International POPs Elimination Project

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

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Monitoring of POPs pesticides in the Slovak Republic

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OIKOS

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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.

This report is available in the following languages: English, Slovak

Monitoring of POPs pesticides in the Slovak Republic

Summary

The use of POPs pesticides was banned in Slovakia in the 1980s and 1990s (DDT- 1973, HCB - 1974, aldrin - 1979, endrin and toxaphene - 1984, heptachlor - 1989) but their residues still have been present in particular compounds of environment in consumables and feedstuff as well as in human tissues. They have a bio-accumulative nature mainly in human and animal tissues.

With respect to fact that that the harmful character of pesticides on human organisms was unambiguously proved, their occurrence should be effectively monitored as well as their chain, dynamics and accumulation in environment and human and animal tissues. Another necessity is informing the wider public about pesticides' occurrence, their negative impacts on human organisms and about the possibilities of protection from their negative health effects for instance by changing feeding habits, buying more quality food and bio-products etc.

The second problem connected with the pesticides is represented by stocks of obsolete pesticides. There are approximately 30 thousand tones of them according to statistical data but these are only officially registered stocks and there is reasoned presumption that there is essentially a larger amount of the obsolete pesticides kept unofficially, mostly in unsatisfying conditions (for instance in Bielovce – Greenpeace 2004/05) and practically accessible to the uninformed public. There is the same necessity to introduce general monitoring of their appearance, compete registration and defining dynamics of their spread and accumulation (for instance by general information system – GIS). Also, the public must receive information about health and life risks connected with manipulation of obsolete pesticides.

We want to emphasize that the named steps are only an inevitable precondition for adoption and introduction of long-term measures directed to the maximum reduction of pesticides' negative impacts on human health and the environment. Such measures must be based on legislation, on personal, technical and financial matters and their adoption should be government's immediate priority. The problem with the pesticides begins first in agriculture. It spreads in the environment and has large impacts on human health. It means that at least three areas; agriculture, environment, and health, are responsible for a solution which will require longtime efforts of all the involved parties.

This work describes the basic framework of pesticides monitoring. It lists responsible authorities, views the situation with POPs in the Slovak Republic from selected perspectives (food etc.), evaluates the current system of their monitoring in particular environmental compounds, and offers measures for improvement.

We would like to thank to all the involved parties (FEE TU-ZV, Slovak Hydrometeorological Institute, Institute for Food Research) who collaborated on this document or otherwise helped with its creation.

Daniel Lešinský – project coordinator

Contents

POPs in water

As for checking and monitoring POPs in water and food, these activities take place within the control of the Slovak Ministry of Environment which presents information about monitoring and its results on *www.iszp.sk* (information system about environment). More detailed information is available in partial information systems informing particularly about environmental compounds – water, heterogeneous substances. The system that concerns water is run by the Slovak Hydrometeorological Institute *(www.shmu.sk)* which makes measurements. The Institute measures the quality of surface and underground water. Monitoring of POPs for the partial monitoring system on water is done by the Research Institute for Water Management *(www.vuvh.sk)* and the State Geological Institute *(www.sguds.sk)* and the results are published on website www.*shmu.sk* (link ČMS VODA). Parameters observed in the underground water in 2003 can be seen at the address www.shmu.sk./?page=645. Monitoring results and methods are available in a table on www.shmu.sk/?page=645.

Contact addresses for persons involved in the management and measurement of underground water in the Slovak Hydrometeorological Institute:

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Surface water has been monitored for its POPs content but monitoring is limited in this case. An overview of parameters is not complete but only within regulations. Data on parameters in 2003 are available on www.shmu.sk/?page=666.

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POPs in food and organisms

The presence of POPs in organisms has been observed within the monitoring system focused particularly on heterogeneous substances in food, which is done by the Food Research Institute (www.vup.sk). The partial monitoring system is divided into 3 subsystems:

- coordinated targeted monitoring
- monitoring of food basket
- monitoring of fair game and fish

The monitoring aims to provide objective data on contamination of food chain inputs (soil, animal feed, water for feeding and irrigation, materials of plant and animal origin) within the context of the general environmental situation in the Slovak Republic,and has a direct relation to the subsystem "General research of soil contamination" within the partial monitoring system.

Contact addresses on persons working on the partial monitoring system - polluting chemicals in food:

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Ing. Angela Světlíková
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7. Contact person: Ing. Helena Satková
Tel.: 07/50237 190
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Coordinated direct monitoring is organized by organizations under the Slovak Ministry of Agriculture. The field is the basic monitoring unit. Plant production from approximately 800 fields a year and animal farm production is monitored in five year cycles (on the same cadastral area). Representative regions are included for territorial coverage of the Slovak Republic.

In the first five year period, the monitored localities were selected every year by overlaying maps of contamination of materials of plant and animal origin (elaborated every year on a base of results of a general check-up of heterogeneous substances since 1986); evaluation of a level of environmental pollution in the Slovak Republic) (worked out by URBION); and field monitored in the particular year by the Central Institute for Agricultural Control (Metodic of the coordinated targeted monitoring, Bratislava 1991). The coordinated targeted monitoring in 2000 was made in agricultural companies that had been subjects of this monitoring in 1995.

The partial monitoring system concerning heterogeneous substances has been connected with the international monitoring system GEMS/FOOD since 1994.

Samples of animal feed and materials of animal origin used in food production are taken from the selected areas when they are headed (feeding or plants for human nutrition). Samples of materials of animal origin (milk, meat, entrails) are taken in parallel in the same locality. These are taken four times a year. Samples of animal feed and water for animals are taken in parallel with the samples of animal origin on these farms. Only the following chemicals containing POPs are monitored within the coordinated targeted monitoring: Congeners of PCB – PCB 28, PCB 52, PCB 101, PCB 138, PCB 153, and PCB 180 .

Contamination of food and animal tissues

Polychlorinated biphenyls (PCBs) are monitored within the coordinated targeted monitoring in materials of animal origin, in samples of feed and in irrigation water. No samples withcontent of PCBs exceeding limits set by Slovak legislation were found in any year when the monitoring was done.

The same as in the case of chemicals, the evaluation was focused on comparing changes in contamination of particular commodities after five years. We compared average findings of PCBs in 1992, 1997 and in 2002 with average findings from the second year of 3 cycles in selected districts where the samples were repeatedly taken. PCBs have been observed since 1992 and sum of PCB and particular cogeners were monitored from 1994. When we compared average findings, we saw a slight decrease of average content of PCBs both in all commodities at the same time and also in commodities in all monitored districts in 2002 than in 1997.

Because PCBs had been analysed as a sum until 1994 and as 6 cogeners after that year, sums of findings of each cogener were used for average findings in each sample separately in order to get a comparison.

The highest average results of sum of PCBs were discovered in a beef meat in 1992. Later we saw a significant decrease in average findings. Measurements in 2002 showed PCBs under the quantification limit in 74,6% of the samples. In the last couple of years the average results of PCBs are also under the limit of particular cogeners (0,15 mg/kg lipid and 0,2 mg/kg lipid). The largest decrease in average findings of PCBs sum was found in 1997 compared to 1992 when it achieved 50,4%.

Similarly as in case of the beef, the average results also decreased in pork. Average results decreased by 34,2% in the second cycle with the exception of 2000 when the concentrations were slightly higher than in 1995.

The most significant decrease of PCB sum was discovered in 2002 compared to 1997 (decrease by 71,2%) while in 1997 the decrease was 35% compared to 1992. In 2002, PCBs under the quantification limit were found in 100% of the measured samples.

The appearance of PCBs in milk has been monitored since 1992. A sum of PCBs was monitored until 1994 and after this date particular PCB cogeners were measured. In order to compare the results we counted out a sum of PCBs also for the years after 1994 by summing up the findings of each cogener. Similarly as in the case of meat, a significant decrease was found in average results in the second cycle. PCBs in milk monitored in 2002 were under the quantification limit in 80,1% samples.

Other monitored polluting substances with the content of POPs

Contamination of food in consumers‘ network by pesticide residues was not too large in 2002. Samples with pesticide content above limits were registered in Slovakia in 2002 only in case of drinking water when content of HCB was exceeded (128% of the limit). In 92,7% of the samples the discovered content of PCB was under the detection limit.

Exposition of population exposure to DDT isomers and analogs (DDD, DDE) has been analyzed since 1993. An intake of the sum of DDT into the human organism was calculated on the basis of the found data and compared with the limit exposition concentration “acceptable” daily intake (ADI) which is 20 mg/kg body weight. The discovered concentrations fulfilled 0,97% of human exposition (ADI) limits. Average exposition intakes for the population were very low. The intake of DDT slightly increased in 1999 and 2000 compared to 1997, but this was followed by a decrease of the

exposition levels in 2001 and 2002 when the concentrations were lowest in the whole monitoring period.

DDT isomers and its analogs do not appear to represent a serious health risk in terms of their intake. However, as a bio-accumulative substance, even low initial concentrations will increase over time. Sources of exposition are prevailingly in products of animal origin.

As for monitoring of polyaromatic carbohydrates, 82% of all measured levels do not reach the detection limit. However, five samples containing benzo(a)pyrene were discovered in drinking water with levels that were 206% higher than regulatory limits. The samples were from the second consumer basket in town Kežmarok.

Monitoring of PCB congeners in 2002 did not find a single sample exceeding the limit levels. Eighty percent of all measured concentrations did not reach the detection limit, and the levels in the rest of the samples were very low. That is why daily intakes of PCB congeners were not even evaluated even though the food is the most important source of the intake (from 95%) in terms of human exposure.

The content of PCB congeners in fish and venison was analyzed within the monitoring of fair game and fish:

Commodity	**Metals**	**PCB congeners**
Muscles (fair game)	Hg Cd As Pb Cr Cu	28 52 101 138 152 180
Liver (fair game)	Hg Cd As Pb Cr Cu	- - - - - -
Muscles (fish)	Hg Cd As Pb Cr Cu	28 52 101 138 152 180

Districts: Dunajská Streda, Trnava, Levice, Šaľa, Trenčín, Banská Bystrica, Prievidza, Lučenec, Žiar nad Hronom, Ružomberok , Žilina, Bardejov, Humenné, Gelnica, Košice-okolie, Sobrance, Spišská Nová Ves, Trebišov.
Observed animals: small game, fair game, predators, predatory fish, and non-predatory fish.

POPs in water

Monitoring of POPs in soil is guaranteed by the Slovak Ministry of Agriculture. These chemicals are monitored in soil within the Partial monitoring system-soil. The work is performed by the Research Institute of Pedology and Soil Protection (www.vupu.sk) in cooperation with the Central Institute for Inspection and Probation in Agriculture (www.uksup.sk) which cares about general research of soil contamination. These two institutions perform the research only to the extent of duties settled in the task ordered by the Ministry of Agriculture and according to the valid legislation. Information about the soil monitoring is annually published in a publication „Monitoring of Soil in the Slovak

Republic). Mainly chlorine pollutants are monitored by the Central Institute for Inspection and Probation in Agriculture within the general research of soil contamination.

Monitored pollutants include:
PCB congeners 28,52,101,118,138,153,180
Sum of PCBs
alpha, beta, gamma hexachlorocyclohexane
heptachlor, heptachlor-epoxide
endrin
dieldrin
aldrin
DDD, DDE, Sum DDT, sum of CLRH (pyrene, chryzene, benzo(a)pyrene) and others

The monitored pollutants, sample locations, numbers of samples, way of sampling and evaluation are all listed in the named publication „Monitoring of Soil in the Slovak Republic (available on www.sizp.sk – ISM on the left side, on the right: partial monitoring systems, soil – PMS Soil – Accession rights of users to information and publicly available information: 2, reports – Continual Report PMS Soil in 2004)
The monitoring is guaranteed by the Research Institute for Pedology and Soil Protection. The department is subordinated directly to director of the institute. It also has its branch in the town Banská Bystrica.

POPs in sediments of rivers, lakes and water reservoirs

(State Geological Institute, Accredited testing laboratory, Reference laboratory of the Slovak Environment Ministry, address: Markušovská cesta 1, 052 40 Spišská Nová Ves)

Monitoring of toxic chemicals in sediments of the Slovak territory is not realized regularly as in the case of surface and underground water. Analyses of POPs are realized in the frame of projects for the ministries of environment, agriculture and health, or on the basis of orders from state and private companies. Samples of sediments from rivers, lakes and water reservoirs were analyzed in the labs of the State Geological Institute in Spišská Nová Ves, in the Research Institute of Water Management, Slovak Hydrometeorological Institute and UPKM. Gas and liquid chromatography is the most frequently applied analytic method for finding PCBs and chlorinated pesticides.

DDT: It is apparent from the results that despite being banned for more than 20 years, it is still possible to prove its presence in the environment together with DDT's degradation products DDE and DDD. Amongst 73 samples taken in the Spiš-Gemer mountains, 7 were positive - with the maximum concentration of 0,208 mg/kg.

Samples of water sediments were taken in the frame of project TIBREG in districts Sobrance, Vranov, Michalovce and Trebišov. The content of DDT in the sediments was low even though agricultural activities are widespread in this region. Of 125 samples, only 2 were above the detection limit - 0,09 and 0,02 mg/kg. The highest DDT concentration was discovered in district Levice – 0,94 mg/kg in the sample taken near village Horša.

Contents of DDT in sediments

Locality	Analysis	Year	DDT (mg/kg)				
			No	Min.	Max.	Average	LOD
Surrounding of chemical plant Chemko Strážske	UPKM Bratislava	1997-98	53	0,001	3000	173	0,001
Sobrance, Vranov-Michalovce, Trebišov	State Geological Institute, Spišská Nová Ves	1999-2000	125	ND	0,09	0,002	0,01
Levice		1996	30	ND	0,94	0,033	0,01
Spiš-Gemer mountains		1999-2001	73	ND	0,208	0,022	0,01

Resource: State Geological Institite. Spišská Nová Ves, 2003

Appearance of hexachlorobenzene (HCB) in sediments was analyzed near the Chemko Strážske chemical plant, in the water reservoirs of Domaša, Šírava, Laborec and Ondava. The highest concentrations were found in the western part of the water reservoir Šírava: 1100mg/kg, in the central part of Zemplínska Šírava: 100 mg/kg, Domaša – Turany nad Ondavou: 1100 mg/kg, Domaša-Bžany 2500 mg/kg. The content of HCB in other samples was below 1 mg/kg.

Contents of HCB in sediments

Locality	Analysis	Year	Hexachlorobenzene (mg/kg)				
surroundings of Chemko Strážske	UPKM Bratislava	1997-98	No	min.	max.	average	LOD
			53	0,001	2500	151	0,001

Resource: State Geological Institute. Spišská Nová Ves, 2003

Polychlorinated biphenyls (PCBs): In 1997 – 1998 UPKM Bratislava analyzed 53 samples taken from the surroundings of chemical plant Chemko Strážske. All results were positive. The maximum sum value of PCBs was registered in the waste canal from the chemical plant with PCB concentrations achieving 4100 mg/kg.

The State Hydrometeorological Institute analyzed PCBs in sediments from Slovak rivers Danube, Hron, Ipel and Váh in 2001. Altogether 21 samples were analyzed. Positive values were discovered in 4 samples from the Danube and 1 sample from the Váh.

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Monitoring of POPs also includes inspections of old stockpiles and locations where such chemical stocks might be placed. The work of the Department of Plant Protection in UKSUP also includes collecting information about stocks of obsolete chemical products. The institute has performed this type of research twice in the last five years: the first was ordered on 23 February 2000 with the deadline settled on 30 June 2000. Approximately 60% of all stocks with plant protecting chemicals were checked during this inspection. The second one was ordered on 22 November 2002. According to estimations, the results cover 98% of all known stocks of plant protecting chemicals in the Slovak Republic.

Contacts – Department of plant protection, checking of stocks of obsolete pesticides:

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The Stockholm Convention and Slovakia

Concerning the problem of POPs, the Slovak Ministry of Environment worked out the project Enabling Activity to Fulfill the Obligations of the Stockholm Convention on POPs (including pesticides). More information about the project is available at (www.shmu.sk./?page=11). The Ministry of Environment is not right now involved in any project.

It uses finances from the budget, orders tasks and limits for fulfillment to particular organizations belonging to its management, for instance to the Slovak Hydro-meteorological Institute. These organizations also receive other finances from their own sources (for instance money for water analyses, technical licensing, publishing etc.). As for fulfilling the tasks and budget, they are subordinated to the checking of the upper authority. A similar system for financing also works in the Ministry of Agriculture.

Analysis of pesticides (POPs) monitoring in the Slovak Republic: Strengths, Weaknesses, Opportunities, and Threats

Strengths: - personal and professional background - technical background - institutional frame and competencies	**Weaknesses:** - insufficient communication - incompatible information systems - insufficient public informing - (non)flexibility of monitoring system - limited financing from state budget - insufficient methodology of MRL (EU problem)
Threats: - lack of finances - insufficient legal support (announcement duty) - „black“ stocks of obsolete pesticides in unofficial stockpiles - unchanged old limits of MRL	**Opportunities:** - international coordination of activities - help from the EU, twinning projects - cooperation with agricultural sector/with municipalities - use of modern IT technologies (GIS etc.) - creating the system of Integrated monitoring of pesticides (IMP) - creating publicly accessible online information website „pesticidy.sk“ - definition of new MRL on the basis of a complete method which respects the multiplying effect of more residues;, child organism as reference, updated knowledge about harmful effects and dynamics of particular active substances

POPs pesticides and NGOs in the Slovak Republic:

Greenpeace: within its programmes seeks for and makes monitoring of old stockpiles with substances containing POPs in Slovakia. It strives for their labeling and raising awareness of public and responsible authorities (for example stockpile of the obsolete pesticides in Bielovce).
More information is available on
http://www.greenpeace.sk/campaigns/story/story_166.html

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Internet: www.greenpeace.sk

Friends of the Earth („Priatelia Zeme"): deal with the issue of POPs only partially with concentration on waste incinerators. More information about the campaign, chemicals and also a book about POPs is available on http://www.spz.sk/index_s.html

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Civic association OIKOS – worked out the Report on monitoring POPs pesticides in the Slovak Republic and materials for project Integrated monitoring of pesticides (2005). It closely cooperates with the Faculty of Ecology and Environmentalistics of the Technical University in Zvolen, namely with the Department of Environmental Engineering.
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Civic association CEPTA – Center for the Support of Sustainable Alternatives. It elaborated a model of integrated monitoring of pesticides. Member of the European network MVO-PAN Europe (Pesticides Action Network – www.pan-europe.org) which aims to inform the public about pesticides and to enforce measures directed towards reduction of negative impacts of pesticides on human health an on environment both on European and national level.
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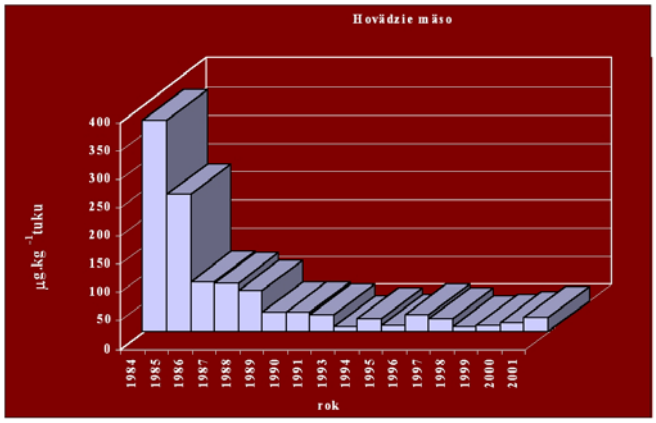
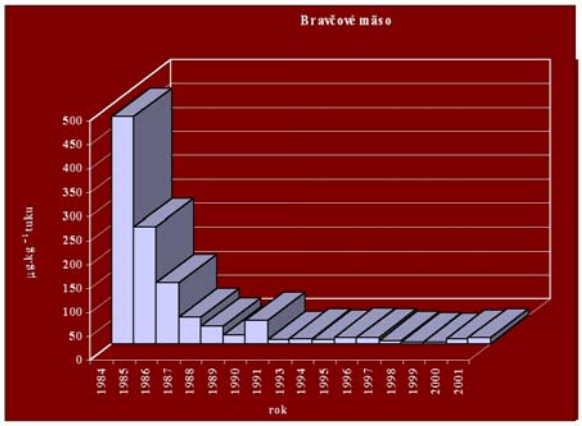
Ipel Union – deals with the problem of POPs in the area around river Ipel. It monitors local stockpiles for POPs content. Its coordinator was Ido Walentand the Union´s residence is in Šahy. Despite intensive efforts we unfortunately so far have not succeeded in getting a relevant contact with anyone from the Ipel Union. According to existing documents the union was very active in terms of the obsolete pesticides in the past years.

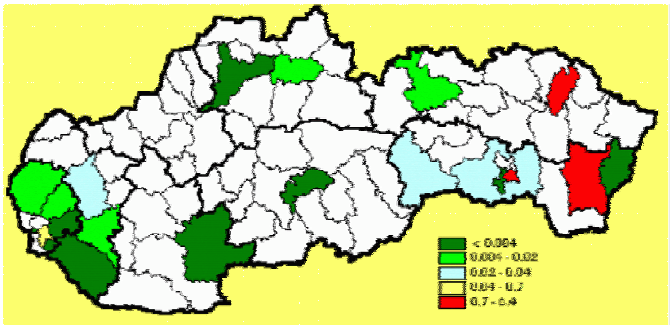
Annexes



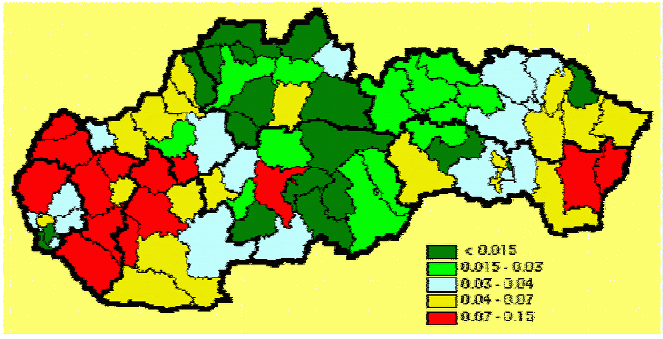
1. DDT in beef meat (Source: VÚP, Šalgovičová, 2004)



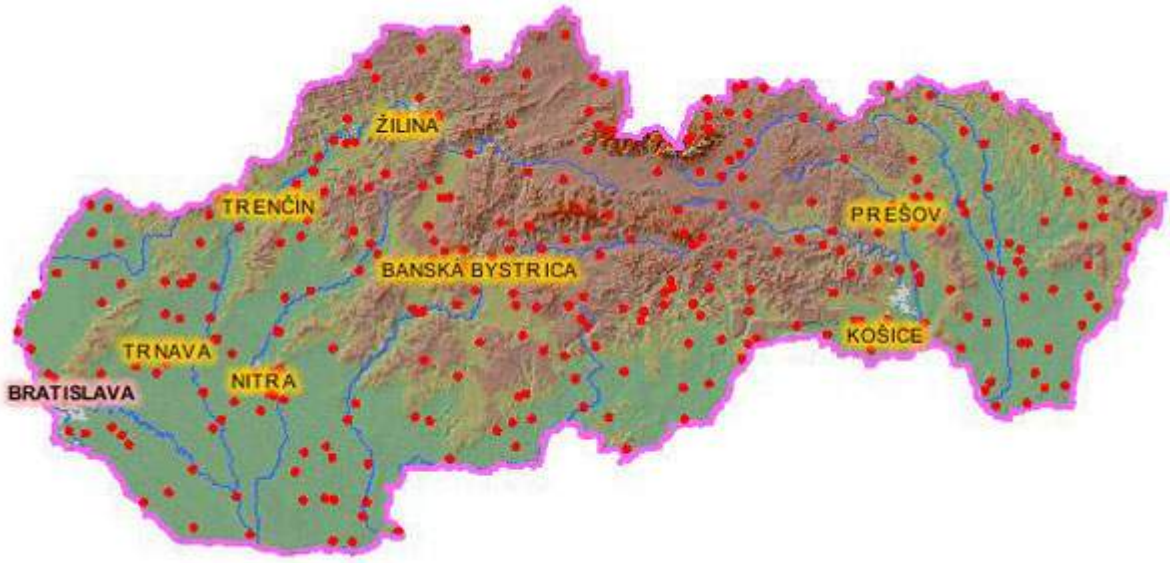
2. DDT in pork meat (Source: VÚP, Šalgovičová, 2004)



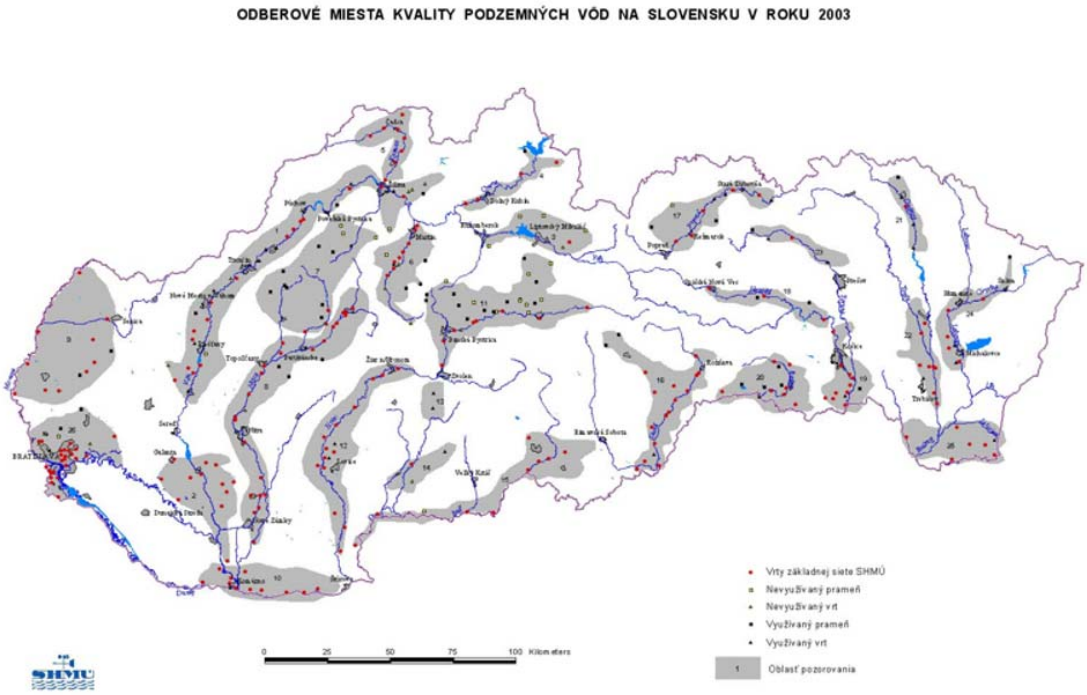
3. Slovak Republic - DDT in pork meat (Source: VÚP, Šalgovičová, 2004)



4. Slovak Republic - DDT in beef meat (Source: VÚP, Šalgovičová, 2004

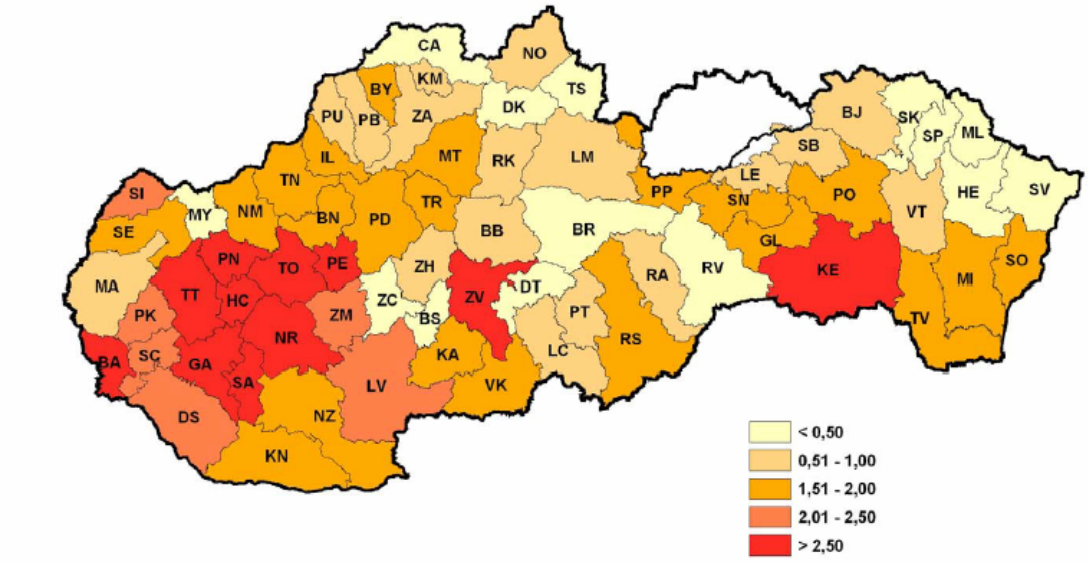


5. Compartment monitoring system "Soil", sampling places for basic soils monitoring in Slovak Republic (Source: VUPOP 2004).



6. Compartment monitoring system "Water", monitoring net; wells for underground water monitoring in Slovak Republic in 2004 (red dots), grey areas – areas catched by monitoring (Source: SHMÚ).

Figure 29. Loading of agricultural soil by pesticides in 2002 (kg/ha)



7. Loading of agricultural soil by pesticides in 2002 in kg/ha (Source: UKSUP)