International POPs Elimination Project

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

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Country Situation Report on POPs in Albania

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April, 2006

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About the International POPs Elimination Project

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

IPEP has three principal objectives:

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

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

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

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

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

IPEN gratefully acknowledges the financial support of the Global Environment Facility, Swiss Agency for Development and Cooperation, Swiss Agency for the Environment Forests and Landscape, the Canada POPs Fund, the Dutch Ministry of Housing, Spatial Planning and the Environment (VROM), Mitchell Kapor Foundation, Sigrid Rausing Trust, New York Community Trust and others.

The views expressed in this report are those of the authors and not necessarily the views of the institutions providing management and/or financial support.

This report is available in the following languages: English.

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1. What are Persistent Organic Pollutants (POPs)?

Persistent organic pollutants (POPs) are highly toxic, organic compounds. They include pesticides used to protect plants from insects (aldrin, dieldrin, endrin, heptachlor, mirex, and toxaphene) and in control of vector-borne diseases (DDT) or to protect seeds (HCB); heat-resistant compound used primarily in electrical equipment such as transformers (PCBs); and substances generated as a by-product of incomplete combustion and chemical processes (dioxin and furans).

The brief description of each POP can be found in Annex 1.

POPs can persist in the environment for decades. They are semi-volatile and can be circulated across country boundaries and globally. It means that they travel thousands of kilometers from their source of origin. Some of these POPs eventually concentrate in cold regions, such as the Arctic and mountainous regions.

POPs resist breakdown in water and readily dissolve and accumulate in fatty tissue (in lipids). In a process known as *bioconcentration*, animals can absorb concentration of POPs at levels many times higher than those found in the environment. POPs can *bioaccumulate* exponentially up the food chain, reaching the greatest magnitudes in predatory birds, mammals and humans.

Dioxins, DDT or polychlorinated biphenyls (PCBs) can cause hormonal defects even in very low quantities and they threaten reproduction of people and animals. (POPS can have for instance a negative impact on male fertility). They also harm the immune system and some of them cause cancer.

The Stockholm Convention on Persistent Organic Pollutants focuses on reducing with the goal of eliminating 12 POPs. They include pesticides, industrial chemicals and unintended by-products. All of them were already mentioned in the first paragraph. The Convention also aims to prevent the introduction of new chemicals with POPs-like characteristics and to ensure the environmentally sound destruction of POPs waste stockpiles. The Convention sets out the actions to be taken by Parties to reduce and wherever feasible, eliminate releases of by-product POPs chemicals.

In Albania the topic of POPs has increased in importance especially after becoming a party of Stockholm Convention. Until this time problems with special regards to POPs faded down in comparison with other environmental issues, which are being resolved in Albania.

2. Sources of POPs

Albania is a small country located in South Eastern Europe. It has borders with Serbia and Montenegro, Kosovo, the Former Yugoslav Republic of Macedonia and Greece and covers an area of 28,748 km². From the fertile coastal plain on the Adriatic Sea, the land rises into hills and mountains to the North (Albanian Alps) and East (Korabi Mountain). Small rivers traverse the country. Although Albania is rich in water resources, 33% of the catchment areas are situated outside its national borders.

In Albania several sources of POPs can be found, such as barrels with obsolete chlorinated pesticides (in the area of Porto Romano), PCBs from the transformer units, or uncontrolled fires in the municipal waste dumpsites, where hazardous and medical waste is also often dumped.

Energy production (heat and electricity) based on combustion of fossil fuels is another important source of POPs, especially PCBs. However, the share of thermo-power stations is quite low in Albania as the most of electricity comes from hydropower.

A serious problem is that Albania lacks a hazardous and industrial waste policy, governing the proper handling and use of chemicals. Thus mishandling of PCBs, or agricultural pesticides and biocides may be allowing the evaporation or leakage of these chemicals into the environment, with serious consequence for nature and human health. It is estimated that approximately 1 500 tons of chemical and hazardous wastes are stored throughout the country. In many cases, this waste is being stored without adequate safeguards or monitoring systems (UNEP, 2000c).

Generally government considers the environment to be an integral component of poverty reduction and will work to achieve an integrated rural development that includes the protection and improvement of use of natural resources. Environmental policies during the period 2002 – 2004 are directed at halting the process of environmental degradation; creating conditions for rehabilitation of polluted areas and promoting the sustainable use of natural resources.

In 2002 the Government formulated, with financial and technical support from World Bank, and other players of the international community, the National Strategy for Socio-Economic Development (NSSED). This Strategy, developed through a broad participatory process that included local government, civil society, private sector and donors, aims to address poverty reduction through a broad set of reforms and activities.

Currently the government, with support from UNDP, is engaged in a continued participatory dialogue and advocacy to integrate the Millennium Development Goals (MDGs) into the NSSED. Initial progress has been made in linking MDG-NSSED development priorities with the annual Medium-Term Budget Program (MTBP) under which Albanian public institutions are working. Thanks to UNDP efforts in promoting and advocating for national commitment to Millennium Development Goals, the NSSED is also seen as one of the mechanisms to achieve the Millennium Development Goals.

2.1 Pesticides

The use of pesticides in Albania has been decreasing since 1991.However, no procedure was applied to probate and record pesticides during this time. Some estimates of the use of pesticides in Albania after 1991 are given in Table 1.

Table 1: Usage of pesticides after 1991
Sources: ' MAF, * World Bank 1992, ** Dutch Project "For Strength of PPS in Albania", 1995

Year	Pesticides	
	Tons	a.i./ha*
1991'	1585	0.68
1992*	1700	0.73
1993**	790	0.34
1994**	740	0.32
1995**	520	0.22
2000	88	0.04

***a.i./ha = active ingredient per hectare**

2.1.1 DDT

DDT usage in Albania occurred for some years and is shown in Table 1. In 1981 in Tirana, Albania there was a massive DDT spill which exposed villagers to the highest level of ingestion of DDT ever recorded.

Table 2: Usage of DDT in Albania
Source: Pacyna, 1999 according to WHO Europe, 2003

Year	1970	1975	1980	1985	1990	1996
Amount of DDT (tonnes)	90	12	6.66	3	0	0

2.1.2 EU pesticides = toxic waste in Albania

At the end of 80s and the beginning has Albania gradually emerged from diplomatic isolation and began its transition to a free market economy. The governments and industries in the Western Europe, have cultivated a relationship with Albania afterwards. While this has generated numerous benefits for the Albanian economy, larger problems loom in the future. There are several notorious cases when western industries have taken it upon themselves to flood Albania with packaging and other byproducts of production which it is loath to dispose of within its own borders.

For example, the German company Schmidt-Cretan shipped between 1991 and 1992 to Albania 480 tons of hazardous chemicals. The most notable of these chemicals were toxaphene and phenyl mercury acetate, both of which have been banned in the EC since 1983. These shipments were made under the guise of "humanitarian aid" for Albania's agricultural sector.

It was only after the shipment's arrival in Albania that the Albanian authorities realized there were serious problems. The pesticides had expired, making then extremely hazardous, they were poorly packaged, of poor quality and generally unsuitable for use. Only after strong international pressure and setting up of stricter rules measures with regards to movement of hazardous waste forced German government to accept the return of the 1991-92 shipments. (Source: http://www.american.edu/ted/albania.htm).

A similar situation occurred in 1992 when the EU's PHARE programme (Poland-Hungary Aid

for the Reconstruction of the Economy) provided funds for the export of 214 tonnes of pesticides to Albania. The export was financed without adequate information as to whether the exports were needed or suitable. Afterwards it appeared that most of the 350,000 newly privatized smallholding farmers could not afford to buy foreign pesticides and also that most of these new farmers had little or no experience in handling toxic chemicals; they did not have information about the dangers of toxic chemicals; nor did they have information about the dangers of the particular pesticides or the necessary protective equipment.

By mid-1994 only a third of the pesticides had been sold, and the remaining stock expired in 1994-95. The pesticides sent included organophosphates, carbaryl and thiodan (containing endosulfan). (Source: http://www.pan-uk.org/pestnews/pn26/pn26p22.htm)

As late as in 2002 the Project of the Phare Program evacuated from Albania all the stock pesticides existing in the former storage sites of the agriculture sector and eliminated them in Germany. There are no more POPs pesticides listed in the Stockholm Convention in the agriculture sector in Albania

The state of the former storehouses in 2005 is problematic. Most of these storage sites are used for other purposes or as storage for the imported pesticides according to the legislation in place.

A POPs pesticides inventory of 2005 found out that there are not more such chemicals in stored in the agriculture sector of Albania. In the health sector there are still 1,948 kg of DDT 25 % and 1,140 kg of Lindane 10%.

These chemicals will be discussed with the MoEFWA (Ministry of Environment, Forestry & Water Administration) for final disposal under the frame of the project financed by the Dutch government for residues stored in Bishti Palla.

2.2 Waste

2.2.1 Health Care Waste

According to a UNECE study from 2002 there are 51 hospitals in Albania producing about 7.3 tons of medical and other hospital waste per day in seven cities. This amounts to 2,600 tons per year.

The bulk of medical waste is incinerated at the University Hospital Centre in Tirana, where a second-hand incinerator with no smoke purification equipment was installed through bilateral cooperation. This incinerator has a capacity of 108 kg/h. and is only used for the waste from one hospital. Because of a lack of financial and human resources, other hospitals do not collect and transport their waste for incineration.

Currently there are no exact data on how much medical waste is actually incinerated. It is clear that at present there are not enough facilities for hospital waste treatment. Therefore, they are dumped at uncontrolled landfills together with municipal waste. (UNECE, 2002)

2.2.2 Industrial waste

During the 90s the industrial activity in Albania decreased significantly. Before this period the main industrial sectors were smelting, metallurgy, oil refining and chemical production. For instance the chemical industry as a whole has practically shut down. At present few big industrial

plants are operating, but a significant amount of industrial solid waste is still stored at these sites. Many of these sites are contaminated by toxic chemicals and heavy metals; they are sources of soil, air and groundwater contamination.

Approximately 1,500 tons of chemical and hazardous wastes are stored across the country. In many cases, this waste is being stored on site without adequate safeguards or monitoring systems (UNEP, 2000c).

2.3 Industry

2.3.1 Air Pollution

Historically, the major sources of air pollution have been industries involved with chromium smelting, copper, cast-iron and steel metallurgy, and thermo-electric production. Since 1992, many of these industries have closed. Today, the major sources of air pollution are oil extraction and refining, domestic heating, cement production and unregulated garbage burning (UNEP, 2000c).

2.3.2 Chemicals

The mishandling of polychlorinated biphenyls, ozone-depleting chemicals, agricultural pesticides, and biocides may be unnecessarily allowing the evaporation or leakage of these chemicals into the environment, with serious consequences for nature and human health (UNEP, 2000c).

3. Levels of POPs

Up to now, in Albania there are not permitted levels of POPs except for some emission from certain industries. Based on the National Plan for the Approximation of Legislation and SAA Implementation, during the year 2007 will be established the permitted levels for POPs.

3.1 POPs levels in the environment

So far in Albanian environmental legislation there is not any legal act for POPs and no permitted levels for POPs in the environment are defined. By the Decision of the Council of Ministers of 2002, in the Permitted levels for emissions in air, there are defined permitted levels only for dioxins and PCBs for certain industrial activities. It should be mentioned that all permitted levels are transposed form respective EU Directives.

The first inventory of unintentional POPs compiled in the frame of preparation of NIP POPs Albania contained the following data for the respective source categories (Table 3). The data was prepared using the UNEP Toolkit. Note that most releases appear to come from uncontrolled burning. However, caution should be exerted in interpreting these figures. The UNEP Toolkit contains emission factors primarily derived from processes and practices in developed countries and substitution of its factors with those derived from the scientific literature or other government agencies can alter the source priorities as well as the total dioxin emissions per year. The result is that using the Toolkit can overestimate releases from some sources and underestimate releases from others. (Costner P, RAPAM, 2005)

Table 3: The preliminary dioxin inventory in Albania, October 2004

		Annual		Releases	g TEQ/a	
Cat.	Source categories	Air	Water	Land	Products	Residue
1	Waste	14	0	0	0	0.070
2	Ferrous and non	0.935	0	2.91	0	0
3	Power generation	0.000563	0	0	0	0.000111
4	Mineral production	1.00020	0	0.150	0	0
5	Transportation	0.3304245	0	0	0	0
6	Uncontrolled	43.154463	0	0.0065204	0	0
7	Chemicals and	0	0	0	0	0
8	Miscellaneous	0	0	0	0	0
9	Disposal/landfill	0	57.52910	0	0	0
1-9	Total	**59.4206505**	**57.529100**	**3.0665204**	**0**	**0.0763**

The preponderance of information in following paragraphs - Emission data, Mean annual concentrations in main environmental compartments, trends in emissions and mean annual concentrations in main environmental compartments, Depositions and transboundary fluxes of B[a]P - were borrowed from the following website:
http://www.msceast.org/countries/Albania/#popemis

3.1.1 Emission data

Emission data on PCDD/F, HCB, PCB, B[b]F, B[a]P and B[k]F transport used in calculations on the regional scale were taken from POPCYCLING-Baltic project (Pacyna et al., 1999). Total emissions of the country (Table 2) as well as the maps of spatial distribution of emissions for 1998 (HCB, PCBs) and 2001 (PCDD/Fs, B[a]P, B[b]F,B[k]F) used for modeling are presented. See the Annex 2.

**Table 4: Total emissions of POPs in Albania,
Total emissions of HCB, PCBs are from the year 1998 and
total emissions of PCDD/Fs, B[a]P, B[b]F,B[k]F are from the year 2001.
(source: http://www.msceast.org/countries/Albania/#popemis)**

POPs	Total emissions, t/y (for PCDD/Fs - g TEQ/y)
PCDD/Fs	2.7
HCB	$5.5 \cdot 10^{-2}$
PCBs	0.1
B[b]F	0.2
B[k]F	0.2
B[a]P	0.2

The experts estimates and official data (UN/ECE reported) of PTS emissions in Albania for the year 1995 are shown in Table 5. Mean HCB emission and deposition (dry + wet) estimates for Albania from the year 1998 are shown in Table 6. (UNEP, 2002 – Mediterranean Regional Report).

Table 5: The expert estimates and official data (UN/ECE reported) of PTS emissions in Albania (year 1995); *Estimate for 1996 (source: UNEP, 2002 – Mediterranean Regional Report)

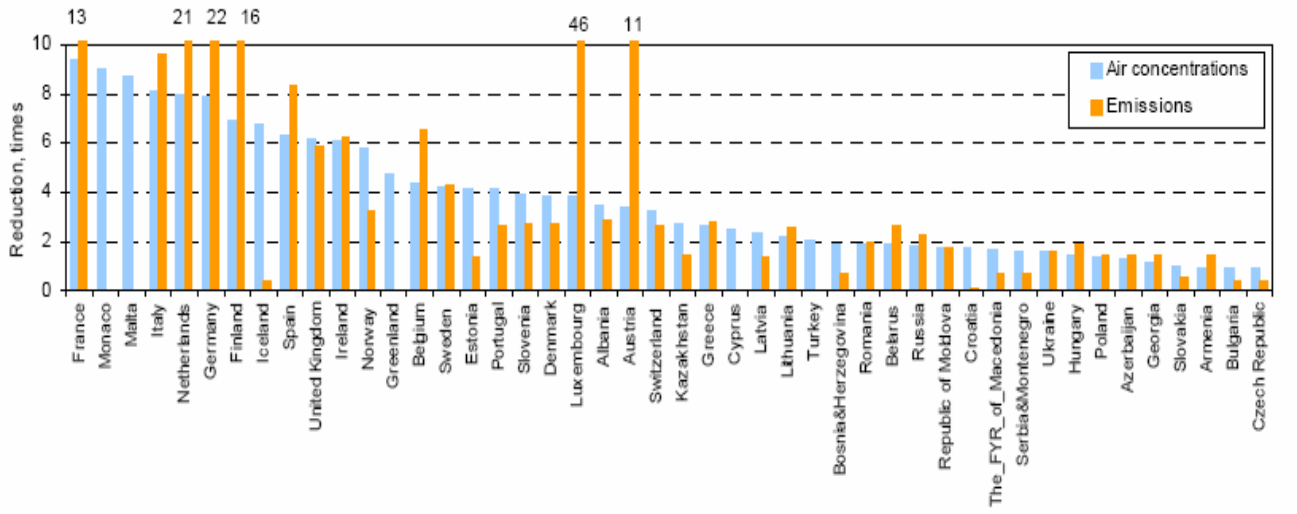
PTS	PCBs	HCB	PCDD/Fs	γ - HCH*
(kg/year)	146	55	2.67	463

Table 6: Mean HCB emission and deposition (dry + wet) estimates (year 1998) (source: UNEP, 2002 – Mediterranean Regional Report)

Country	Emission flux (g/km2/y)	Total emission (kg/y)	Deposition flux (g/km2/y)	Total deposition
Albania	1.88	60	0.15	4.46

The data of average concentrations of toxic congeners in the surface air layer of European countries as well as the emission trends in European countries including Albania are shown on the Graph 1.

Graph 1: A decrease in the average concentrations of PCDD/Fs in the surface air of European countries as compared with a decrease in the emissions of European countries from 1980 to 2001 (source: EMEP, 2004)



3.1.2 Mean annual concentrations in main environmental compartments

Calculated concentrations in various media including atmosphere (means over the country, minimum and maximum values in the country) are presented in Tables 5, 6 and 7. The maps of spatial distributions you can see in the Annex 3. Since according to the modeling results the content of HCB in vegetation is less than 1%, the corresponding map is not presented.

Table 7: Air concentrations, ng/m^3 (for PCDD/Fs - fg TEQ/m^3) (source: http://www.msceast.org/countries/Albania/#popemis)

POPs	Mean	Min	Max
PCDD/Fs	1.45	1.02	3.52
HCB	$5.54 \cdot 10^{-2}$	$4.86 \cdot 10^{-2}$	$6.12 \cdot 10^{-2}$
PCBs	$9.24 \cdot 10^{-2}$	$6.94 \cdot 10^{-2}$	0.13
B[b]F	0.23	0.13	0.86
B[k]F	0.17	$8.07 \cdot 10^{-2}$	0.79
B[a]P	14.65	13.42	17.67

Table 8: Soil concentrations, ng/g (for PCDD/Fs - pg TEQ/g)
(source: http://www.msceast.org/countries/Albania/#popemis)

POPs	Mean	Min	Max
PCDD/Fs	0.21	$8.36 \cdot 10^{-2}$	0.34
HCB	0.14	$5.78 \cdot 10^{-3}$	0.37
PCBs	4.12	0.39	10.01
B[b]F	2.69	0.56	7.08
B[k]F	1.99	0.31	6.20

Table 9: Vegetation concentrations, ng/g (for PCDD/Fs - pg TEQ/g)
(source: http://www.msceast.org/countries/Albania/#popemis)

POPs	Mean	Min	Max
PCDD/Fs	0.31	0.20	0.64
HCB	0.17	$3.75 \cdot 10^{-2}$	0.39
PCBs	10.93	3.95	28.37
B[b]F	29.57	3.96	71.94
B[k]F	18.34	1.88	54.84

3.1.3 Trends in emissions and mean annual concentrations in main environmental compartment

Trends in air, soil and vegetation concentrations of selected POPs, as well as trends in emission fluxes over the country are introduced in Annex 4.

3.1.4 Depositions and transboundary fluxes of B[a]P

On the basis of emission and meteorological data for 2001 transboundary depositions of B[a]P were calculated. The maps of air concentrations, maps of deposition fluxes from national sources, contributions of external anthropogenic sources to deposition to the country and total depositions to the country are presented in the Annex 5. Besides pie charts illustrate the deposition budget for principal regions-receptors and contributions of main sources to air concentrations and deposition to the country.

3.2 Transformer oils - PCBs

The information in this paragraph was taken from Koci K. (1998): The trend of POP pollution in the Albanian Adriatic Coast. Case study PCBs (1992-1996). In: UNEP/IFCS, 101-106.

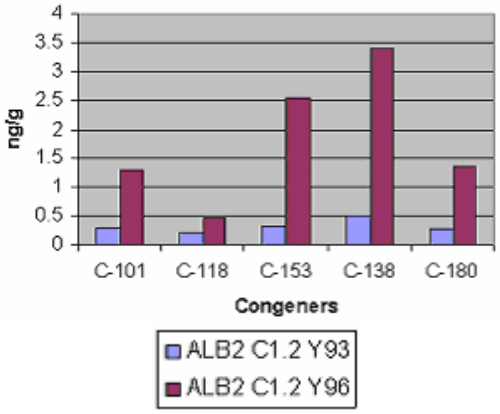
The first determinations of PCBs in Albania were made in the year 1992. Different batches of transformer oils were analyzed at that time and it was confirmed that the concentration of total PCBs in no case went beyond 1 ppm. During the six following years of transition time many old transformers were replaced and transformer oil from different sellers has been imported as well. The transformer oils from big transformers of Tirana and Durres region were analyzed in 1998. The analysis found out that the PCB concentrations have increased, in some of the oils up to 50 ppm (Table 10).

Table 10: PCBs Content of Big- Transformer Oils (April 1998)
(source: Koci, 1998)

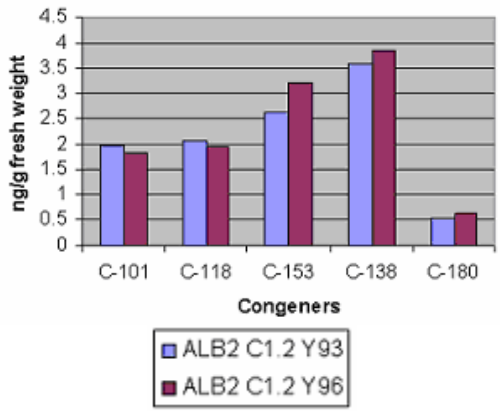
Sampling Site	Designation	∑ PCBs (μ g/g)
Tirana Substation 1	Transformer TI 1-0	1.1
Tirana Substation 1	Transformer TI 2-0	1.9
Tirana Substation 1	Recycling Unit	9.2
Tirana Substation 1	Recycling Unit(Oil/Soil)	5.9
Tirana Substation 2	Transformer SE 1-0	0.3
Tirana Substation 2	Transformer SE 2-0	1.1
Tirana Substation 2	Transformer SE 3-0	1.0
Tirana Substation 3	Transformer TR 1-0	1.5
Tirana Substation 3	Transformer TR 2-0	1.6
Durres Substation 1	Transformer SH 1-0	0.9
Durres Substation 1	Interrupter SH 11-S	42.2

3.3 Sediments and biota

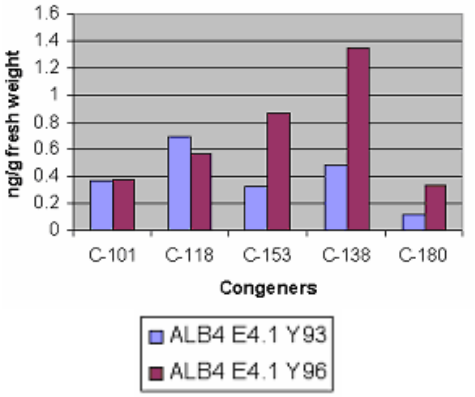
PCBs have been systematically analyzed in sediments and biota of the Adriatic Coast beginning in 1993 in the framework of the MEDPOL Phase II project, (Koci, 1998). The level of total PCBs in the year 1993 ranging from around 1 to 5 ppb (= ng/g dw) in sediments and from around 10 to 20 ppb for mussels (fresh weight). In the coming years they found a distinct increase of the PCB concentration in sediments and biota (see the comparison between 1993 and 1996 in graphs no. 2 – 5). In some sampling sites, especially in the coastal region in front of Tirana and near the Durres Harbor (Sampling sites ALB2/C1.2), this increase sometimes ranges up to five-fold in sediments. This increase is less pronounced in the southern part of the coast where there is less contribution from pollution.



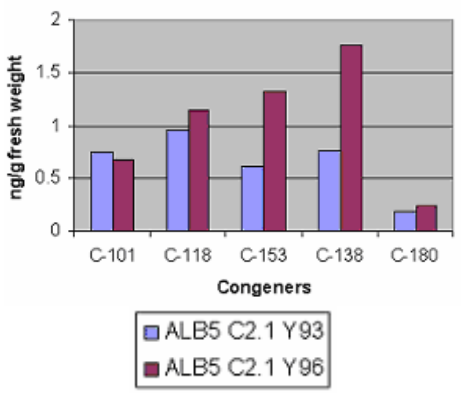
Graph 2: PCB-congeners in sediments near Durres Harbor
(PCB – congeners at sampling site ALB2/1.2 in sediment, Y93 = year 1993, Y96 = year 1996)
(source: Koci, 1998)



Graph 3: PCB-congeners in *Mytilus Galloprovincialis*, Durres Harbor
(PCB-congeners at sampling site ALB2/C1.2 in biota, Y93 = year 1993, Y96 = year 1996)
(source: Koci, 1998)



Graph 4: PCB-congeners in *Mytilus Galloprovincialis*, Semani River Mouth (PCB-congeners at sampling site ALB4/E4.1 in biota, Y93 = year 1993, Y96 = year 1996) (source: Koci, 1998)



Graph 5: PCB-congeners in *Mytilus Galloprovincialis*, Vlora Bay (PCB-congeners at sampling site ALB5/C2.1 in biota, Y93 = year 1993, Y96 = year 1996) (source: Koci, 1998)

3.4 Wildlife

The different levels of PCBs concentrations were found in the analyzed samples from the Lagoon of Karavasta (see Tables 11 - 13). The bird eggs have the highest concentrations of these compounds. The Karavasta lagoon complex has about 4200 ha of water and is considered today the most important wetland. It was set aside as a natural protected area 30 years ago. This area lies far from PCBs pollution sources.

The PCB residues were determined in eggs of a series of migratory birds (*Sterna* and *Pelecanus sp*.) inhabiting the Karavatsa lagoon, a natural protected area in Albania. Concentrations of total PCB congeners were in the range of 145 – 656 ng/g ww. The mean concentration in eel liver (*Anguilla sp*.) was 9 ng/g ww. (Source: UNEP, 2002 – Mediterranean Regional Report)

3.5 Breast Milk

PCDD/Fs, PCBs

PCDD/Fs and PCBs concentration in breast milk of the Albanian women is shown in Table 14.

Table 14: Albania – Dioxins in Breast Milk (source: Costner P., 2000 according to Liem and Rappe, 1999; Greenpeace, 1998; Greenpeace, 1999)

Approximate overall average (pg TEQ/g fat)	PCDD/Fs Range of averages (pg TEQ/g fat) = ppt TEQ	PCBs Range of averages (pg TEQ/g fat) = ppt TEQ	No. Samples in pool	Approximate year of sampling
4.3	3.8 – 4.8			1992 – 1993
city				
Tirana	4.8	2.3	10	1992 – 1993
Librazhd	3.8	1.7	10	1992 – 1993

The Table 15 shows the mean PCDD/Fs and PCBs levels in human milk for Albania, expressed as the sum of the six marker congeners as well as the coplanar congeners. The data are from 1987-1990 (source:

WHO, 1996; Border et al., 1993; Larsen et al., 1994 according to UNEP, 2002 – Mediterranean Regional Report). Found PCDD/Fs and PCBs levels in breast milk are at lower end of data collected from Europe.

Table 15: The mean concentration of PCBs and PCDD/Fs in human breast milk, Albania (source: UNEP, 2002 – Mediterranean Regional Report)

Congener / country	PCBs Marker congeners (ng/g lipid base)	PCBs Coplanar (pgTEQ/g lipid base)	PCDD/Fs (pgTEQ/g lipid base)
Albania	54.3	1.14	4.88

The levels of PCBs in human milk were obtained during the European Study. The average values for Albania were 42 ng/g and 63 ng/g (Langer P., 1998).

Table 11: Concentrations of Ballschmiter PCB-Congeners (ng/kg, fresh weight)

Sample specification	Sediment (top layer)	Myt. gallo-provincialis	Carcinus estuarii	Gobius bucchichi	Mugil cephalus	Dicentrarchus labrax	Dicentrarcus labrax (liver)	Mugil ramada	Mugil ramada (liver)	Anguilla anguilla	Ang. a anguilla (liver)	Sterna albifons-egg	Sterna hirundo-egg	Pelecanus crispus-egg
Congener														
C-28/31	54	82	77	180	125	155	1139	168	366	284	330	518	21954	4106
C-52	62	109	57	278	95	100	1287	131	252	232	1184	219	2012	3054
C-101	65	285	71	252	179	116	2140	157	341	266	3178	320	6367	2892
C-138	50	195	85	173	310	220	3241	360	659	551	4173	18255	45179	6937
C-153	224	1586	279	418	798	589	10807	900	1813	1859	7340	65910	142728	28399
C-180	54	144	41	72	163	164	2412	310	510	385	798	28486	64322	10040
Total µg/kg)	0.5	2.4	0.6	1.4	1.7	1.3	21	2-0	3.9	3.6	17	113.7	282.60	55.4

Table 12: Concentrations of non-ortho and mono-ortho PCBs (ng/kg, fresh weight)

Sample specification	Sediment (top layer)	Myt. gallo-provincialis	Carcinus estuarii	Gobius bucchichi	Mugil cephalus	Dicentrarchus labrax	Dicentrarcus labrax (liver)	Mugil ramada	Mugil ramada (liver)	Anguilla anguilla	Ang. a anguilla (liver)	Sterna albifons-egg	Sterna hirundo-egg	Pelecanus crispus-egg
Non-ortho PCBs														
C-77	1.6	9.3	1.8	8.2	5.8	2.9	24.4	4.2	11.8	3.6	23.1	18	370.5	36.2
C-81	0.6	0.55	0.5	2.4	0.6	1	7	0.5	2	2.1	19.9	27.6	110.9	26.1
C-126	3.6	1	0.2	n.d.	1.4	1.1	8.3	1.2	3.8	2	n.d.	37.1	183.8	31.4
C-169	0.1	0.3	0.1	0.5	0.3	0.3	1	0.3	0.9	0.5	n.d.	13.3	58.9	8.6
Mono-ortho PCBs														
C-105	28.4	54.3	28.4	105.1	83.7	46.5	1037	71.3	157.4	153.9	3049.50	1511.3	6295	1423.8

C-144	0.8	4	1.1	7.5	5.6	3.2	38.2	3.8	7.2	7.7	139	78.3	154.4	55.4
C-118	55.4	122.3	79	245.7	231.1	119.8	2218	259.4	485.6	559.1	6820	7054	12631	5079
C-123	3.8	16.4	6.7	26.6	18.2	11.5	192.2	20	50	32.6	484.5	265.1	503.7	388.6
C-156	7.1	27.7	9.4	36.8	33.2	21.1	393.6	47.2	92.2	61.4	932.6	1893.2	5295	1108.7
C-157	4.6	10.1	2	9.8	10.6	6	132.1	11.6	25.8	14.1	240.4	341.5	1729	2608
C-167	1.5	11.4	3.9	13.5	18.1	12	128.9	18.4	41	34.4	331.3	1975.6	1889	289.2
C-189	0.5	4.3	0.3	1.5	2.9	2.2	17.9	9.8	17.5	6.8	9.5	334.3	1261	307.6

Table 13: Concentrations of the PCBs according to chlorine No. (ng/kg, fresh weight, total PCBs (µg/kg, fresh weight)

Sample specification	Sediment (top layer)	Myt. gallo- provincialis	Carcinus estuarii	Gobius bucchichi	Mugil cephalus	Dicentrarchus labrax	Dicentrarcus labrax (liver)	Mugil ramada	Mugil ramada (liver)	Anguilla anguilla	Ang. a anguilla (liver)	Sterna albifons-egg	Sterna hirundo-egg	Pelecanus crispus-egg
Cl-No.														
1	3	4	3	35	9	7	27	6	22	10	8	3	4	6
2	58	123	87	393	119	106	427	147	344	247	467	138	1712	142
3	129	270	136	499	208	293	1914	319	653	509	596	596	35693	5190
4	308	506	279	1410	584	589	7647	582	1592	1222	8448	3828	30629	21852
5	366	978	386	1773	1289	604	14336	967	2113	2177	28012	16824	40161	17356
6	498	2704	639	1371	2455	1484	27658	2541	5292	4059	30806	142423	322988	61496
7	163	994	110	250	590	417	10662	941	1639	907	3059	55573	203701	34236
8	13	37	10	25	70	68	986	111	233	156	90	11248	18605	3790
9	2	9	2	9	10	9	83	10	43	21	8	1005	1728	436
10	2	4	1	4	3	11	33	9	37	11	2	561	491	140
Total PCBs														

(#1-209) (µg/kg)	1.5	5.6	1.7	5.8	5.3	3.6	63.8	5.6	11.9	9.3	71.5	232.2	655.7	144.6
TE (WHO 97)	0.37	0.14	0.04	0.07	0.2	0.15	1.47	0.19	0.52	0.32	1.7	5.94	24.69	4.67

4. Damage caused by POPs

Several hot-spots have been identified by different organizations, missions such is UNEP mission, EC mission etc.

Table 16: List of identified environmental hot spots in Albania (various sources)

Place	Chemical
Pesticide and dichromate, Porto Romano-Durres	Chlorobenzenes, Lindane, chromium
Chlorine alkali and PVC factory, Vlore	Mercury, PCDD/Fs
Marize oil field, Patos	Oil in the Gjanice river
Waste Disposal Site, Sharra	PCDD/Fs,[a] heavy metals, PAHs
Oil refinery, Ballsh	Oil in the Gjanice river
Nitrate fertilizer plant, Fier	Arsenic
Metallurgical complex, Elbasan	Waste contaminated by heavy metals, fluorine
Copper factory, Rubik	Copper
Phosphate fertilizer factory, Lac	Arsenic and copper

4.1 The Chemical Enterprises in Porto Romano- Durres

Until 1990, the former chemical plant in Durres produced sodium dichromate, for leather tanning, and pesticides, such as Lindane (gamma-HCH) and thiram (tetramethylthiuram disulfide). When the plant was operating, it produced 6-10 tons of Lindane per year. Until very recent times, some families lived in the area of the former Lindane production process for several years. Their houses were built using contaminated bricks from the old Lindane production building 20 meters away. The families were keeping domestic animals – cows, sheep and goats – inside the plant area. The domestic animals fed there and were exposed to the contaminated soil. A well with a depth of about 6 meters is located inside the plant and was being used to water the animals and irrigate vegetables. In 2006 one family is still staying within the area of the former plant.

UNEP analyses showed high levels of technical HCH mixtures in the area of the plant and in storage facilities located 2 kilometers away. UNEP samples identified tetra-, penta-, hexa-, and hepta-chlorinated cyclohexanes, in which the hexachlorane isomers were dominant (UNEP, 2000b).

A summary of UNEP samples is showed in the Table 21.

A UNEP soil sample taken from the Lindane production area contained 8.79 g/kg of HCH- isomers. The isomers are shown in the Table 17. The content of heptachlorinated cyclohexanes was 10%, the tetra- and pentachlorinated cyclohexanes 5%. The sample also contained 0.172 g/kg of tri- and tetrachlorinated benzenes.

[a] Levels of PCDD/Fs measured in soil samples from the Sharra dumpsite are in fact low - comparable to levels in agricultural soils in such countries like Czech Republic for example, it is estimated that the site might be a dioxin hotspot due to waste open burning, but no other dioxin measurements are available so far.

Table 17: HCH isomers in soil

Total / isomer	Amount (g/kg)
HCH- isomers	8.79
α-HCH	2.4
β-HCH	2.0
γ-HCH	3.14
δ-HCH	1.29

Table 18: HCH isomers in cow milk

Total / isomer	Amount (mg/kg)
α-HCH	4.86
β-HCH	7.27
γ-HCH	0.13
δ-HCH	0.47
ε-HCH	0.084

A **well water sample** contained 4.4 mg/l of chlorobenzene, 60 µg/l of 1,3- and 1,4-dichlorbenzene and 7 µg/l of 1,2,3- and 1,2,4-trichlorbenzene. The HCH content in this sample was 4 µg/l.

A **milk sample** is shown in Table 18 and the UNEP conclusion is as follows: *"These concentrations suggest that milk cannot be used for human nutrition without poisoning a serious risk for health. It can be assumed that the concentration of HCH-isomers in the animal´s tissues is much higher"* (UNEP, 2000b).

A sample of **sheep's wool** contained the concentration showed in the Table 19.

Table 19: HCH isomers in sheep's wool

Total / isomer	Amount (mg/kg)
α-HCH	0.062
β-HCH	0.11
δ-HCH	0.14

A **soil sample** from the area of the former dichromate plant (about 20m from the Lindane production process) contained HCH-isomers in the quantities showed in the Table 20.

Table 20: HCH isomers in soil

Total / isomer	Amount (mg/kg)
α-HCH	1.1
γ-HCH	0.71
δ-HCH	0.4

One site at a nearby wetland has been used as a dumpsite, which is divided from the Adriatic Sea by a road. The site still contains toxic waste including Lindane and chromium-rich residues (UNEP, 2000c).

There is also a storage site, Bishti i Palles, located approximately 1.5 kilometers from the former plant. The storage site consists of three buildings that contain an estimated 370 tons of chemicals. According to local experts, and based on site inspection, these include Lindane, methanol, carbon sulfite, sodium dichromate, mono-methylamine, and di-methylamine (UNEP, 2000c).

Table 21: Samples results from chemical plant in Durres – September 20, 2000 (UNEP, 2000b).

Sample	Place	Chemical	Concentration
air	40 m behind former Lindane production process	pentachlorcyclohexane	4 ppb
air	60 m behind former Lindane production process	pentachlorcyclohexane	4 ppb
sheep wool	20 m behind former Lindane production process	α-HCH β-HCH δ-HCH	0.062 mg/kg 0.11 mg/kg 0.14 mg/kg
milk	20 m behind former Lindane production process	α-HCH β-HCH γ-HCH δ-HCH ε-HCH HCB	4.86 mg/kg fat 7.27 mg/kg fat 0.13 mg/kg fat 0.471 mg/kg fat 0.084 mg/kg fat 0.02 mg/kg fat
pepper	20 m behind former Lindane production process	HCH	No HCH
soil	chemical reactor hall of former Lindane production process	α-HCH β-HCH γ-HCH δ-HCH	2,400 mg/kg 2,000 mg/kg 3,140 mg/kg 1,290 mg/kg
soil	sodium dichromate production	α-HCH β-HCH γ-HCH δ-HCH	1.1 mg/kg low level 0.71 mg/kg 0.40 mg/kg
water	6 m deep well outside house 20 m behind former Lindane production process	Clorbenzene 1,3- and 1,4-dichlorbenzene 1,2,3- and 1,2,4-trichlorbenzene	4.4 mg/l 0.06 mg/l 0.007 mg/l

The ruins of former chemical plant in Porto Romano – Durres, contaminated with chromium residues, hexachlorane and other chemicals will be encapsulated in a area within the former chemical plant. The work is underway.

As for the stock of hazardous chemicals, including hexachlorane in Bishti i Palles, there is another project financed by Dutch government for their repackaging and removal from Albania for final disposal

4.2 Chlorine alkali and PVC factory, Vlore

Four miles north of Vlore is the site of former chemical complex that produced chlorine, alkali, vinyl chloride monomer and polyvinyl chloride. The plant was closed in 1992, and its buildings have been completely destroyed since that time. Families now live around the industrial site. The factory encompasses approximately 1 km^2 and is located directly on the Adriatic Sea. A major environmental problem is posed by the destroyed former chlorine-alkali electrolysis plant. UNEP observed drops of metallic mercury in the hall of the electrolysis plant and in all of its drainage canals (UNEP, 2000b).

There is no information on levels of POPs as PCDD/Fs as no special analysis have been done on the site.

The plant used to discharge all of its wastewater into Bay of Vlore without treatment. Sludge from the production process was been dumped in an area between the plant and the Bay of Vlore (UNEP, 2000c).

4.3 Waste Disposal Site, Sharra Tirana

Sharra is Tirana's principal landfill. It stores most forms of non-industrial urban waste, including medical waste. The area's soil and water is vulnerable to pollution due to the geological structure of the soil (sand, gravel and clay), the lack of a protective lining, untreated drainage water and the hydrological connections between groundwater and the surface water of the Erzen River.

UNEP samples were analyzed for organic and inorganic pollutants. Soil samples from the landfill contained urban organic compounds, such as fatty acids (mono- and dicarbonic acids), phthalates, ionic and non-ionic tensides (surfactants) in the range of approximately 10 mg/kg. The dioxin content in the soil sample is shown in Table 22. The measured levels are comparable to soils category[b] in the vicinity of highly polluted watercourses, soils with high emission burden, and soils with long-term repeated application of sewage sludge in the Czech Republic (Holoubek, I. et al. 2003/2005). It has to be noted that every country needs a ranking of soil pollution based on in-country data. We make this comparison, because there is a lack of data about dioxin levels in soils from Albania.

Significant air pollution is being caused by the burning of waste, especially plastics. An air sample contained traces of substances such as alkylated benzenes and PAHs. Trichloromonofluoromethane was also found.

Because the dumpsite is completely accessible to domestic animals and people, higher levels of these pollutants are probably being directly inhaled (UNEP, 2000b).

Table 22: Levels of 17 dioxins (PCDD/Fs) congeners in a soil sample taken by UNEP from Sharra landfill - September 18 – 2000. Source: UNEP Chemicals (2000b). Note: (* n.d.=not determined)

PCDD/F congener	WHO-TEF	Absolute	WHO-TEQ
		in pg/g dry matter	
2,3,7,8 TeCDD	1	0	0
1,2,3,7,8 PeCDD	1	0	0
1,2,3,4,7,8 HxCDD	0.1	1.2	0.12
1,2,3,6,7,8 HxCDD	0.1	2	0.2
1,2,3,7,8,9 HxCDD	0.1	1.1	0.11
1,2,3,4,6,7,8 HpCDD	0.01	12.9	0.129
0CDD	0.0001	26.1	0.00261
2,3,7,8 TeCDF	0.1	2	0.2
1,2,3,7,8 PeCDF	0.05	1.6	0.08
2,3,4,7,8 PeCDF	0.5	1.3	0.65
1,2,3,4,7,8 HxCDF	0.1	2.5	0.25
1,2,3,6,7,8 HxCDF	0.1	2.9	0.29
1,2,3,7,8,9 HxCDF	0.1	0	0
2,3,4,6,7,8 HxCDF	0.1	2.2	0.22
1,2,3,4,6,7,8 HpCDF	0.01	8.9	0.089
1,2,3,4,7,8,9 HpCDF	0.01	0	0
OCDF	0.0001	4.5	0.00045
PCDD/F		**69.2**	**2.34106**

[b] With levels of dioxins in a range between 1.6 – 14 pg TEQ/g.

Until now Albania does not have a sanitary landfill for disposal of urban solid waste. The burning of waste in the dumpsite is a common feature for all dumpsites of this kind of waste in the main cities and towns of the country. At the same time there is not yet a chemical analysis on the dioxins/furans neither in air nor in water.

In March 2006 the Albanian Parliament adopted a loan from the Italian Government for 6.5 million Euros (0.5 million was granted) for intervention in the Sharra dumpsite. It is foreseen to improve the environmental and health management of the dumpsite, including extinguishing the fires and extending the time of its use for five more years.

4.4 Metallurgical complex, Elbasan

The metallurgical complex in Elbasan was in full operation between 1977 and 1990. During this period, the complex emitted quantities of SO_2, CO_2, cyanides, phenols, H_2S and dust. Since 1990, all the processes have been closed, except a scarp steel smelter. The smelter emits particles, CO, SO_2 and iron dust. The environmental problem is caused by a hydro-tailing and dust from a former coke production process (UNEP, 200b).

Today a complex of factories in the town of Elbasan producing cement, steel and chrome faces new emission curbs in an attempt to safeguard people's health.

4.5 Copper Smelter / Factory in Rubik

Until it closed in 1998, the copper factory in Rubik produced refined copper products for wiring. Under normal conditions the heavy metals are immobilized in the slag. These heavy metals are washed out, and the acidic water contains copper, chromium and cadmium (UNEP, 2000b).

According to the Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases (UNEP, 2005) production of ferrous and non-ferrous metals is known large source of PCDD/Fs in many European countries. However no analysis on POPs was done on the site.

4.6 Results of analyses for organochlorine pesticides in soil and eggs

In spring 2006 Arnika in cooperation with EDEN Center conducted a field visit of some environmental hot spots in Albania, namely the ex-chemical plant in Porto Romano, the waste disposal site Sharra – Tirana and the metallurgical complex in Elbasan. The field visit resulted in the collection of samples of soil and eggs, which were then analyzed for organochlorine pesticides content in the Czech Republic by laboratory Axys Varilab. Chicken eggs were prepared for analysis and analyzed in same way as during global eggs sampling project carried out by IPEN (DiGangi, Petrlík 2005).[c]

[c] The eggs were kept in cool conditions after sampling and then were boiled in Albania by EDEN Center for 7 - 10 minutes in pure water and transported by train to the laboratory at ambient temperature. After being received by the laboratory, the eggs were kept frozen until analysis. The egg shells were removed and the edible contents of eggs were homogenised (sample from Elbasan 1 contained 1 egg, in other two cases 3 eggs were analyzed in a composite sample). A 30 g sub-sample was dried with anhydrous sodium sulphate, spiked by internal standards and extracted by toluene in a Soxhlet apparatus. A small portion of the extract was used for gravimetric determination of fat. The remaining portion of the extract was cleaned on a silica gel column impregnated with H_2SO_4. The extract was further purified and fractionated on an activated carbon column. The fraction containing OCPs was analysed by GC-MS on Autospec Ultima NT.

Two samples were collected from the area of Porto Romano which is notoriously known as one of the worst environmental hot spots in the Balkan region because of the abandoned chemical plant for sodium dichromate and pesticides, such as Lindane (gamma-HCH) and thiram (tetramethylthiuram disulfide). The first one is a sample of mud (Table 23), which was collected in the storage building containing barrels of obsolete chemicals. The storage house is situated in Bishti i Palles, which is located approximately 1.5 kilometers from the former plant. Also eggs from chickens grazing in the vicinity of the plant were analyzed for organochlorine pesticides content (Table 24). In the both cases high levels of Beta HCH and Lindane were found. These findings confirm this area as one of the most contaminated environmental hot spots in the Balkan region.

Table 23: Concentrations of particular organochlorine pesticides in the sample (mud) collected in storage house in Bishti i Palles. Source: Axys Varilab CZ 2006.

Chemical	Amount ng/g(dm)
TeCB*	0,56
1,2,3,4 TeCB	1,3
Hexachlorobenzene	3,7
Beta HCH	3900
Lindane	120
delta HCH	570
o,p' DDE	ND
p,p' DDE	2,9
o,p' DDD	0,62
p,p' DDD	1,4
o,p' DDT	1,1
p,p' DDT	1,2

***total sum of 1,2,4,5 and 1,2,3,5 isomers**

Table 24: Concentrations of particular organochlorine pesticides in the sample (free range chicken eggs) collected close to obsolete chemical plant in Porto Romano

Chemical	Amount ng/g (fat)
TeCB*	4,5
1,2,3,4 TeCB	3,5
Hexachlorobenzene	10
Beta HCH	1800
Lindane	59,8
delta HCH	11,4
o,p' DDE	ND
p,p' DDE	220
o,p' DDD	ND
p,p' DDD	1,6
o,p' DDT	1,5
p,p' DDT	39,9

***total sum of 1,2,4,5 and 1,2,3,5 isomers**

Analysis for OCPs was done in the Czech Republic in laboratory Axys Varilab. Laboratory Axys Varilab, which is a certified laboratory by the Institute for technical normalization, metrology and probations under Ministry of Industry and Traffic of the Czech Republic for analysis of POPs in air emissions, environmental compartments, wastes, food and biological materials.

Tables 25 and 26 show the amount of organochlorine pesticides found in eggs collected in the Elbasan area, which is influenced by emissions from a large metallurgical complex. The complex is, however, partially closed nowadays. Eggs were collected in front of the entrance to the metallurgical complex (Elbasan I.) and also few kilometers away, close to the cement kiln (Elbasan II.).

Table 25: Concentrations of particular organochlorine pesticides in the sample (free range chicken eggs) collected close on site Elbasan I. (close to metallurgical complex). Source: Axys Varilab CZ 2006.

Chemical	Amount ng/g (fat)
TeCB*	0,28
1,2,3,4 TeCB	0,24
Hexachlorobenzene	3,4
Beta HCH	14,7
Lindane	1,8
delta HCH	0,51
o,p' DDE	ND
p,p' DDE	150
o,p' DDD	ND
p,p' DDD	0,44
o,p' DDT	1,8
p,p' DDT	52,7

***total sum of 1,2,4,5 and 1,2,3,5 isomers**

Table 26: Concentrations of particular organochlorine pesticides in the sample (free range chicken eggs) collected close on site Elbasan II. (close to cement kiln). Source: Axys Varilab CZ 2006.

Chemical	Amount ng/g (fat)
TeCB*	0,26
1,2,3,4 TeCB	0,24
Hexachlorobenzene	23,9
Beta HCH	12,5
Lindane	5,5
delta HCH	0,44
o,p' DDE	ND
p,p' DDE	56,4
o,p' DDD	ND
p,p' DDD	NMS
o,p' DDT	0,65
p,p' DDT	7,2

***total sum of 1,2,4,5 and 1,2,3,5 isomers**

The last sample (Table 27) is a sediment from the outflow from the Tirana's principal landfill – Sharra, where is disposed off municipal waste, including waste from hospitals. The outflow of the dumpsite discharges later to the river Erzen.

Table 27: Concentrations of particular organochlorine pesticides in the sample (sediment) collected from the outflow of waste water from landfill Sharra – Tirana. Source: Axys Varilab CZ 2006.

Chemical	Amount ng/g
TeCB*	0,11
1,2,3,4 TeCB	0,26
Hexachlorobenzene	0,99
Beta HCH	7,5
Lindane	0,44
delta HCH	0,78
o,p' DDE	0,29
p,p' DDE	10,5
o,p' DDD	6,3
p,p' DDD	15,9
o,p' DDT	5,6
p,p' DDT	37,5

***total sum of 1,2,4,5 and 1,2,3,5 isomers**

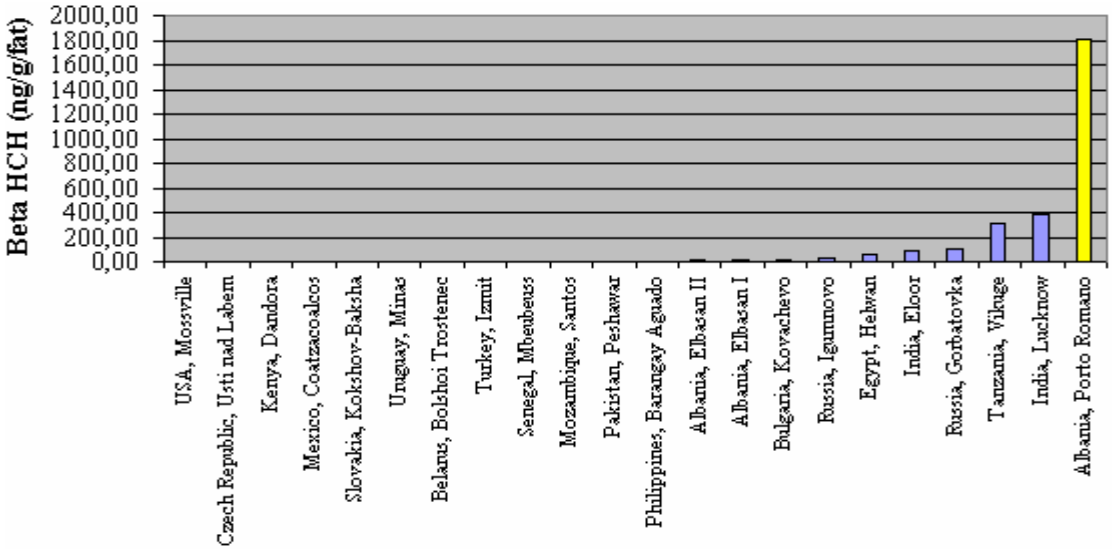
Table 28 shows the levels of the selected organochlorine pesticides, which have been found in free range chicken eggs samples from different parts of the world. In diagrams 6, 7 and 8 is a graphic comparison of the detected values (Data source: Blake, 2005 and measurements done by Axys Varilab CZ 2005 on Arnika's request during global eggs sampling project in 2005). Eggs collected in the vicinity of the abandoned chemical plant in Porto Romano are substantially higher in Beta HCH and Lindane than eggs from another sample sites. For example, the second highest concentration of Beta HCH, which was detected in eggs collected close to unsecured medical waste incinerator and 25 km far from the pesticides factory (in the Chinhat Industrial Area) in Lucknow, India is still about 4 times lower than in eggs collected in the vicinity of the abandoned chemical plant in Porto Romano.

An increased level of HCB was found in chicken eggs sample from Elbasan taken near cement factory (see Graph 8). This level is comparable to those found in industrialized areas from other parts of world (Mexico, Czech Republic).

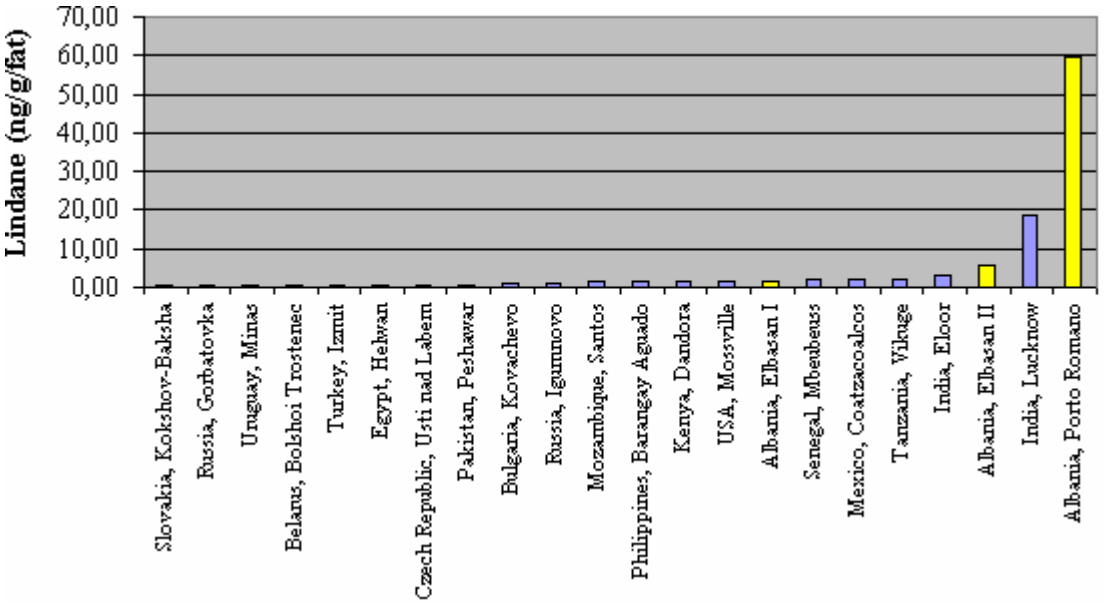
Table 28: Sampling locations, concentrations of total hexachlorobenzene, Lindane and Beta HCH in composite egg samples, and characterization of sampling sites (based on data from Blake, 2005 and the field measurements).

Sample Location	HCB (ng/g fat)	Lindane (ng/g fat)	Beta HCH (ng/g fat)	Characterization of sample site
Albania, Elbasan I	3,4	1,8	14,7	Metallurgical complex
Albania, Elbasan II	23,9	5,5	12,5	Cement kiln
Albania, Porto Romano	10	59,8	1800	Chemical plant
Belarus, Bolshoi Trostenec	4,7	0,58	2,40	Dumpsite (fires)
Bulgaria, Kovachevo	25,5	1,10	19,50	Power plants, industrial area
Czech Republic, Lysa nad Labem	46,4	NA	NA	Hazardous waste incinerator
Czech Republic, Usti nad Labem	35,8	0,68	0,54	Chlorine chemical industry site, hazardous waste incinerator
Egypt, Helwan	15,1	0,66	52,50	Metallurgy, cement kilns
India, Eloor	7,7	3,00	85,40	Organochlorine pesticides production
India, Lucknow	34,5	18,90	390,00	Medical waste incinerator
Kenya, Dandora	4,4	1,40	1,10	Dumpsite (fires)
Mexico, Coatzacoalcos	34,5	2,20	1,40	Petrochemical complex
Mozambique, Santos	0,9	1,30	4,50	Cement kiln burning waste
Pakistan, Peshawar	1,1	0,75	4,70	Mixed waste dumpsite
Philippines, Barangay Aguado	1,7	1,30	6,80	Medical waste incinerator
Russia, Gorbatovka	68,9	0,50	100,00	Chlorine chemical industry site, hazardous waste incinerator
Russia, Igumnovo	11,8	1,10	36,30	Chlorine chemical industry site, hazardous waste incinerator
Senegal, Mbeubeuss	1,7	2,00	4,00	Dumpsite (fires)
Slovakia, Kokshov-Baksha	10,7	0,48	1,80	Municipal waste incinerator
Tanzania, Vikuge	19,1	2,30	310,00	Obsolete pesticides storage
Turkey, Izmit	5,3	0,60	3,70	Hazardous waste incinerator
Uruguay, Minas	1,4	0,51	2,00	Cement kilns burning waste
USA, Mossville	1,2	1,70	0,27	PVC and oil industries

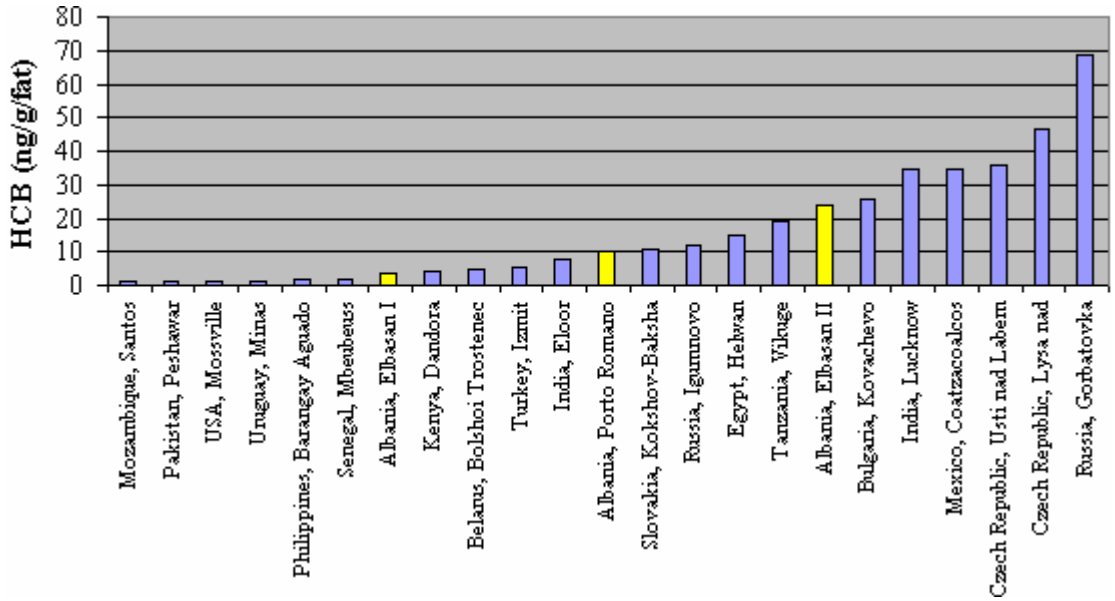
Graph 6: Comparison of Beta HCH levels found in composite egg samples from various countries



Graph 7: Comparison of Lindane levels found in composite egg samples from various countries.



Graph 8: Comparison of HCB levels found in composite egg samples from various countries.



5. Laws currently regulating POPs and activities related to POPs in Albania

The national legislation does not contain any separate law or bylaw which is contrary to the provisions of Stockholm Convention, but up to now there no specific legal act to deal with POPs.

In some laws and bylaws, as well as in some other state documents for environment, there exist open windows for future treatment of POPs in accordance with the requirements of the Convention. The preparation of the specific legal frame to enable the implementation of the requirements of the Convention is part of the general efforts to transpose and harmonize the national legislation with the EU one in the field of environmental and human health protection. The preparation and approval of each of the acts, part of the specific legislation on POPs, shall be realized in accordance with an approved detailed program, in the frame of the NIP which is short, medium and long term, giving priority to the most necessary acts and approval of which ease the preparation of the others.

There have been already undertaken steps which in some way do touch the problem of POPs in Albania. A list of particular activities or legislative changes, which have been already done or which are going to be carried out are noted bellow (European Environment and Health Committee – available at: http://www.euro.who.int/eehc/implementation/20051108_1).

1. The law on Service on the Protection of Plants, approved in March 2005, bans the use of chlorinated pesticides. The procedure of registration for pesticides involves issuing permits for their importation and application after they have been subject to judgement by several research institutions and the State Commission on Pesticides on their effectiveness, impact on human health, animals and environment, possible secondary effects etc. The classification of pesticides and their toxicity is based on EU recommendations

2. The new revised national environment action plan envisages the establishment of a centre of clean technologies that would develop a legal framework for cleaner production, strengthen intersectoral involvement in implementing clean technologies and policies that develop them, and strengthen crisis management in the event of industrial accidents, both nationally and locally. A centre for cleaner production was set up in 2005. A project has started to develop training programmes on introducing cleaner production particularly in small and medium sized enterprises. The main goal would be to reduce waste generation at source and make technological processes more efficient economically and environmentally.

3. A UNDP project began in 2004 on preparation of a POPs National Implementation Plan under the Stockholm Convention and is now in its implementation phase, in collaboration with the Ministry of Environment, its aim being to phase out POPs and manage contaminated sites. The project will enable Albania to ratify the Convention.

4. In 2005 Albania adopted a national plan for legislation approximation, to bring the country in line with the EU. All environmental EU Directives are likely to be transposed.

6. NGOs and POPs

The issue of POPs is rather new for NGOs in Albania so it is necessary to build up their own capacity in this field. In Albania there is a wide range of other environmental problems which need to be resolved and therefore the POPs issue somehow faded down. This is also due to relatively high complexity of the topic and also lack of financial support, which is necessary in order to work effectively on the issue of POPs.

In Albania, EDEN Center, recently began working on POPs and has joined the IPEP project. Most of their activities on this field are aimed on the awareness-raising campaign.

The main activities that are made in the framework on POPs related issues in Albania are:

- Identify and investigate Albanian printed and electronic media about the public information on POPs effect and its situation in Albania during last 2 years. Analyze the good and missing points of this information (September 2005)
- Following each step of inventory process of other teams ,informing continuously the public for it, between news or reports published in "Ekolevizja" newspaper (like specialized newspaper in environmental issues) or in daily newspaper and TV stations
- Collecting information and awareness material for creating a leaflet about POPs and printing it. In the day of report the leaflet is prepared and ready to print in 1000 copies
- Till now we are prepared with good information for the filming about POPs We have started documentation in film inventory work of other teams creating basic material for producing a short documentary on POPs in Albania.

As well as the need for broad public participation the success of the awareness on POPs depends on the active participation of many groups in the implementation of the activities anticipated by the Plan

7. Efforts to deal with POPs

7.1 Government

In the field of chemicals, the Government of Albania has signed the Stockholm Convention on Persistent Organic Pollutants on 5 December 2001 and ratified it in 2004. It has further accessed to the Basel Convention on Transboundary Movements of Hazardous Waste and their Disposal in 1999. Albania has yet to sign the UNECE Convention on Long-Range Transboundary Air Pollution and its Protocol on Persistent Organic Pollutants (POPs). It also has not signed or ratified the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.

Hazardous chemicals, wastes, contaminated soil and waters are of high priority in Albania. Both the NSSED (National Strategy for Socio-Economic Development) and sectoral policy papers such as National Environmental Action Plan (NEAP) identified number of priority actions in the areas of human safety and security from hazardous chemicals. The NEAP laid down several goals, targets and areas of interventions that POPs Enabling Activity project will provide valuable contribution toward implementation of action plan.

Albania is in the process of negotiating a Stabilization and Association Agreement (SAA) with the European Union, which will set the conditions for the country's eventual accession to the EU. The project will help the government in achieving its aim by addressing issues related to the contaminated sites around the former pesticide factory and landfill sites. A UNEP commissioned study 'Post Conflict Environmental Assessment-Albania' revealed that Durres, in the vicinity of the former pesticide factory is highly contaminated with Lindane and other isomers of hexachlorohexane. Although Lindane (and other isomers of HCH) are not yet included in the Stockholm Convention, they are, however, listed as a POPs in the regional UNECE LRTAP POPs protocol.

7.1.1 PCB

In 1997-1998, the PCB content in various parts of the country has not been monitored. In relation to this, it is necessary to identify through out the country the large electrical transformers, which are the main users and contain the larger quantity of PCBs, and also determine the amount of used oils. It can be hypothesized that the situation of POPs in Albania is not critical, although their impact (biomonitoring, human health) has not been monitored.

(source: http://enrin.grida.no/htmls/albania/soe1998/eng/issues/waste/hchimpac.htm)

7.1.2 Waste issue

According to data from the Ministry of Environment (2002) municipal waste generation stood at 0.7 kg per inhabitant per day, or 255 kg per inhabitant per year in the four main cities of the country. The disposal of municipal waste needs to be solved. In most cities waste is collected and transported by a municipal or privatized waste management service company. Rural areas are not yet covered by municipal waste management services. The main components of municipal waste in the big cities are inert materials, plastics and vegetable scraps and all municipal waste is deposited at uncontrolled dumpsites, along with industrial and hospital waste and hazardous waste and there is no inventory of such sites. Waste is also burned in open areas. Even urban waste is not treated in an environmentally and sanitary way.

A law on environmental management of solid wastes was approved in 2003 and sub laws are underway. A feasibility study was done on a landfill for hazardous waste. Environmental Impact Assessment is underway to select the site. A draft law on hazardous wastes is in the adoption process.

In the last few years, as part of the LIFE project, the Environmental Centre for Administration and Technology in Tirana has prepared a strategic plan for managing hospital waste for the capital city, which will serve as a model. Measures should be taken to increase public awareness on environmental health impacts, which at the moment is not sufficient.
(source: http://enrin.grida.no/htmls/albania/soe1998/eng/issues/waste/hchimpac.htm)

8. State of Stockholm Convention Ratification and the National Implementation Plan

Albania signed the Stockholm convention on December 5, 2001 and ratified it on October 4, 2004. The National Implementation Plan should be submitted on January 2, 2007 to the UNEP Stockholm Convention Secretariat (source: http://www.pops.int/).

Since January 2005 the United Nations Development Programme on POPs is running in Albania with the objective to strengthen the capacity and build ownership in Albania, to meet its obligations under the Stockholm Convention, including preparation of a POPs National Implementation Plan. The National Implementation Plan describes how Albania will meet its obligations under the Convention to phase-out POPs sources and manage POPs contaminated sites. The project will enable Albania to ratify the Stockholm Convention and become a Party to the same.

The Enabling activity project will be divided into 4 main tasks: General project coordination, legal assessment awareness raising POPs, monitoring schemes and capacity assessment

- Compilation of initial POPs inventory
- POPs priority setting, evaluation of management options and drafting National Implementation Plan
- Finalization of National Implementation Plan

Final output of the project will be strengthened national capacity to meet its obligations under the Stockholm Convention and National Implementation Plan will be formulated. The project lasts 12 months, so it should finished by the end of December 2006. (source: http://www.undp.org.al/?projects,79)

9. Public awareness activities

9.1 Public Information in Albania

Up to the early 1990s there was very little access to or dissemination of environmental information in Albania. The concept of provision of information, particularly environmental information, is relatively new. The Albanian Constitution of 1998 recognizes everyone's rights "to be informed on the environmental situation and its protection" and "to participate in decision-making processes". Another step forward was the approval of the Guidelines "On the environmental information and public access for environmental information," No. 7, dated 19.1.1998 by the Minister of Health and Environment**.**

These guidelines determine the type of information that the MoE should possess and guarantees the right of every citizen to have access to information, regarding the environmental elements, the activities that have or might have negative impacts on the environment and human health, as well as the measures for their protection, including administrative measures and the programs for the environmental administration and conservation policies and strategies, designed for this purpose. The guidelines also determine how the request must be presented, the format for the information requested by the public, and the deadlines for providing the information or refusing the request.

One of the priorities of the environmental Strategy and National Environmental Action Plan of 1993 is "development of environmental knowledge and increased public participation in environmental issues". The participation of non-governmental organizations in environmental issues as foreseen in the National Environmental Action Plan of 1993 aims at increasing public awareness on environmental issues through mass media, seminars and conferences, and also through designing policies that enable public participation in decision-making and the development of environmental standards.

A significant accomplishment in the field of public information and participation was the signing on 25 June 1998 and ratification on 27 June 2001, of the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, commonly known as the Aarhus Convention. This Convention was translated into the Albanian language during 1999, and then distributed to national level institutions and NGOs for comments and then to the Ministry of Foreign Affairs for submission to the Council of Ministers and Parliament for ratification.

In order to fulfill the obligations of this Convention, a Draft-Law on "The Public Rights on Environmental Information" was prepared. This project was undertaken with the legal assistance of the PHARE Program. In collaboration with the Regional Environmental Center (REC), a meeting of the Parliamentary Commission of Health and Environment and Parliamentary Commission of Laws was held in July 2000 in order to facilitate its ratification by the Parliament. According to the agreement on Association and Stabilization with the EU and the governmental program for the four-year period from 2002-2006

In addition, there are several other international legal frameworks with provisions on access to environmental information, public participation and access to justice such as the Universal Declaration of Human Rights, the Convention on Climate Change (ratified in October 3, 1994), and Biodiversity Convention (ratified in January 4, 1994)

9.2 Access to Information

Environmental information is mainly disseminated through electronic and print media. A considerable number of information leaflets, posters, and fact-sheets on the environment have been produced and distributed. The regular publications include the Environmental Bulletin of MoE (100 printed copies, four editions per year), the State of Environmental Reports in Albanian and English (1 000 printed copies), the biweekly newspaper "Ekolevizja" ("Ekomovement") published in 600 copies and managed from 22 environmental associations group named "Ekolevizja", and the REC Daily Environmental News disseminated electronically to approximately 300 addresses.

Information about the MoE is available through the Internet www.moe.gov.al. There are about five articles or news stories per day per eight-to-ten independent daily newspapers. Limited environmental information is disseminated through TV and radio.

The articles of the newspapers are very much focused on "news" and not analysis. There is a lack of investigative journalism that could give more in-depth analyses of environment-economic related issues. The only professional edition in the environmental issues is the biweekly newspaper "Ekolevizja" which has investigative articles and environmental news and is distributed in all Albania

Nevertheless Albanian citizens are not generally well informed about the risks of pollution, the relationship between the environment and public health, and the benefits of a clean environment for the economy and society as a whole. This is also true among national and local politicians and the international community. There is a great need for improved environmental awareness at all levels of the society. Additionally, measures to facilitate and stimulate the public's right to seek environmental information should be taken.

Even if the Ministry of the Environment receives only about four-to-five official requests for environment-related information a month, public interest in and concern for environmental issues have increased during the last few years. In the newly established Environmental Information Centre one to two individuals visit the centre per day and search for the environmental information.

If the public is interested in certain environmental issues, requests for information have to be made to the public authorities. It should be noted that there are existing procedures on answering public requests. The procedure is defined by the guidelines "On the environmental information and public access for environmental information," The practice, however, shows that some of the requests made to the MOFF (Ministry of Environment Forest and Fishery) have been denied.

An accessible pollutant release and transfer register (PRTR) or a similar system does not exist at the moment. However, theoretically the public has the right to access environmental information in individual facilities on, for example, released pollution, produced waste and wastewater or similar activities either from public authorities or directly from facilities. On the other hand, the practice shows that the inspectors of the Regional Environmental Agencies do not have the right to enter a factory if the owner does not agree. Requests to public authorities for information on confidential activities, international affairs, national defence, public security, issues under investigation or already investigated, materials which if announced might further damage the environment, and unfinished draft materials may be refused.

The way information is collected and maintained does not facilitate public access. However, a big part of all materials available in the MoE and in the Environmental Information Centre libraries can be used and copied in limited number of copies free of charge. In other cases when the requested information must be copied in quantity, the actual cost for copying must be paid.

9.3 Public awareness and participation

In the last 5 years, public information has increased as a result of numerous activities of civil society in general and the environmental NGOs in particular. Mass media, especially the printed and the electronic media, have been and remain the most committed in this area.

The number of NGOs acting in the environmental field has increased. In 1994 there were only 7, while at the end of 2000 the number had reached 70 NGOs. The projects implemented by these organizations have increased year by year and their main topic has been informing the public and raising awareness about environmental protection.

In order to formalize the cooperation with the environmental NGOs, MoE has signed a Memorandum of Understanding with the NGOs. MoE and the local government in many cities of Albania implement activities in coordination with NGOs, especially on the national and international environmental days.

The right of the public to access information is incorporated in the Constitution of the Republic of Albania, which was approved in 1998. In this context, the amendment made in 1998 to the law "On Environmental Protection" guarantees the right of each individual to be informed. The Albanian Parliament ratified the Aarhus Convention in 1999 dealing with this issue.

Nevertheless, the developments and achievements in the field of public information, awareness and participation can be considered to be modest.

An Environmental Information Centre is in the process of being established within the MoE, but is not organized yet to publish and offer the necessary environmental information upon request.

Although the media are paying increasingly more attention to subjects of environmental concern, a professional approach is lacking in some cases. Training of journalists to treat environmental problems in an objective, professional and timely manner, is another field which should be supported and encouraged by the MoE. Till now association "Masmedia and Environment" have made the training of printed journalists in environmental journalism but these projects are supported from foreigner donors, not from MoE.

9.4 Public Education and Awareness

Environmental education in the country today is poorly funded and it is only offered to a limited number of young Albanians. It seems that schools are not actively promoting environmental education through environmental project weeks or similar activities. Methodological materials, textbooks, and training are lacking for teachers and students. The Albanian Development Education Project (SOROS) has proposed a new curriculum model for primary, secondary and high schools, but aspects of environmental education are not incorporated. To try out the curriculum sixteen schools were chosen as pilot schools.

The fulfilling of the tasks in the Action Plan will depend on the involvement of directors of all levels of the administration and of NGOs.

The representatives of central institutions and NGOs have participated in the process of preparing the Action Plan and will continue to be important partners for effectively and sustainable implementing UNEAP - 2001.

A special emphasis should be put on the preparation of education programmes for the interested parties, including central and local institutions.

The activities will focus on the preparation of training materials, seminars and courses for teachers, journalists, etc. Many institutions, including NGOs, will be involved in the organization of media awareness raising activities.

The critical components for increasing the environmental awareness of the public will be the collection, processing and analysis of environmental data and the dissemination of the information, to all the interested parties involved in the implementation of the Action Plan, including managers and users of natural resources, researchers, NGOs and the public.

The improvement of public environmental awareness is considered one of the priority activities of the Plan and, beside the participation of central and local administration directors, NGOs will play a key role. The partnership of state institutions with NGOs is critical to the achievement of the objectives of Action Plan with respect to public awareness and participation.

10. Recommendations on a solution to the POPs problem

Bellow are depicted some general recommendations which may help in the process of dealing with POPs problem:

- To develop a legislative basis on POPs with regard to Albanian conditions and international requirements.
- To complete an inventory of sites and sources of POPs in Albania.
- To develop a database of sources of POPs.
- To locate POPs hot spots in Albania, evaluate the level of danger and propose solutions.
- To carry out measures concerning regulations, prohibitions and environmentally-friendly liquidations of primary and secondary sources of POPs contamination.
- To dispose of POPs, POPs contaminated equipment and POPs contaminated waste , including hospital waste, with the help of environmentally-friendly methods and technologies.
- To organize a monitoring system of POPs in the environment of Albania.
- To organize a monitoring system of POPs in contaminated sites, in emissions for main sources of POPs, food products and drinking water.
- To organize technical support for POPs monitoring through equipping laboratories with modern devices of analytical control and the creation of new laboratories with highly qualified staff.

- To develop a list of environmentally-friendly technologies for POPs elimination with regard to their effectiveness, economic suitability and possibility of use in the territory of Albania.

- To support scientific research on POPs problem in Albania for a better understanding of the problem and ways of finding solutions.

- To organize a program on rehabilitation of territories contaminated by different kinds of POPs.

- To organize a system of preventive measures regarding the safety of the workforce during the POPs-related work and the complex of medical and biological measures during the extraordinary situations.

- To start an informational and educational campaign on POPs and their impact on the environment and public health.

- To inform the population about the process of implementation of the Stockholm Convention.

- To create an informational centre on POPs problems.

- To foster and maintain the active participation of NGOs and civil society organizations in decision-making and activities related to POPs.

11. Alternatives to POPs

The shift away from POPs and other toxic chemicals must generally build on the significant steps taken to date and continue at an even faster rate, spurred by much greater investments of money and energy. Viable alternatives, products and processes are not the problem. Many are already in use or in practice around the world. The challenge is to make these alternatives more widely known and available and to accelerate research, community based activities, and other initiatives. Although the shift from POPs is a long term effort, this transition has already gained considerable momentum. But without increased support, especially by key decision makers in industry and government, this momentum could be lost. The opportunity to advance alternatives to POPs exists at all levels of decision making within and among governments, in the industrial sector, and throughout civil society. (WWF, 1999)

The negotiation with regard to POPs problem must be undertaken both on national and international level. Strong initiative in this field will help chart the way forward to phasing out and banning the production and use of persistent chemicals, while identifying, promoting, and implementing alternatives that are environmentally acceptable, effective, and affordable for all.

Viable alternatives exist for almost all known uses and sources of these chemicals. Utilizing cultural, biological, physical, and bio-rational control methods, Integrated Pest Management (IPM) offers the agricultural sector a range of alternatives to POPs pesticides. Industrial chemicals such as PCBs used as insulators in electrical transformers and capacitors can be replaced by biodegradable substitutes such as

mineral oils and silicone oils. As unintentional byproducts of manufacturing processes and combustion, dioxins and furans pose a more difficult challenge due to their ubiquitous nature. However, dioxin emissions can be significantly reduced through such actions as moving away from municipal waste incineration and concentrating on expanded recycling, reuse, and composting programs; eliminating the use of chlorine bleaching in pulp and paper manufacturing; and replacing PVC plastic with other plastics that do not contain chlorine - or by using more traditional materials such as wood, metal, paper, and glass. (source: http://www.worldwildlifefund.org/toxics/projects/project2a.cfm)

13. New POPs

13.1 BFRs – Brominated Flame Retardants

These products are basically used as additives in different applications, and encompass a variety of chemical species. The most used are polybrominated diphenyl ethers (PBDEs), polybrominated biphenyls (PBBs), tetrabromobisphenol (TBBPA) and hexabromocyclododecane (HBCD).

The major source of BFRs is their evaporation from products in use. BFRs are particularly emitted to in-door environment from products where the flame retardants were / are used as additive. This is the case of computer monitors or other elements from TV sets. BFRs emissions from televisions are shown in Table 27.

Table 27: BFRs emissions from televisions and computers at home in service for ten years (source: International Telecommunication Union, 2002 according to UNEP, 2002 – Mediterranean Regional Report)

TV, PC /BFRs	No	TBPPA	DecaBDE	OctaBDE	PentaBDE
TV units* (x1000)	480	0.02	3.28	0.47	0.34
PC units** (x1000)	30	0.02	0.04	0.06	0.29

***It has been considered that only 5% of the televisions contain TBPPA as additives.**
****It has been considered that 65% of computers contain TBBPA.**

The BFR, pentabromodiphenyl ether has been nominated to the Stockholm Convention and recently declared by the POPs Review Committee to be a POP. Currently, the Committee is assembling the risk profile for the substance. At COP2 of the Stockholm Convention, the EU announced their intention to nominate octabromodiphenyl ether to the Convention list.

13.2 Lindane

Lindane has been nominated by Mexico to be included on POPs list under Stockholm Convention. The POPs Review Committee declared Lindane to be a POP and currently is assembling the risk profile.

According to information mentioned above there are several hot-spots contaminated by this chemical in Albania.

14. Resources on POPs

Websites:

A) Governments / IGOs / Institutions

1. Stockholm Convention website - http://www.pops.int/
2. The United Nations in Albania - http://www.un.org.al/
3. UNEP Chemicals website – http://www.unep.org/ http://www.unep.org/themes/chemicals/
4. UNDP – POPs - http://www.undp.org/gef/05/portfolio/chemicals.html#pops

5. UNIDO – POPs - http://www.unido.org/doc/46478
6. UNDP / GEF – http://www.undp.org/gef/05/
7. GEF - Small Grants Programme - http://sgp.undp.org/
8. World Health Organisation - http://www.who.int/en/
9. Basel Convention website - http://www.basel.int/
10. EU (European Union) website – POPs - http://www.europa.eu.int/comm/environment/dioxin/index.htm
11. State of the Environment in Albania 1997-1998 - http://enrin.grida.no/htmls/albania/soe1998/eng/index.htm
12. European Environment and Health Committee - http://www.euro.who.int/eehc/implementation/20051108_1
13. World Bank POPs website - http://lnweb18.worldbank.org/ESSD/envext.nsf/50ParentDoc/PersistentOrganicPollutants?Opendocument
14. Meteorological Synthesizing Centre-East - http://www.msceast.org/about.html
15. U.S. Environmental Protection Agency - http://www.epa.gov/
16. Danish Environmental Protection Agency - http://www.mst.dk/homepage/
17. Food and Agriculture Organization of the United Nations - http://www.fao.org/
18. Protocol on Pollutant Release and Transfer Registers - http://www.unece.org/env/pp/prtr.htm
19. EUNECE (United Nations Economic Commission for Europe - http://www.unece.org/
20. European Environmental Agency - http://www.eea.eu.int/
21. OECD (Organisation for Economic Co-operation and Development) - http://www.oecd.org/

B) NGOs / NGOs Networks

22. IPEN (International POPs Elimination Network) website - http://ipen.ecn.cz/
23. IPEP (International POPs Elimination Project) website - http://www.oztoxics.org/ipepweb/
24. Greenpeace website - http://www.greenpeace.org/international_en/
25. WWF website - http://www.panda.org/ http://www.panda.org/about_wwf/what_we_do/toxics/index.cfm
26. GAIA (Global Anti- Incinerator Alliance, Global Alliance for Incinerator Alternatives) - http://www.no-burn.org/
27. PAN (Pesticide Action Network International) website - http://www.pan-international.org/

Databases / Magazines:

a) toxicological databases – international

1. ATSDR (Agency for Toxic Substances and Disease Registry) - http://www.atsdr.cdc.gov/
2. INCHEM (Chemical Safety Information from Intergovernmental Organisations) - http://www.inchem.org/
3. Haz-Map Occupational Exposure to Hazardous Agents - http://hazmap.nlm.nih.gov/index.html

b) Magazines

1. Environmental Health Perspectives - http://ehp.niehs.nih.gov/

POP Experts / Ministries / Institutions:

Institution	Name	Address	Tel.	E-mail
POPs Profile Information – Reporting Form: **Source:** http://www.chem.unep.ch/pops/pops-gs/al/popf3.pdf				
Faculty of Natural Sciences, University of Tirana	Kosta Koci	Boulevard Deshmoret E Kombit, Tirana, Albania	3554225454	
National Environmental	Agron Jana	Boulevard Bajram Curri,	3554264905/ 30682	cep@cep.tirana.al

Agency		No 9, Tirana		
National Environmental Agency	Dr. Tatiana Kotobelli	Boulevard Bajram Curri, No 9, Tirana	3554264905/ 30682	cep@cep.tirana.al
Ministry of Agriculture and Food	Aleksander Kolaci	Sheshi Skenderbej Boulevard Deshmoret E Kombit	3554223952	
National Veterinary service				

IFCS National Focal Point
(IFCS – Intergovernmental Forum on Chemical Safety)
National Environmental Agency
Attn: Dr Tatjana Hema, President
Blvd. Zhan D'Arc, No. 1, Tirana, Albania
Tel: (355) 43 65229 / 42 30682
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Fax: +355 (4) 232075, 234448
http://www.undp.org.al/?contacts

Albania - POPs Enabling Activity: Preparation of the POPs National Implementation Plan under the Stockholm Convention
POPs Project Management Unit
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GEF Small Grants Program
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Phone: +355-4-230-541
Email: arian.gace@undp.org
Web: http://www.gef-sgp.org.al

15. References

Axys Varilab CZ 2005: Reports No. 618/1-10 on PCDD/Fs, PCBs and OCPs determinations of samples No. 4443-4450, 5769-5779, 5781-5787, 5783B, 5802 and 5808 issued in March 2005 in Vrané nad Vltavou.

Axys Varilab CZ 2006: Report No. 743/1 on OCPs determinations of samples No. 6218-6222 issued in April 2006 in Vrané nad Vltavou.

Blake A., (2005): The Next Generation of POPs: PBDEs and Lindane - “Keep the Promise, Eliminate POPs!” Campaign and Community Monitoring Working Group of the International POPs Elimination Network (IPEN) Report

Costner P., (2000): Dioxin Elimination, A Global Imperative, Greenpeace International
the report is available at: http://archive.greenpeace.org/toxics/reports/dioxelim.pdf

Costner P, RAPAM, Estimating releases and prioritizing sources in the context of the Stockholm Convention: Dioxin emission factors for forest fires, grassland and moor fires, open burning of agricultural residues, open burning of domestic waste, landfill and dump fires. International POPs Elimination Project, International POPs Elimination Network, December 2005

DiGangi, J., Petrlík, J. (2005): The Egg Report. "Keep the Promise, Eliminate POPs!" Campaign and Dioxin, PCBs and Waste WG of IPEN Report. Prague - Chicago, April 2005. Also available at:
http://www.oztoxics.org/ipepweb/egg/Sampling%20Report%201.html

EMEP (2004): Persistent Organic Pollutants in the Environment - Status Report 3/2004; the report is available at: http://www.msceast.org/reps/3_2004.pdf

Greenpeace (1998) - Allsopp M., Stringer R., and Johnston P.: Unseen Poisons – Levels of Organochlorine Chemicals in Human Tissues, Global Review of Data on 12 Priority Persistent Organochlorine Pollutants and Some Other Organochlorines in Human Tissues
the report is available at: http://archive.greenpeace.org/toxics/reports/unseenpo.pdf

Greenpeace (1999): The Tip of the Iceberg – State of knowledge on POPs in Europe and Arctic; the report is available at: http://archive.greenpeace.org/toxics/html/content/popinc_links.html

Holoubek, I. et al. 2003/2005: Úvodní národní inventura persistentních organických polutantů v České republice. Project GF/CEH/01/003: ENABLING ACTIVITIES TO FACILITATE EARLY ACTION ON THE IMPLEMENTATION OF THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (POPs) IN THE CZECH REPUBLIC. TOCOEN, s.r.o., Brno representing Consortium RECETOX - TOCOEN & Associates, TOCOEN REPORT No. 249, Brno, August 2003. Version 2003.
Koci K. (1998): The trend of POP pollution in the Albanian Adriatic Coast. Case study PCBs (1992-1996). In: UNEP/IFCS, 101-106; the report is available at:
http://www.chem.unep.ch/pops/POPs_Inc/proceedings/slovenia/koci.html

Langer P. (1998): Polychlorinated Biphenyls and the Thyroid Gland – Minireview, Endocrine Regulations, Vol.32, 193-203; the article is available at: http://sav.sk/journals/endo/full/er0498e.pdf

UNECE (2002) – Environmental Performance Review of Albania for the Eighth session of the Committee on Environment Policy; available at: http://www.unece.org/env/epr/studies/albania/

UNEP Chemicals (2000a): Proceedings of the Subregional Workshop on Identification and Management of PCBs and Dioxins/Furans - Koci K., Schramm K.-W., Henkelman B., Marku E.: Polychlorinated Biphenyls in a Low Polluted Area (Karavasta Lagoon; Albania): Levels; Patterns; and Biomagnification; the report is available at: http://www.chem.unep.ch/pops/POPs_Inc/proceedings/croatia/Cavtat_2000.pdf

UNEP Chemicals (2000b): Balkans Technical report – Analytical Results of UNEP Field Samples from Industrial Hot Spots in Albania; the report is available at: http://enrin.grida.no/htmls/albania/reports/tech/docs/tec_anal.pdf

UNEP (2000c): Post Conflict Environmental Assessment – Albania; United Nations Environment Programme.

UNEP (2002) - Mediterranean Regional Report – Regionally Based Assessment of Persistent Toxic Substances; the report is available at: http://www.chem.unep.ch/pops/POPs_Inc/proceedings/croatia/Cavtat_2000.pdf

UNEP Chemicals (2005): Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2nd Edition

WHO Europe (2003): Health Risks of Persistent Organic Pollutants from Log-Range Transboundary Pollution

WWF (1999): Successful, Safe, and Sustainable Alternatives to Persistent Organic Pollutants; the report is available at: http://assets.panda.org/downloads/successful_english.pdf

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