment and listing of new chemicals

The Republic of Armenia has no suggestions in concern of inclusion of new chemicals to Annexes A, B and/or C. No such suggestions are expected in nearest future.

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

Out of chemicals listed in Annexes A, B and C to Stockholm Convention, at present only PCBs are used in Armenia. Issues on evaluation and regulation of PCBs are presented in part 2.3.2.

3 STRATEGY AND ACTION PLAN ELEMENTS

3.1 Policy Statement

In order to meet basic provisions of Stockholm Convention the following activities are necessary for the Republic of Armenia:

- to develop and to carry out national strategy on POPs minimization and liquidation;
- to provide formation of the required regulating legal basis in the field of POPs management, including establishment of norms/ standards on the contents of dioxins/ furans, PCBs in various objects of the environment, emissions and discharges of the enterprises, in foodstuffs and forages;
- to expand information maintenance of bodies of state and executive authority, industrial enterprises supervising bodies, educational institutions, research institutes, public organizations, general population, mass media, trade unions and other social institutes by information materials about the threat of dioxins/ furans, PCBs and other POPs for human health and the environment;
- to develop the structure of POPs monitoring system on environmental media (atmospheric air, surface waters, soil and biota) in the Republic of Armenia;
- to ensure establishment of scientific-methodical and operational-industrial centres of monitoring (for sampling and analysis), having equipped their necessary devices and required equipment;
- to ensure realization of Inventory on the main sources of dioxins/furans and PCBs releases into the environment and, relying on the results obtained, to create a Database;
- to ensure unification of existing and newly developed techniques and standards and other regulating-engineering specifications for sampling/ selection and analysis of samples of environmental media for the contents of POPs according to methods accepted in the international practice;
- to develop regulating-legal basis for collection and storage of PCBs and PCB-containing equipment;
- to ensure State control on storage, transportation, utilization/ destruction of POPs;
- to facilitate the development of new methods (chemical, biological) for utilization/ recycling of PCBs: methods alternative to burning;

- to provide in State Budget funds/ financing for Research and Development (R&D) of scientific works in the field of POPs management;
- to provide and establish economic incentive mechanisms of stimulation of the subjects of economic activity (physical and legal persons), whose activity is directed at destruction / liquidation of POPs in ecologically sound manner;
- realization of obligatory certification of foodstuffs and raw material for POPs content;
- development of the Inventory/ Register on current and predicted emissions of POPs into the environment;
- development of Cadastre on production, distribution, use, import and export of POPs and wastes, polluted by POPs;
- development of Cadastre on POPs stocks and wastes, containing POPs, polluted territories and foodstuffs;
- development and implementation of ecologically cleaner production and technologies on POPs recycling / destruction;
- Establishment of the Cleaner Production Centre in Armenia;
- Broadening and strengthening international cooperation on POPs management, exchange of information obtained as a result of researches, engineering development, monitoring, BAT and BEP.

3.2 Implementation Strategy

Main strategic trends of the National Action Plan for implementation of Stockholm Convention in Armenia are as follows:

- Minimizing/ elimination of POPs releases into the environment; minimizing POPs impact on human health;
- Up-dating of the National Register on POPs releases in order to facilitate implementation of Stockholm Convention;
- Disposal/ liquidation of stocks of obsolete pesticides regulated by Stockholm Convention;
- Replacement of PCB-containing oils and their disposal/ destruction in environmentally sound manner, preferably using the non-combustion technologies;
- Replacement of PCB-containing equipment and its disposal/ destruction in environmentally sound manner;
- Application of BAT/BEP principles as background for development of the strategy for future industrial progress;
- Collection of additional data required for evaluation/ ranking of contaminated sites and carrying out remediation measures;
- Establishment of POPs Central Analytical Laboratory to perform constant monitoring

programmes, analyses and ecological control aimed to solve POPs problems relevant to implementation of Stockholm Convention;

- Working-out/ development of a conception for long-term POPs monitoring aimed to facilitate implementation of Stockholm Convention;
- Creation of National Inter-Departmental Council on implementation of Stockholm Convention and carrying-out policy on POPs issues, raising the level of coordination in activity of different Ministries/ Agencies involved in POPs-related issues, as well as for efficient information exchange;
- First-priority solution of the problem of ecologically sound destruction of POPs stocks and prevention of the possible environmental pollution and the impact to human health.

3.3 Activities, Strategies and Action Plans

3.3.1. Activity: institutional and regulatory strengthening measures

To improve and strengthen institutional mechanisms of management on chemicals and wastes, including POPs, it is necessary to develop a package of programme documentation for implementation of concrete actions, in particular:

a) Establishment of the Centre on development / keeping the National Registers and Classificators of hazardous chemicals and wastes, including POPs, gathering and submission of appropriate information; the Centre will function within the Ministry of Nature Protection of the Republic of Armenia

b) Improvement of the activity performed by the State Nature Protection Inspection of the Ministry of Nature Protection of the Republic of Armenia,

which presupposes

- Maintenance supplies: implementation of computerized, transportation and communication means, as well as programming systems;
- Re-training of specialists;
- Implementation of standards, procedures/ techniques and guidances on POPs control;

Improvement of the entire system of Nature Protection Inspection will facilitate implementation of a full-value and efficient control in concern of chemicals and wastes, including POPs, as well as timely prevention of their harmful impact towards human health and the environment.

c) establishment of the **Training Centre** in the system of the National Academy of Sciences of the Republic of Armenia; the Centre is aimed to train appropriate specialists in the area of management on chemicals and waste, including POPs;

d) Establishment of the **Cleaner Production Centre**

The organization of this structure presupposes:

- creation of a Databank on cleaner technologies;
- ensuring conditions for implementation of cleaner technologies by the users of chemicals and wastes, including POPs, in the order established by the legislation;
- development of technologies for POPs destruction in an environmentally sound manner;

e) Provision of research institutions, functioning in the structure of the Ministry of Nature Protection, Ministry of Health, Ministry of Agriculture and National Academy of Sciences of the Republic of Armenia with the appropriate material and technical means in order to develop scientifically substantiated norms/standards and regulations, and to make proper decisions for management and use of chemicals and wastes, including POPs.

f) In the order established by the legislation, to form a constantly functioning Commission for decision-making on POPs with involvement of the representatives of bodies of state governance, scientific institutions, public organizations having authorities/ responsibilities in the sphere of POPs.

Main approaches for solution of the strategic problems on strengthening the legislative sphere, institutional measures, and actions on regulation are as follows:

- **Improvement** of legislative basis of the Republic of Armenia in accordance with the Stockholm Convention.
- **Strengthening** the coordination between the State structures involved in decision-making on POPs (Ministries/Agencies, Departments and Boards), for realization of unified State policy in respect of POPs and meeting the obligations of the Republic of Armenia under the Stockholm Convention;
- In the order established by the legislation, **formation** of a constantly functioning Commission on making decisions on POPs with involvement of the representatives of bodies of state management, scientific institutions, and public organizations having authorities/ responsibilities in the sphere of POPs.
- In order to meet the provisions of the Stockholm Convention **correction** and **up-dating** of information presented in National Inventory on POPs (PCB-containing oils and PCB-containing equipment, obsolete POPs- containing pesticides); this latter should be supported by the legal/normative documents precisely defining and distributing duties of private persons and official institutions;
- **To identify**, legislatively, **methods** of ecologically sound destruction of POPs-containing wastes with the purpose to prevent environmental pollution, to decrease the volumes of generated emissions and to perform analysis of risks arising due to realization of established procedures/ technologies;
- Realization of sanitation/ remediation at the polluted territories / "hot spots" that should be supported by legal documents.

Thus, main actions on strengthening of legal/legislative and institutional basis involve the following:

Legislative

- Law on Waste - approved and endorsed by the National Assembly of the Republic of Armenia (No. 159-N of November 24, 2004).

- Law on Chemicals - to be developed in 2005 as a Draft.
- Working out regulations on norms and standards relevant to POPs.

Institutional

- Development of the National Register on Chemicals;
- Development of the State Cadastre on hazardous wastes and contaminated sites;
- Development of a Register of state enterprises, at which there takes place generation, treatment and disposal of wastes, including POPs
- Creation of a Data basis on POPs destruction technologies;
- Development of a Cadastre on sources of pollution emissions;
- Establishment of the Training Centre to train appropriate specialists in the area of management on and use of chemicals and waste, including POPs;
- Establishment of the Centre of Cleaner Technologies;
- Establishment of an Inter-Agency Council for Regulation of POPs issues;
- Coordination of actions and information exchange for implementation of Stockholm, Basel, Rotterdam and Aarchus Conventions.

3.3.2. Activity: measures to reduce or eliminate releases from intentional production and use

Chemicals listed in Annex A to Stockholm Convention are neither produced, nor used in the Republic of Armenia.

3.3.3. Activity: production, import and export, use, stockpiles and wastes of Annex A POPs pesticides (Annex A, Part 1 chemicals)

At present, organochlorine pesticides are neither manufactured nor applied in the Republic of Armenia. Both import and export of pesticides cannot be officially performed, as pesticides subject to the Stockholm Convention, Annex A are not included in the "List of chemical and biological plant protection means allowed for application in the Republic of Armenia".

Main strategic approaches in the sphere of organochlorine pesticides (OCPs) are as follows:

- Setting and adoption of legal tools for disposal/cessation of illegal import of POPs pesticides;
- Working-out Programmes for regular monitoring of OCPs residues in environmental and bio-media;
- Ensuring inspection of former and currently available dumps, sites of abandoned agricultural warehouses, pesticides store-houses by means of on-site checks;
- Establishing a specialized Body/Office of Plant Protection Service aimed to prevent illegal use of organochlorine POPs pesticides regulated by the Stockholm Convention in each marz/region of Armenia, as well as obtaining relevant information on used plant protection means (incl. assortment, quantities);

- It is necessary to continue gathering/ collection and processing of information on sources of POPs releases and the levels thereof, including issues dealing with wastes (dumpsites and the territory of storehouses) in order to assess/ evaluate and analyze the state of environment;
- For the constant monitoring of POPs residues in the environment and for development of a Data Base, it is expedient to establish the Central Analytic Laboratory on POPs for analysis and control on the state of the environment;
- To take ultimate inventory of existing stocks of obsolete pesticides in order to specify the qualitative and quantitative content of pesticide wastes;
- It is necessary to identify methods for destruction of existing stocks of obsolete inappropriate-for-use POPs pesticides and to arrange elimination thereof in an environmentally sound manner.

3.3.4. Activity: production, import and export, use, identification, labeling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A, Part II chemicals)

No PCBs were ever manufactured in the Republic of Armenia. Oils intended for use in the equipment of various types in industry and energy sectors were earlier imported to Armenia and still continue to be brought from abroad (Russia, Bulgaria).

Strategic goal on PCBs, in the final analysis, is to develop the entire system of actions on minimization and, ideally, on elimination of the impact of PCBs to the population and the environment, for which, first of all, it is necessary to carry out the following measures:

- Development of a register of equipment with PCBs and annual up-date;
- Identification of energy equipment with PCBs and appropriate labeling/marking;
- Gradual (step-by-step) disposal of PCBs in energy sector, industry and other sectors);
- Preparing solutions on decontamination of equipment and destruction of oils;
- Development of proposals on creation of financial mechanisms for destruction of PCB–equipment;
- Assessment/evaluation of capacities for PCB destruction both in-country and abroad;
- Development of regulating/normative documents and approval of national standards for analytical determination of PCBs in environmental media.

The system of actions aimed at minimizing PCB releases and elimination of PCB impact on humans and the environment should include:

Strengthening Legislation on norms/standard, i.e. development of documents regulating the following:

- Order on the removal/ phasing-out PCB-containing equipment;
- Suggestions on application of alternative substances instead of PCBs;
- Requirements on examination of PCB polluted areas and environmental media;
- Requirements on clean-out of PCB polluted areas and environmental media;

- Requirements on establishment of special stationary or mobile facilities for destruction of PCB and PCB-containing substances and wastes;
- Requirements on collection and transportation of PCB and PCB-containing wastes;
- Processes of destruction for PCBs, PCB-containing equipment and PCB-containing wastes;
- Sanitary hygienic standards on PCB contents in the environment and remediation of PCB-polluted areas;
- Requirements on labeling/marking of existing PCB-containing equipment that is currently exploited;
- Industrial arrangements aimed at establishment or construction of:
  - Facilities for manufacturing of non-PCB (alternative) substances;
  - Facilities for PCB extraction from PCB-containing equipment or PCB storage vessels, as well as subsequent washing-up (clean-out) and utilization of the equipment;
  - Mobile and stationary facilities for destruction of PCBs and PCB-containing wastes;
  - Technologies and corresponding facilities for PCBs clean out from the area and environmental objects.

Implementation of control analytical measures including:

- Ecological control over destruction of PCBs and PCB-containing wastes, as well as control/supervision on the quality of activity performed for clean-out of PCBs from the areas;
- Carrying out analytical comparative studies (or obtaining necessary information from foreign partners) in concern of existing technologies.

Technical-organizational and management activity:

- Development of a strategy for procurement of imported alternative substances to replace PCBs in exploited equipment (alongside with other measures on phasing-out PCBs);
- Training of specialists capable to perform all types of activity on destruction of PCBs and PCB-containing wastes, equipment utilization, monitoring and remediation of the area and environmental objects/ media;
- Arrangement of the system on collection of PCB-containing wastes.

3.3.5. Activity: production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country

In the Republic of Armenia DDT is not produced. Its use is prohibited. However, there is extensive evidence of illegal importation and application of DDT at the territory of Armenia.

It should be mentioned that Annex B chemicals are banned for import, application and production by the Decision of the Government of the Republic of Armenia "On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia" (No. 293-N of March 17, 2005).

Hence, in order to prevent illegal application of DDT it is necessary to increase control on its import and use.

To ensure conditions for control on pesticides use/application it is expedient to establish a specialized Plant Protection Service in each marz/region of Armenia. Such a body will be responsible for centralized/organized plant treatment. In addition, it is necessary to found advisory board involving specialists of agricultural profile. Establishment of a specialized Plant Protection Service will facilitate obtaining actual information on applied plant protectants (assortment, quantities), as well as assist in prevention of illegal use of organochlorine POPs pesticides regulated by Rotterdam Convention.

3.3.6. Activity: register of exemptions and the continuing need for exemptions (article 4)

Chemicals listed in Annexes A and B are neither produced, nor used in Armenia; likewise there is no regulating/legislative basis for recommencement of their production or use.

Proceeding from this, there is no need to plan additional actions and to submit data for written notification of the Convention Secretariat for registration of concrete exemptions in Armenia.

3.3.7. Action plan: measures to reduce releases from unintentional production (article 5)

In the Republic of Armenia during the last years, a tendency is observed to reduce POPs releases/emissions into the environment, including emissions of dioxins/ furans; this latter is explained by the peculiar features of the period in transition in the national economy of Armenia, in concern of the types of ownership in industry and other sectors.

It is necessary to mention that in Armenia in the nearest future one cannot anticipate significant changes in concern of total amounts of released POPs, or releases distribution according to categories, same as no drastic decrease of POPs releases.

Strategic goals in the sphere of by-products firstly of all should be aimed at carrying out measures facilitating reduction of Dioxins/Furans, appropriate alternate substitution of the raw material and/or initial materials, modification/up-dating of the technology process (including the industrial monitoring and re-equipment of the appropriate operations).

In order to decrease the impact of POPs on human and environmental health, the overall strategy on reduction/ limitation of POPs releases should correspond to the strategy of cleaner production, which presupposes application of integrated strategy on environmental protection in industrial processes, in finished/ manufactured products, in the sphere of rendering services. Main elements of this strategy are as follows:

- Efficient use of raw materials and energy resources;
- Reduction/ elimination on application of toxic and hazardous materials, including organochlorinated ones;
- Minimizing wastes generation, including POPs-containing wastes;

- Utilization and recycling of wastes in ecologically sound manner;
- Improvement and changes of technology.

3.3.8. Activity: measures to reduce releases from stockpiles and wastes (article 6)

Actions taken for minimizing or liquidation of releases related to stockpiles and wastes should be aimed at ensuring protection of the environment and human health. Main actions include:

- Inventory taking at POPs pesticides burial sites and storehouses;
- Creation of a Data base on industrial dumps of POPs-containing hazardous wastes;
- Monitoring of POPs contaminated areas/sites;
- Step-by-step elimination of POPs burial sites by destruction of POPs wastes and soil remediation at contaminated lands;

3.3.9. Strategy: identification of stockpiles, articles in use and wastes

Strategic approaches for identification of POPs-containing stocks and wastes are as follows:

- Constant monitoring on POPs residues in environmental media, database creation and maintenance to ensure control on the state of the environment;
- Taking final inventory of existing stocks of obsolete, inappropriate for use pesticides, PCB-containing oils and equipment in order to identify and justify actual amounts of stocks, to reveal quantitative and qualitative content of POPs residues;
- Selection of methods for destruction/decontamination of existing stocks of obsolete, inappropriate for use pesticides and PCB-containing equipment in order to perform destruction thereof in an environmentally sound manner.

3.3.10. Activity: manage stockpiles and appropriate measures for handling and disposal of articles in use

Strategic approach in the sphere of POPs stockpiles management and taking appropriate measures for handling and disposal of POPs articles in use is as follows: to develop and implement actions aimed at minimizing and abatement of POPs stockpiles unfavourable impact to the environment and human health, in particular:

- Preparation of regulating legislative documents addressing issues of handling and disposal of POPs articles in use:
  - Development of a legislative basis for collection and storage of POPs-containing wastes and equipment;
  - Development of guidances and manuals on POPs safe handling;
  - Legal regulation of issues relevant to establishment of POPs monitoring system, etc.;
- Implementation of organizational, technical and managerial actions:

- Holding training courses and re-training of specialists;
- Development of proposals for implementation of a Programme on disposal of articles in use considered as POPs;
- Analysis and evaluation of technologies on decontamination/destruction of POPs-containing wastes;
- Analysis of their cost-effectiveness from the point of view of nature protection; consideration of alternative decisions, modes, etc.;

- Carrying-out industrial and technical measures:
  - Capacity building and arranging a system for collection and storage of POPs wastes;
  - Identification and selection of environmentally sound modes for destruction of POPs - containing wastes;
  - Obtaining and implementation of technologies for destruction of POPs -containing wastes, etc.;
- Taking control analytical measures in the sphere of handling POPs-containing stocks:
  - Working-out a concept on development of POPs monitoring system;
  - Extending monitoring studies on POPs in environmental media;
  - Defining measurements scope, assessment/evaluation of appropriate expenses for quantitative determinations in environmental media, etc.

3.3.11. Strategy: identification of contaminated sites (Annexes A, B and C chemicals) and remediation in an environmentally sound manner

The main initial statement for management of contaminated areas is taking consecutive inventory of these sites alongside with the analysis of the ecology risk and assessment/ evaluation of needs, i.e. requirements for decontamination, as well as the economic evaluation of actions aimed at remediation/ sanitation.

Consecutive inventory of these sites is also necessary for prevention of on-going contamination due to leakages, evaporation or dangerous penetration of substances after floods, which came to be observed in Armenia annually during the recent years as well as implementing preventive measures against such phenomena.

3.3.12. Activity: facilitating or undertaking information exchange and stakeholder involvement

State structures, Ministries or Agencies involved in management of chemicals and wastes, including POPs, regulation of issues relevant to it, within the frames of their responsibility perform collection and storage of information, submission of the appropriate information to the National Statistical Service of the Republic of Armenia and other structures, as well as distribution of information amongst the concerned parties in the order established by legislation.

At present due to the lack of financial resources the scope of monitoring on residual amounts of

chemicals, especially of POPs (organochlorine pesticides, PCBs) in environmental media, as well as study in concern of the unfavourable impact of chemicals and wastes on human and environmental health is limited. Therefore, the study on the effect exerted by chemicals to human health and the environment is performed selectively according to some branches of industrial production.

At the research institutes of the republic primary data is available on long-term studies (in the form of reporting materials on Research and Development (R&D), State-of-the-Art reports on the impact of chemicals on the health status in workers, according to branches of industry, including occupational health in workers of chemical industry until 1992. Data is also available on the state of health in rural population, on the environment, on residual amounts of organochlorine pesticides in environmental media (surface waters, waters of Sevan Lake, soil, air), foodstuffs, and biomedia (breast milk).

Information on certain types of organochlorine pesticides and especially on Dioxins/ Furans is less accessible. In majority of cases, it is connected with analytical, financial and technical difficulties on identification of these types of POPs.

The core of a problem is to establish a unified body responsible for gathering information on POPs and coordination of actions performed by concerned Ministries and Agencies. It is necessary, in the order established by the legislation, to set a constantly functioning Commission for decision-making on POPs with the involvement of representatives of State Governing Bodies, Research Institutions, and public organizations authorized for activity relevant to POPs.

Establishment of a unified body responsible for coordination of performed activity, information exchange, and carrying out complex researches on issues dealing with prevention of environmental and human health against the impact of POPs, as well as a body responsible for decision-making at the national level would facilitate increase of cooperation and information exchange in concern of POPs amongst various State structures commitment of obligations foreseen by Stockholm Convention.

In order to solve the existing problems in the sphere of information exchange and for involvement of concerned parties in POPs problems the following is necessary:

- To create the system for information gathering and exchange;
- To organize workshops for stakeholders/ concerned parties;
- Dissemination/ spread of information about POPs in mass media;
- Preparation of information leaflets, brochures for authorities at the levels of marzes (regions), enterprise employees and farmers;
- Preparation of reports for various Task Force groups, engaged in POPs issues;
- Development of a web page on POPs issues.

3.3.13. Activity: public awareness, information and education (article 10)

The activity based training and educational programmes will become an important component of the strategy on public awareness raising and education.

Within the educational campaign it is urgent to draw attention to the following:

- Education, instruction on main aspects relevant to POPs;

- Open cooperation with mass media in order to improve the level of their grounding in this area, probably even by means of alternating the prejudiced approaches;
- Wide and transparent cooperation with NGOs in the sphere of ecological initiatives in order to foresee and forestall non-competent actions and irrational/ inappropriate campaigns of mass media reminiscent of "breaking into open doors" or the "breakthrough" type.

Main approaches of informational and educational activity should be inferred from International Conventions, existing laws and state environmental policy of the Republic of Armenia.

In order to raise the level of information, competence and education in general public it is necessary to carry out the following:

- To arrange and hold trainings and workshops on POPs for different target groups;
- To work out educational and general information programmes for schools and universities on POPs as well as their after-effects for human health and the environment;
- To establish regional centres of ecological education at the level of marzes of Armenia;
- To prepare training/ educational materials and publications for different society groups (schoolchildren, students, farmers);
- Working out and implementation of information and educational programmes for (re)training of workers, researchers, lecturers, technical and administrative staff.

3.3.14. Activity: effectiveness evaluation (article 16)

Annual evaluation on the efficiency of actions undertaken for POPs destruction and decontamination will be performed, as well as, on the background of updating of Registers and Cadastres, evaluation of the changes in POPs releases into air, water and soil.

3.3.15. Activity: reporting

Notification duties of each Party in concern of actions undertaken for implementation of the provisions of Stockholm Convention are given in the text of the Convention.

Overall progress evaluation of Stockholm Convention Implementation Plan will be done by the Inter-Agency based on the annual reports, as well as the recommendations on further actions/ measures will be accepted.

The Republic of Armenia will prepare:

- Reports for the Conferences of Parties on meeting country commitments;
- Reviews on the process of implementation of the Plan aimed at its up-dating;
- Reports for the Conferences of Parties in concern of monitoring of releases, their impact on human health and environment.

In addition, it can be assumed that duties on reporting will be further specified by Conference of the Convention Parties after the entry into force of the Stockholm Convention.

3.3.16. Activity: research, development and monitoring (article 11)

Significant in this strategy will be the consistently emphasis on the need for research and development in the area of POPs (removal, emissions, fate, effects).

Main approaches of the strategy should be based on state policy implemented in the sphere of science, researches and technology development/design.

Researches and monitoring on POPs should be performed in the line of:

Scientific investigations:

- Elaboration of State scientific-research project proposals aimed to study the processes of POPs distribution and transformation in the environment as well as the assessment/ evaluation of their impact on human health.

Monitoring studies:

- Preparing/setting up the concept of long-term monitoring on POPs issues in the view to support the implementation of the Stockholm Convention;
- Establishment of Central analytical laboratory on POPs for carrying out permanent monitoring programmes, analyses and environment control with the goal to carry out tasks associated with the implementation of the Stockholm Convention;
- Accreditation of selected laboratories based on the level of their tools/equipment provision;
- Working out a Programme on constant monitoring and its implementation on the country scale;
- Updating the National Inventory on POPs releases into environment to support the implementation of the Stockholm Convention;
- Establishment of POPs monitoring network in different environmental media (air, water, ecosystem, soil) and food-stuffs;
- Implementation of water and soil quality monitoring system in case of liquidation of burials and industrial storehouses;
- Unification of the procedure on inventory/ accounting of POPs generation sources, as well as analytical methods on POPs determination;
- To re-evaluate existing industrial manufacturing relevant to POPs issues, develop systematically on-going long-term monitoring activities, and subsequent research and pilot studies, whose goals are to find a specific problem, a possible indication for future monitoring;
- Fulfillment of monitoring programmes must be in compliance with the requirements of international conventions;
- Establishment of a monitoring system integrated to international programmes, creation of information system serving as a basis for risks assessments aimed at human health and environmental protection;

– Development of monitoring and research programmes as instruments for evaluation of the efficiency of measures for implementation of Stockholm Convention.

On the basis of current situation analysis, the suggestions were made and considered as optimal for the creation of POPs monitoring system aimed to evaluate the effectiveness of implementation of international conventions. To be precise, the suggestions include the following:

- Strengthening cooperation between the Ministry of Nature Protection, Ministry of Health, Ministry of Agriculture, Ministry of Trade and Economic Development and Ministry of Energy to prepare a complete concept of monitoring POPs in an environment, which would enable to make appropriate assessment.
- To constantly pay attention to the quality of obtained data, their interpretation and accessibility.
- To analyze/evaluate the state of utilisation and processing of the available existing data by concerned ministries and agencies.
- To analyze, process data applying modern statistical methods, to evaluate and generalize existing trends from the viewpoint of assessment/evaluation of the risks for human health and environment including accessibility of data for the specialist/experts and general public via Internet.
- To establish a monitoring system integrated into the international monitoring system, which must be used as a basis for analysis of the long-term trends and assessment/evaluation of risks for human health and the environment.
- To emphasize the quality of generated data and their harmonisation (applying same format/scope/volume; unified work characteristics of analytical methods, sampling technique) to achieve (inter-)comparable values and results.

Future expected research activities on POPs issues can be realised with an extensive participation of a number of research institutes of Armenia due to financial support of international organizations; such activity can be considered an integral part of international actions dedicated to POPs problems.

Main directions of research programmes regarding POPs should be focused on:

- studies on POPs dynamics in soils, surface waters, sediments, ground water and agricultural production;
- study on the POPs effects on human health and epidemiological studies comparing burdens of population groups to possible health hazards;
- POPs residues monitoring in human biomedia and assessment/evaluation of possible health risks relevant to POPs. In Armenia information is available on the results of POPs monitoring for the residues thereof in breast milk of feeding mothers in rural area. However, no data is available concerning concentrations of these substances in blood plasma or serum, in subcutaneous fat. There are no data on epidemiological studies relating to possible health risks for different population groups (endocrine disruption, immune toxicity, enzyme disarrangements/abnormalities, neurotoxicity, etc.);
- study on processes of cumulation and distribution, transformation and bioaccumulation of POPs in different ecosystems;
- study of the effects on wildlife and various biocenoses;

- study on the mapping of environmental loads/burden of persistent organic pollutants for application remediation measures in the environment and subsequent to decrease their exposure on humans;
- studies on technologies for the POPs destruction and remediation of contaminated sites on the basis of joint scientific-research projects.

3.3.17. Activity: technical and financial assistance (articles 12 and 13)

Technical and financial support for capacity building in concern of meeting country commitments within the framework of Stockholm Convention can be brought to the following:

- Ensuring the tools/equipment basis, stock materials, reagents and analytic standards for POPs monitoring accredited laboratories;
- Purchase of technologies for sound destruction/elimination of POPs burials and wastes;
- Purchase of BAT technologies or alternative technologies for decontamination of PCB-contaminated equipment;
- Ensuring financial assistance of international organizations (UN, GEF, World Bank) and bilateral donors.

3.4 Development and Capacity-building Proposals and Priorities

- Establishment of the National Inter-Agency (Inter-ministerial) Council in order:
  - to implement the Stockholm Convention obligations and policies concerning POPs in general,
  - to evaluate the environmental measures regarding national legislation in a given field,
  - to apply practises of accepting the basic political and economic measures by consulting with experts in the given field,
  - to evaluate projects relevant to the POPs issues,
  - to coordinate the activities performed by different ministries/departments involved in POPs issues and effective information exchange.
- Establishment of Central Analytical Laboratory on POPs for carrying out permanent monitoring programmes, analyses and environment control with the goal of realising tasks associated with the implementation of the Stockholm Convention.
- Arrangement and holding trainings and workshops for different target groups on POPs issues.
- To ensure sufficient technological capacity for the replacement of PCB containing oils and equipment.

- To ensure sufficient technological capacity for storage of wastes contaminated by POPs (especially PCBs), and obsolete pesticides, including organochlorine preparations.
- Determination of the environmentally sound and cost effective technologies for liquidation/ elimination of stockpiles containing POPs waste.
- Public awareness and knowledge raising in concern of POPs issues, risks, as well as the impact thereof on human health and the environment.

3.5 Timetable for Plan Implementation

- Sending of the 1st Draft of the NIP Proposal for public discussion of representatives of concerned ministries and departments, and members of Steering Committee, and national experts.
- Public discussion, remarks, additions, and revisions of the 1st Draft of the NIP Proposal.
- Summarising the remarks and recommendations, preparation of the 2nd draft of the NIP Proposal.
- Presentation of the 2nd draft of the NIP Proposal on the Workshop (Defining expected results and targets of the NIP).
- Summarising the remarks and suggestions from the Workshop; summarising the 3rd Draft and Official version of the NIP Proposal
- Preparation of the final NIP version within two years after the entry into force of the Stockholm Convention.

3.6 Resource Requirements

Ensuring financial resources to carry out actions proposed in the Plan will be possible due to the following sources:

- State Budget;
- Financial means of enterprises;
- Financial means of regional communities (budgets of marzes/regions);
- Assistance rendered by international organizations.

According to preliminary evaluation the overall costs of measures included in the NIP (Annex 1) make US $15.46 million.

LIST OF ANNEXES

Activities required to implement priority goals of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia"

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
A. Legal, Regulatory and Institutional Activities						
1. Improvement of the legal framework	Improvement of the legal basis for chemicals management (including POPs) (hereinafter POPs) under Stockholm Convention requirements	Revision of existing legal acts; identification of gaps and propose the recommendations for amendments. Development and adoption of normative documents for sound chemicals and wastes management including as following: • Law on Wastes • Law on Chemicals • Working-out normative acts for development and establishment of the Register on POPs and POPs-containing wastes; National Profile to assess National Infrastructure for POPs Management	MoNP *, MoH, MoA, MoEF, MoTED, NStatS, MoJ	5 years	 100,000 30,000 50,000	State budget
2. Improvement of Institutional structures	Legal regulation of issues on strengthening capacities for sound chemicals management Coordination and supervision of POPs related activities	To amend the Statute of the Ministry of Nature Protection by including the authorities assigned for implementation of obligations under the Stockholm Convention by the Republic of Armenia Establishment of an Inter-agency Council for the implementation of the Stockholm Convention and policies concerning POPs in general, and making decisions on POPs.	MoNP MoNP	1 year 5 years		
	Establishment of the Information Center on POPs related issues	Information exchange between the Republic of Armenia and conventions secretariats to fulfill/implement the obligations under Stockholm, Basel, Rotterdam and Aarhus Conventions and to manage the NIP; active distribution of information on POPs. Establishment of a Cleaner Technologies Centre	MoNP	5 years		State budget
	Improvement of the process of managing data on chemicals and wastes; accounting/inventory and improvement of the system on accounting and reporting in this field	Establish information system on chemicals and wastes. Setting-up the following: • National Register on Wastes** • National Register on Chemicals, including POPs • State Cadastre on Wastes, involved Classificatory of wastes, including POPs** • State Register on the sites/entities, at which POPs-containing wastes are generated, processed, utilized, and disposed** • Data Bank on technologies for destruction/ decontamination of POPs-containing wastes** • Register of pollutants releases and transfer (PRTR)	MoNP, NStatS	5 years	 100,000 100,000 100,000 100,000 100,000 100,000	International donors, State budget

* See "Abbreviations and Acronyms"

** Waste Research Center established by the Decision of the Government of the Republic of Armenia No. will facilitate implementation of pre-planned activity

Proposed Area	Activity	Brief description	Leading and implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
3. Development of regulatory mechanisms	Development of guidances and handbooks/manuals	Preparing of a draft instructions, methodic procedures, technical specifications, etc.	MoNP, MoH, MoA, MoEF, MoTED, MoJ DoS, CSC, NStatS	5 years	50,000	International donors State budget
4. Strengthening legislative and regulatory mechanisms by practical guidances on POPs	Improvement of the system for reporting and data processing/analysis on POPs	Correction and up-dating information presented in the National POPs Register (PCB-containing oils, PCB-containing equipment, obsolete POPs pesticides) Decision making on methods/ modes of environmentally sound destruction of POPs wastes Development of regulatory /legislative acts required for remediation of actions at contaminated sites, "hot spots" Assessment of needs: Development of guidelines for individuals occupationally exposed to POPs. Rendering consultations	MoNP, MoH, MoA, MoEF, MoTED, SCS	5 years	50,000 50,000 200,000	International donors, State budget
B. Activities on PCBs, PCDDs/PCDFs issues						
5. Establishment of PCB management system	Verification of data concerning PCBs sources and quantities Development of the regulating-legal basis for collection and storage of PCB-wastes and PCB-containing equipment.	Collection and generalization/ summarizing of information, inventory taking on equipment still exploited , as well as that phased-out and inappropriate for further exploitation (oils are discharged from the equipment, but the equipment is not cleaned, washed-out); collection and summarizing information on PCB-containing oils filled in the equipment and PCB-containing wastes	MoNP, MoE, MoTED, energy enterprises	5 years	150,000	International donors, State budget
	Development of proposals on program for PCB-containing oils and PCB-containing equipment elimination from use	Preparing a program involving priorities based on contamination levels and the technical state of the equipment Wash-out and decontamination of unused resources and appropriate-for-use equipment, which contains PCBs, in order to further refilling/recharge thereof by PCB-free oils	MoNP, MoTED, MoE, energy enterprises	5 years	500,000 2 000, 000	International donors, State budget International donors
	Development of permanent system for collection, treatment, decontamination and disposal of PCB-containing oils and PCB-containing equipment including damaged, leaking power equipment, which pose threat to environment and human health	Ensuring centralized storage of PCB-contaminated damaged, leaking equipment and providing compliance with the requirements for the safe/sound storage thereof. Obtaining and implementation of technology for destruction of PCB-containing oils and equipment Formation of a system for collection and decontamination of the surface layer of soil taken from the areas contaminated due to leakages of PCB-containing oils from the equipment	MoE, MoNP, MoH MoTED, MoFE	5 years	1 800, 000 1 000, 000 1 500,000	International donors

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
6. Increase /strengthening capacity of energy sector for identification of PCBs-containing power equipment	Raising knowledge and skills on sampling, identification, labeling procedures and reporting	Preparation of training manual, specification of sampling/analytical kits, training courses for all energy enterprises. Preparation of handbooks/handouts on PCB sound disposal: development of technical regimen for identification, assessment/evaluation, labeling and phasing-out PCB-containing equipment	MoNP, MoE, *all energy* enterprises	5 years	40,000 20,000	International donors
		Up-dating information presented in National Inventory on POPs (PCB-containing oils and PCB-containing equipment). Preparation of programmes aimed at PCB inventory, application of sampling and analytical methods	MoE, DoS, energy enterprises	5 years	80,000 80,000	International donors, State budget, energy enterprises
7. *Inventory of* PCBs in oils and electrical power equipment	*Identification of existing* PCB concentrations presence in oils and power equipment	*Sampling and assessment* of PCBs presence, labeling. Identification of "Hot spots", risk assessment, reporting on the results obtained	MoE, MoTED DoS, energy enterprises	5 years	100,000 100,000	International donors, State budget, energy enterprises
8. Widening the scope/ scale of PCBs inventory	Identification of PCBs existing concentrations in other sectors of national economy	Development of the legal basis for sampling and storage of PCB-containing oils and PCB-containing equipment Preparation of instruction for identification of PCBs in equipment, produce and goods	MoE, MoNP, MoH MoTED MoA	5 years	20,000 30,000	State budget
9. Handling PCB-contaminated and damaged equipment	Ensuring implementation of measures on environmentally sound destruction of PCB-contaminated, damaged, leaking power equipment posing threat	Centralized collection of PCB-containing equipment including damaged, leaking power equipment Ensuring the provision of safety storage/handling. Identification of technology for PCBs and PCB-contaminated equipment elimination/ destruction	MoE, MoNP, MoH	5 years	1,000,000 1,000,000 1,000,000	International donors
10. Reduction of PCDD/PCDF emissions	Analysis/Evaluation of possibilities to apply alternative methods for PCDD/PCDF emission reduction	Analysis of data on alternative technologies and evaluation of possibilities to apply them in the Republic of Armenia	MoNP, MoE, MoTED, MoEF	5 years	200,000	International donors, State budget
	Inventory/Verification of PCDD/PCDF releases into environmental media (surface water, soil) and the sources thereof	Gathering information in order to update the inventory on PCDD/PCDF releases	MoNP, MoE, MoTED	5 years	20,000	International donors, State budget

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
	Review and evaluation of the main sources of PCDD/PCDF and emission factors thereof	Determination of the measurements scale, evaluation the relevant costs for performing measurements in environmental media Quantification of PCDD/PCDF in environmental media and calculation on the expenses required for their laboratory determination	MoNP, MoE, MoTED, DoS	5 years	20,000	International donors, State budget
	Preparing guidelines on reduction and elimination of PCDD/PCDF releases into environment	Determination/ selection of methods for PCDD/PCDF wastes disposal/destruction in an environmentally sound way and POPs releases reduction from dumps/landfills	MoNP, MoH, MoE, MoTED, DoS	5 years	30,000	International donors, State budget
C. Monitoring activities						
11. Increasing /strengthening national capacities for POPs monitoring	Development of the concept for POPs monitoring system and large-scale monitoring studies on POPs in environmental media Legal regulation of issues dealing with the establishment of a system for POPs monitoring	Formulate monitoring strategies for different groups of POPs, sources and environmental media. Development of monitoring programs and POPs sampling procedures/ requirements. Distribution of authorities between laboratories performing analyses for POPs determination; information exchange on POPs subject to monitoring and environmental media	MoNP, MoA, MoH	5 years	300,000	International donors, State budget
	Establishment of the Central Analytical Laboratory on POPs	Procurement of the equipment and reagents, obtaining international accreditation for POPs determination in soil, water, biomedia, foodstuffs, imported and exported produce, approval of standard procedures for analytical determination.	MoNP	5 years	1 600,000	International donors, State budget
D. Capacity building						
12. Capacity building for unintended POPs	Increase knowledge on sources of POPs unintended generation	Collection of data on sources of POPs unintended generation and releases; analysis of data. obtained Estimation of emissions, risk evaluation, and sources prioritization	MoNP	5 years	50,000 20,000	International donors, State budget
	Quantitative and qualitative inventory on dioxins sources and releases	Sampling and analysis at international accreted laboratory. Interpretation of results and formulating recommendations for further actions	MoNP, MoTED, DoS	3-5 years	100,000	International donors, State budget
13.BAT and BEP knowledge transfer	Gaining knowledge on application of BAT and BEP for POPs management. Formulate affordable options for the Republic of Armenia	Formulating courses topics and holding workshops/trainings, and study tours. Formulate and discuss BAT and BEP options on POPs management issues for the Republic of Armenia	MoNP, MoTED, and other stakeholders	5 years	20,000	International donors
	Preparation and publication of materials (guidebook) on PCBs handling and management	Preparing methodic materials/guidances on PCBs management for various target groups.	MoNP, MoTED, MoE	5 years	50,000	International donors, State budget

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
E. Activities on wastes and landfills						
14. Improvement of wastes management system	Environmental and economic evaluation of management on POPs-containing waste	Evaluation of specific technologies for POPs-containing wastes and analysis of their efficiency from the environmental point of view	MoNP, MoTED, MoEF, private industrial enterprises	5 years	25,000	International donors, State budget
	Analysis/Review of technologies for treatment/destruction of POPs wastes generated in industry sector	Review of methods for prevention of POPs generation and their releases into environment with emphasis on main sources. Evaluation of environmental and economic efficiency of preventive measures application. Consideration/review of alternative solutions	MoNP, MoTED, MoEF, private industrial enterprises	5 years	25,000	International donors, State budget
	Evaluation of possibilities to apply alternative methods for wastes treatment	Substantiation of the possibility to apply alternative methods in practice, based on the evaluation of the technical and economic analysis Modification and correction/adjustment of waste destruction methods in accordance with national capacities and facilities	MoNP, MoTED, MoEF	5 years	50,000	International donors, State budget
15. Increasing capacity for better management of obsolete pesticides	Upgrading capacity of local authorities for safe and environmentally sound management of stockpiles	Holding training courses for representatives of local authorities and bodies of self-governance	MoNP, MoH, MoA, NGOs	2-3 years	40,000	State budget
	Facilitating liquidation /elimination of burial site of obsolete pesticides in an environmentally sound manner	Setting-out and development of regulating/ legal basis for liquidation/elimination of burial site of obsolete pesticides	MoNP, MoA, DoES, YCA, NGOs	1 years	20,000	State budget
		Preparation of a Plan on liquidation of obsolete pesticides stockpiles Implementation of measures aimed at destruction of obsolete/inappropriate for use pesticides	MoNP, MoA, MoH, MoTC, MoE, NGOs	5 years	100,000	State budget International donors
	Performing the environmental and economical evaluation of the environmental impact of obsolete pesticides	Analysis of environmental and health impacts of obsolete pesticides and the consequences thereof	MoNP, MoA, MoH, NGOs	3 years	20,000	International donors, State budget

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
F. Remediation measures						
16. Increasing the level of management on contaminated sites	Development of tools/mechanisms for identification of contaminated sites/areas	Preparation of methodology for risk assessment, formulation of contaminated sites criteria, consultations with stakeholders	MoNP, MoH, MoA, MoE, MoTED, energy enterprises	3 years	50,000	International donors, State budget
	Preparation of POPs-contaminated sites assessment plan	Mapping and description of POPs contaminated sites. Creation and handling Register of POPs contaminated sites. Collection of relevant information; rendering consultations for local authorities, population, enterprises, etc. Evaluation and mapping of identified POPs contaminated sites; performing analytical studies	MoNP, MoH, MoA, MoE, local authorities, NGOs	5 years	100,000	International donors, State budget
	Application/use of low-cost remediation options for POPs-contaminated sites	Preparation of programs on modern environmentally sound and cost-effective remediation options to be applied; holding workshops, study tours. Development of low-cost remediation measures	MoNP, MoH, MoA, MoE, MoTED, NGOs	3 years	50,000	International donors
G. Research activities						
17. Promotion of research and development on POPs issues	Support and stimulate the scientific research activity of institutes in POPs-related issues and strengthening cooperation	Providing financial resources for Research and Development (R&D) of POPs issues (organochlorine pesticides, PCBs, dioxins): monitoring, risk assessment, and assessment of the impact produced to environment and human health	MoNP, MoSE, NAS, NGOs	3-5 years	100,000	International donors State budget
H. Public awareness raising, training and education						
18. Active application of communication means aimed at decision-making on POPs problem	Ensuring efficient cooperation on POPs related issues and information/ knowledge and skills exchange for decision makers, professionals and public	Preparing guidance manuals, establishment of a communication framework for information exchange	MoNP, NGOs	5 years	50,000	International donors, State budget
	Development of a system on information collection and exchange	Creation of the operational system on information collection and exchange	MoNP, NGOs	5 years	20,000	International donors, State budget
	Preparation of a plan for dissemination of POPs relevant information	Plan preparation on the basis of provisions of the Aarhus Convention and protection of confidential information	MoNP, NGOs	5 years	20,000	International donors, State budget

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
19. Building up participatory process for unified decision-making on POPs problems	Organizing an active and efficient participatory process for concerned parties/ stakeholders on elaboration of POPs issues	Arrangement of meetings on POPs issues. Arrangement of meetings and seminars on POPs exposure risks. Development of processes and procedures for participatory solution of POPs problems	MoNP, NGOs	5 years	50,000	International donors, State budget
20. Information exchange at country and international levels	Strengthening the awareness of general public on POPs issues, risks, consequences and required mitigation measures	Development and dissemination of POPs- related information in mass media and accessible publications. Participation at international forums	MoNP, MoH, MoE, NAS NGOs	5 years	100,000	International donors, State budget
21. Education	Preparation of educational/training programmes embracing POPs problems and chemical safety issues (programmes are intended for all the levels of education in the Republic of Armenia)	Development and dissemination of educational materials for specific groups of population (pupils, students, farmers, manufacturers, power engineering specialists, doctors) Establishment of Regional Centers for ecological education in marzes (districts) of Armenia	MoNP, MoSE, NGOs	5 years	40,000	International donors, State budget
	Preparing proposals for the information campaign for public awareness on POPs	Specifying data scope and quality of information available for general public on POPs hazards to human health and environment. Awareness raising in specific population groups mostly vulnerable to POPs exposure/impacts	MoNP, MoSE, NGOs	5 years	40,000	International donors, State budget
	Preparation of proposals for educational programmes on POPs issues aimed at establishment and improvement of a permanent system of environmental education at all the levels	Review of existing information on POPs issues disintegrated in different educational programmes. Application of synergy principles in management on chemicals and waste, including POPs issues, in programmes on environmental education	MoNP, MoH, MoSE, NAS, NGOs	5 years	40,000	International donors, State budget
	Development and implementation of educational programmes on POPs issues in high school and for post-graduate education	Preparing the educational programmes aimed at the awareness raising on POPs hazards, including posed threat to the human health and environment Development of the Internet/ website on POPs issues	MoNP, MoH,MoSE, NAS, NGOs	5 years	40,000	International donors, State budget

Proposed Area	Activity	Brief description	Leading and Implementing Agencies	Duration	Estimated Costs, US$	Potential Sources of Funding
22. Public awareness/ training	Wide-scale public awareness on POPs and chemical safety	Holding trainings/workshops on POPs issues for different target groups Preparation and submission of training materials on POPs for schoolchildren, students, workers of industrial and energy enterprises, medical doctors, farmers, etc.	MoNP MoH, MoSE NAS, NGOs	5 years	300,000	International donors, State budget
I. Activities on Reporting						
23. Updating and verification of information on POPs issues at the national level	Preparation of reports for the Conference of the Parties to the Convention	Review of activities undertaken in the Republic of Armenia and addressed at the implementation of Stockholm Convention provisions	MoNP	To be specified by the Conference of the Parties	50,000	State budget
	Regular updating and assessment of implementation efficiency of the NIP in a manner to be specified by the Conference of the Parties	Review of the progress in activities undertaken at the national level	MoNP	To be specified by the Conference of the Parties	50,000	State budget
	Updating the NIP in accordance with the decisions of the Conference of the Parties to the Stockholm Convention	Periodical reviews and updating of NIP according to further decisions of the Conference of the Parties to the Stockholm Convention. The Conference of the Parties will adopt recommendations, decisions and establish the procedures to follow and methods for assessment of implementation plans.	MoNP	To be specified by the Conference of the Parties	80,000	State budget
	Regular revision/reconsideration and up-grading POPs management policy and strategy	Regular revision of the schedule of the NIP for the Stockholm Convention	MoNP		20,000	State budget
	Total for NIP				15,460,000.00	

Annex 2

LIST OF REGULATORY LEGAL ACTS

approved

by the Government of the Republic of Armenia for implementation of country commitments under Stockholm Convention

- Decision of the Prime Minister of the Republic of Armenia "On setting-up the working group on regulation of the issues dealing with destruction of obsolete, inappropriate-for-use chemical plant protection substances and working-out action plan for destruction thereof" (No. 452-A of September 22, 2003);

- Decision of the Prime Minister of the Republic of Armenia "On setting-up the Inter-Agency Commission", the functions of which involve decision-making on issues dealing with destruction of expired medicine (No. 645-A of December 12, 2003);

- Decision of the Government of the Republic of Armenia "On the order of licensing for activity on processing, treatment, storage, transportation, and placement of hazardous wastes in the Republic of Armenia" (No.121-N of January 30, 2003);

- Decision of the Prime Minister of the Republic of Armenia "On approval of the membership and order of activity of inter-departmental commission on licensing of activity on recycling, treatment, storage, transportation and placement of hazardous wastes in the Republic of Armenia" (No. 46-N of February 5, 2004);

- Decision of the Government of the Republic of Armenia No. 526-A "On approval of measures ensuring security of obsolete pesticides burial and on assigning funds from the Republic of Armenia state budget for FY 2004" (No. 526-A dated April 22, 2004);

- Decision of the Minister of Nature Protection of the Republic of Armenia "On recognizing the Department of Hazardous Substances and Waste Management at the Administration of the Ministry of Nature Protection of the Republic of Armenia as the focal point for information exchange with the Secretariat of the Stockholm Convention" (No.104-A of April 23, 2004);

- Decision of the Government of the Republic of Armenia "On approval of the "Republic of Armenia List of hazardous wastes" (No.874-A dated May 20, 2004);

- Decision of the Government of the Republic of Armenia "On applying changes to the Decision of the Republic of Armenia No.97 of December 8, 1995 and on approval of the Republic of Armenia "List of prohibited hazardous wastes" (No.1093-N dated July 8, 2004);

- Protocol Decision of the Government of the Republic of Armenia "On approval of the National Profile on Chemicals and Waste Management" (No. 26 of July 8, 2004);

- Decision of the Government of the Republic of Armenia "On implementation of the Republic of Armenia obligations on Rotterdam Convention signed September 10, 1998" (No. 1508-N dated October 29, 2004);

- Decision of the Government of the Republic of Armenia "On implementation of the Republic of Armenia obligations on Stockholm Convention signed May 23, 2001" (No. 1483-N dated October 29, 2004);

- Republic of Armenia Law "On Waste" (No. 159-N of November 24, 2004);
- Decision of the Government of the Republic of Armenia "On approval of the List of actions to implement Republic of Armenia obligations under a number of International Environmental Conventions (No. 1840-N of December 2, 2004);
- Protocol Decision of the Government of the Republic of Armenia "On approval of the "List of actions implemented within the frames of the "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in the Republic of Armenia during 2005-2010" (No. 1 of January 13, 2005).
- Decision of the Government of the Republic of Armenia "On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia" (No. 293-N of March 17, 2005);
- Decision of the Government of the Republic of Armenia "On establishment of the State non-commercial organization "Waste Research Center" (No. 670-N of May 19, 2005).

Annex 3

LIST OF NATIONAL STANDARDS

prepared and approved within the frames of the National Project

"Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Armenia" (GF/ARM/02/002)

- Water quality. Sampling. Guidance on the preservation and handling of samples. National Standard. Republic of Armenia. Yerevan. 2004.
- Water quality. Determination of certain organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes. Gas-chromatographic method after liquid-liquid extraction. National Standard Republic of Armenia. Yerevan. 2005.
- Soil quality. Determination of organochlorine pesticides and polychlorinated biphenyls. Gas-chromatographic method with electron capture detection. National Standard. Republic of Armenia. Yerevan. 2005.

Annex 4

LIST OF SCIENTIFIC PAPERS

prepared within the frames of the National Project

"Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Armenia" (GF/ARM/02/002)

PUBLISHED

1. *Hygienic Aspects of Contamination* by Stocks of Obsolete Organochlorine Pesticides in the Republic of Armenia. In: Abstract Book of the 7th International HCH and Pesticides Forum "Towards the Establishment of an Obsolete POPs/Pesticides Stockpile Fund for Central and Eastern European Countries (CEEC) and New Independent States (NIS)" (June 5-7, 2003. Kiev, Ukraine). p.22

2. Monitoring on Persistent Organic Pesticides in Armenia. In: Abstract Book of the 7th International HCH and Pesticides Forum "Towards the Establishment of an Obsolete POPs/Pesticides Stockpile Fund for Central and Eastern European Countries (CEEC) and New Independent States (NIS)" (June 5-7, 2003. Kiev, Ukraine). p. 69-70

3. Residues of Organochlorine Pesticides in Imported Foodstuffs. In: Abstract Book of the 7th International HCH and Pesticides Forum "Towards the Establishment of an Obsolete POPs/Pesticides Stockpile Fund for Central and Eastern European Countries (CEEC) and New Independent States (NIS)" (June 5-7, 2003. Kiev, Ukraine). p.81.

4. Soil Contamination by Organochlorine Pesticides in the Republic of Armenia. In: Abstract Book of the Sixth International Symposium & Exhibition on Environmental Contamination in Central & Eastern Europe and the Commonwealth of Independent States (1-4 September 2003, Prague, Czech Republic). p.218.

5. Persistent Organic Pollutants in Foodstuffs of Animal Origin from Ararat Valley. In: Abstract Book of the 13 Annual Conference of International Society of Exposure Analysis (September 21-25, 2003, Stresa, Italy). p.23.

6. *Polychlorinated Biphenyls in Open Water Basins in Armenia*. . In: Abstract Book of the 13 Annual Conference of International Society of Exposure Analysis (September 21-25, 2003, Stresa, Italy). p.435.

7. Monitoring of Persistent Organic Pollutants: Water Reservoirs of Armenia. Workshop "Persistent Toxic Substances Contamination of the European Region" As a reflection of results of GEF/UNEP Regional Based Assessment of Persistent Toxic Substances (RBA PTS) in Europe, the implementation of the Stockholm Convention and "Community Strategy for Dioxins, Furans and PCBs" (Brno, Czech Republic, November 10-12, 2003). P.151-154.

8. Ecological and hygienic aspects of industrial and environmental pollution by polychlorinated dibenzodioxins in Armenia. In: Proceedings of the 2nd Congress of Toxicologists, Russia, Moscow, November 10-13, 2003. P.44-45. (in Russian)

9. Monitoring of some persistent organic pollutants in environmental media of the Republic of Armenia. In: Proceedings of the 2nd Congress of Toxicologists, Russia, Moscow, November 10-13, 2003. P.45-47. (in Russian)

10. Contamination of Kotaik region of the Republic of Armenia by polychlorinated biphenyls. In: Proceedings of the 2nd Congress of Toxicologists, Russia, Moscow, November 10-13, 2003. P.47-48. (in Russian)

11. Contamination of Water Basins by PCBs from Energy Sector of Armenia. 2nd Asia Pacific International Conference on Pollutants Analysis and Control. 1-3 December 2003, Hochiminh City, Vietnam. p.63-64. Abstract WA 6A.

12. Contamination of Foodstuffs by Organic Pollutants in Armenia. 2nd Asia Pacific International Conference on Pollutants Analysis and Control. 1-3 December 2003, Hochiminh City, Vietnam p.92-93. Abstract P21.

13. Organochlorine Pesticide Residues in Foodstuffs. The 3rd International Congress of the Asian Society of Toxicology : ASIATOX III February 1-6, 2004, Bangkok / Chiang Mai, Thailand.

14. Distribution of Persistent Organic Pollutants in Sevan - Hrazdan Hydroecosystem .The 3rd International Congress of the Asian Society of Toxicology : ASIATOX III February 1-6, 2004, Bangkok / Chiang Mai, Thailand.

15. Impact of Environmental Hazards on Children's Health in Armenia. Third International Conference on Children's health and Environment. 31 March, 1-2 April 2004, London, UK.p.85.

16. Possible Emissions of Dioxins at Chloroprene Production and Their Probable Role in Formation of Pathology Observed in Occupationally Exposed Workers. American Industrial Hygiene Conference and Exhibition, May 8-13, Atlanta, GA, USA.

17. Distribution of Persistent Organic pollutants in Hydrosystem of Sevan - Hrazdan. XIV Congress of Hygienists, Ukraine, May 19-21, 2004. Dnepropetrovsk, Ukraine. P.154-159. (in Russian)

18. Persistent Organic Pollutants in Rural Area of Armenia In: 2nd International Conference on Rural Health & 1st International Conference on Occupational and Environmental Health in Mediterranean, South East and Central European Countries, Belgrade, 26-29 May, 2004.

19. Levels of Organochlorine Pesticide Contamination in Rural Area of Armenia In: 2nd International Conference on Rural Health & 1st International Conference on Occupational and Environmental Health in Mediterranean, South East and Central European Countries, Belgrade, 26-29 May, 2004.

20. Sources of Mercury Pollution in Armenia. 7th International Conference "Mercury as a Global Pollutant". Ljubljana, Slovenia, June 27 - July 2, 2004

21. Polychlorinated Biphenyls (PCBs): Monitoring of Breast Milk and Dairy Products in Armenia. Bordeaux. 9th FECS Conference on Chemistry and the Environment and 2nd SFC Meeting on Environmental Chemistry Behaviour of Chemicals in the Environment. Bordeaux, France, 2004 August 29th - September 1st .

22. Trophic Transfer of Persistent Organic Pollutants in Hydroecosystem of Sevan Lake. Bordeaux. 9th FECS Conference on Chemistry and the Environment and 2nd SFC Meeting on Environmental Chemistry Behaviour of Chemicals in the Environment. Bordeaux, France, 2004 August 29th - September 1st .

23. Polychlorinated Biphenyls in Foodstuffs of Animal Origin: Armenia 2002-2003. ?he 2nd Asian International Conference on Ecotoxicology and Environmental Safety (SECOTOX). Muang, Songkla 9000, Thailand, September 26 - 29, 2004.

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27. Persistent Organic Pollutants: Dioxin/ furan emissions as challenges for the Republic of Armenia. Fourth SETAC World Congress and the Society of Environmental Toxicology and Chemistry 25th Annual Meeting in North America. Portland, Oregon, USA. 14-18 November 2004. (PT017)

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28. Waste Dumps and Persistent Organic Pollutants in Armenia, 2002-2003. Fourth SETAC World Congress and the Society of Environmental Toxicology and Chemistry 25th Annual Meeting in North America. Portland, Oregon, USA. 14-18 November 2004. (PT018)

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29. Persistent organic pollutants in bottom sediment from water basins of the Republic of Armenia. 3rd Workshop "Integrated sediment and soil assessment". Brno, Czech Republic, February 10-12, 2005

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30. Problem of Obsolete Pesticides in the Republic of Armenia. In: Forum Book of the 7th International HCH and Pesticides Forum "Towards the Establishment of an Obsolete POPs/Pesticides Stockpile Fund for Central and Eastern European Countries (CEEC) and New Independent States (NIS)", 5-7 June 2003, Kiev, Ukraine. Kiev. 2005. P.41-43.

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31. Monitoring of Persistent Organic Pollutants in Foodstuffs in Armenia. Childrens's Environmental Health in Central Asia (CEHCA-2005), Almaty, Kazakhstan, 25-28 April 2005.

32. Organic Pollutants: Main Sources, Fate and Persistence in the Environment of Armenia. SETAC Europe 15th Annual Meeting. 22-26 May 2005, Lille, France.

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34. Former pesticide storehouses and shops: problems and challenges. In: 8th International HCH and pesticides forum for Central European and EECCA (Eastern European, Caucasus and Central Asia) countries. Sofia, Bulgaria, May 26 - 28, 2005.

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39. Polychlorinated Biphenyls in Environmental Media: Armenia. 15th Annual ISEA Conference (ISEA 2005), Tucson, Arizona, October 30 - November 3, 2005.

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