ENVIRONMENT OF THE SLOVAK REPUBLIC

in Focus

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OF THE ENVIRONMENT SR

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BASIC INFORMATION ABOUT THE SLOVAK REPUBLIC

The Slovak Republic **is situated** in the heart of Europe between 17°-23° eastern longitude and 47°-50°latitude, and borders the Czech Republic to the West, Austria to the South-west, Hungary to the South-east, Poland to the North, and Ukraine to the East. Slovakia covers an area of 49 034 km2. In the vicinity of the historical town of Kremnica in central Slovakia, at the top of the Krahule hill, is the geographical centre of Europe.

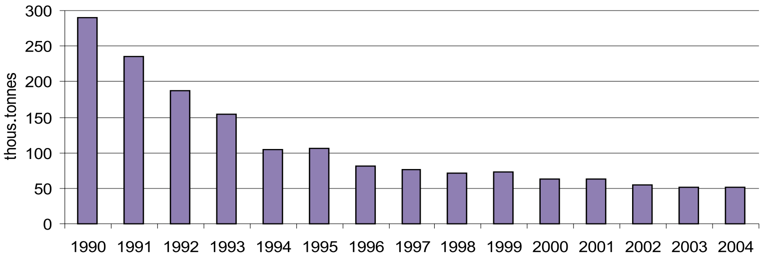
The relief of country is characterised by great difference in height. The lowest lying place is the town of Streda nad Bodrogom (95 m above sea level), the highest point being the Gerlach Peak (2 655 m above sea level) in the High Tatras. Northern and central Slovakia is hilly-covered with the Carpathian mountain range. In the south hills slope down to join The Danube river and East Slovakian Plans which are both important agricultural areas. Danube is most important river, creating a waterway connecting Slovakia with the Black Sea ports and, through the Rhein –Main –Danube canal, also with the west European ones. In the past there were the important commercial trading routes that led across Slovakia, i.e. the Amber Route bringing not only goods (gold, amber, furs) but also information that enabled the various ethnic groups and nations to get to know each other. Nowadays Slovakia is becoming a crossroad of economic and trade routes between the East and the West.

Slovakia has 5 389 180 **inhabitants**. In terms of its population, Slovakia ranks as the 20th country in Europe. The ethnic breakdown of the population is 85.6 % Slovak, 10.8 % Hungarian, and remaining 3.6 % is made up of Gypsies, Czechs, Ruthenians and Germans. The average density is 109 inhabitants per km^2. The average life expectancy is 68 years in men and 77 years in women. The official language is Slovak. The majority of the population is Roman-Catholic. Lutheranism comes next in importance, and a significant part of the population of Easter Slovakia is Greek and Orthodox Catholic.

The territory of Slovakia is situated in the mild climatic belt with regular alternation of the season of the year. The average temperature is 3.7° to 10°C. The alpine region has snow for 130 days. Vegetation in Slovakia thrives in the differing contrasting environment of the Carpathians and the Danube basin, as well as in various climatic conditions. There are five types of florae: the lowest is the oak, then the birch and spruce reaching up to timber line, the mountain pine and the highest is the Alpine. Conditions similar to those affecting plant kingdom also influence the animal kingdom. The entire territory of Slovakia is rich in fauna and most animal species inhabit the mountainous woodland regions. The visitors of Slovakia can admire the oldest cave in Europe as well as the beauty of another eleven accessible caves. The largest natural park is the National Park Low Tatras (73 thous. hectares). The favourable natural conditions of the country that is sloping down toward the south made the earliest human settlements possible very early on. An imprint of a Neanderthal type human skull was found in the travertine layers of Gánovce. In the silts of the river Váh the archaeologists found a jaw of a Neaderthal woman. Many early and late Stone age settlements were discovered in Slovakia. During the Bronze Age Slovakia was a crossroads of many different tribes and ethnic groups. Written records mentioned mainly the Celts, the Romans and the Germanic tribes. The Slavic tribes arrived to Carpathian Valley in the 5th and the 6th centuries. At that time the oldest West Slavic national unit -Samo's Empire –appeared. By the end of the 8th century there were two princedoms on the territory of Slovakia. Pribina's Princedom in Nitra and Mojmir's Pricedom in western Slovakia and in southern Moravia. In years 813 to 833 the princedoms united and laid the foundations of the Great Moravian Empire, a mighty state, that became a powerful barrier against the Frankish expansionism. At the invitation of a Great Moravian ruler, Cyril and Methodius, the founders of the first Slavonic alphabet - Hlaholithic, arrived from Byzantium in 863 and translated liturgical books. They developed the linguistic standard of the Old Slavonic to equal Latin and Greek. Present archaeological excavation continuously brings further evidence of the universally high standard of Great Moravia and their scale is a surprise for European historians. At the beginning of the 10th century Great Moravia Empire disintegrated as a result of Hun invasion and pressures of Frankish Empire. Great Moravia came to the end and Slovakia became part of the early feudal Hungarian state. Hun tribes invaded the Carpathian basin and took over from the Old Slavonic population cultivation, handicrafts and at least partly the state organisation. In the following centuries the country went through very hard times –Tatar invasion (1241) and Turkish invasion (1526). The Turkish invasion lasted 150 years. In the years to follow Slovakia was the place of frequent anti-feudal and anti-Habsburg uprisings. In the revolutionary times of 1848-1849 the Slovaks joined the struggle for the abolition of the feudal system and the national emancipation efforts of the suppressed nationalities in the Austro-Hungarian monarchy, but without any success. It was only the First World War that brought liberation-in 1918 the Czechoslovak Republic came into being. Following the Munich Treaty in 1938, a new state unit appeared in Slovakia -The Slovak Republic. In 1944, at the end of World War II, Slovakia was the place of the second largest anti-fascist uprising in Europe. The history of Slovakia is a history of a European country that has never been at the centre but has always been involved in all significant movements in the European history. As Slovakia was never an independent country, with the exception of short periods, its share in the history is less known.

The Slovak Republic has entered **the history**, as a new country, on January 1, 1993. It came into being following the split-up of the former Czechoslovakia into two independent, sovereign states, The Slovak and The Czech Republics. Soon afterwards, Slovakia was officially recognised by the most important countries. As far as the foreign policy orientation of the SR is concerned, it has become a member of the most significant international governmental organisations. It was accepted into the UN, the Council of Europe, OECD, WHO, WTO, CSCE, IMF, EBRD, INTERPOL and further 49 international governmental organisations.

Emissions of Particulate Matter



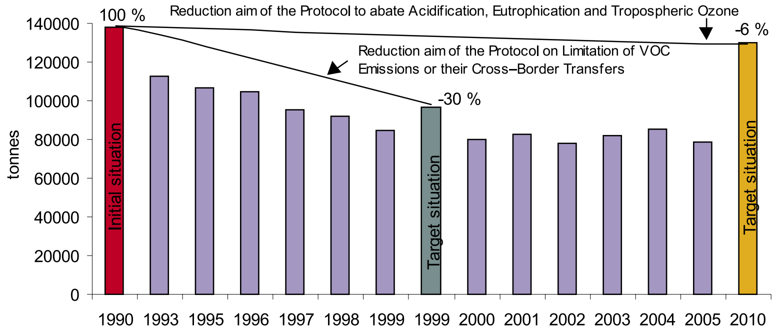
Source: Slovak Hydrometeorological Institute

Emissions of Particulate Matter (PM), or total airborne dust, are the sum of particles of varied size that are freely dispersed in the air. In general, we can say that they irritate respiratory passages and are usually found together with other hazardous compounds, such as sulphur dioxide or nitrogen oxides. While larger particles (above 10 µm) may cause only irritation of the upper respiratory passages with coughing, sneezing, and irritation of the eye's conjunctiva, smaller particles penetrate as far as the lower respiratory passages, and particles below 2.5 µm may even penetrate into the lung's alveoli and either accumulate in the lungs or enter the circulatory system. Hence, we classify dust indicators into total suspended particles, particles below 10 µm (PM_{10}) and particles below 2.5 µm ($PM_{2,5}$).

Since 1990, PM emissions have had a decreasing tendency (290.06 thousand tonnes), with the exception of several years. Most significant reduction in PM emissions was shown in 1990-1994. Compared to 1990, the amount of mentioned emissions as of 2003 (50.69 tonnes) dropped by 82.4%, which is considered significant reduction. In 2004, total number of PM emissions did not change at all (51 745 thous. tons); however, there is still increasing trend in PM emissions from mobile sources, especially from road traffic, as compared to PM emissions from stationary sources.

Reduction in PM emissions, apart from reduction in production and energy consumption, has also been caused by a change within the fuel group to more purified fuels with better quality characteristics. Reduction in particulate matter emissions was further contributed to by introduction of separation equipment or increasing its efficiency, respectively.

Emissions of Non-Methane Volatile Organic Compounds



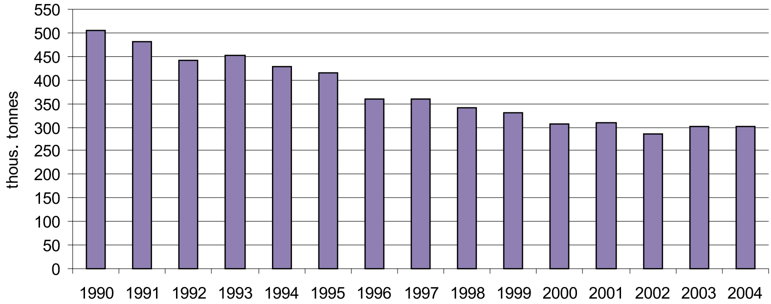
Source: Slovak Hydrometeorological Institute

Emissions of non-methane volatile organic compounds (NM VOC) in 1990-2004 varied in the interval of 138 052 to 78 288 tonnes (in 2002), therefore, they show a decreasing tendency. Drop in total NM VOC emissions was partly caused by reduction in using coating compounds and by gradual introduction of low-solvent types of coatings, extensive introduction of measures in the sector of crude oil processing and fuel distribution, introduction of gas technologies into incineration, especially in the energy area, and by the change to the portfolio of automobiles toward vehicles equipped with operated catalysers. Compared to the reference year of 1990, NM VOC emissions dropped by 43.3% as of 2002. In 2003 and 2004, emissions increased slightly.

Inventory of NM VOC emissions in SR builds on definition of sectors relevant for individual pollutants pursuant to SNAP 97, with attention to, and recommendations of international task force groups of emission inventory (UNECE TF on emission inventory) working under the auspices of the UN EEC. Emissions are being addressed only on the national level and are assessed on the basis of emission factors with reference to some activity and volume of the given activity.

Slovak Republic accessed to signing the Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone whose reduction objective is to decrease the NM VOC emissions by 6% by the year 2010 compared to the reference year of 1990, which is still being met by the SR. Slovak Republic also accessed to Protocol on Limitation of Volatile Organic Compounds Emissions or their Cross–Border Transfers under the mentioned Convention, whose objective was to reduce emissions by 30% by the year 1999, compared to the reference year of 1990. Slovak Republic has successfully met the mentioned obligation.

Carbon Monoxide Emissions

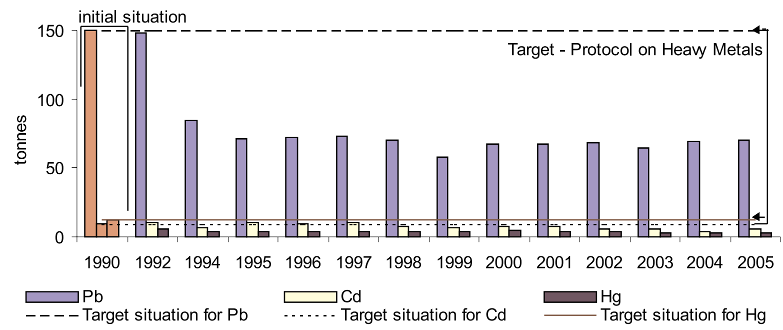


Source: Slovak Hydrometeorological Institute

Carbon monoxide emissions (CO) between 1990 and 2004 in the Slovak Republic varied in the interval of 505.458 – 286.538 thousand tonnes. Mentioned emissions have shown a falling tendency since 1990, which was caused mainly by reduced consumption and change in fuel composition in the sphere of retail consumers. Reduction trend in large-size sources CO emissions was only slight. Most significant CO emission source is iron producing and processing industry; this source has the biggest impact on the trend's characteristics. Reduction in CO emissions in 1992 was caused by decreased volume of production in this type of industry. In 1993, after the mentioned production reached the level of 1989, CO emissions increased correspondingly. In 1996, there was again a slight reduction in carbon oxides emissions, as a consequence of CO emissions reduction measures in the mentioned production area. CO emissions in 2004 dropped by 40%, compared to 1990.

Mobile sources, especially **road transport emissions**, also contribute to total CO emissions in Slovakia. Mobile sources emissions have been monitored since 1990 and are determined on the year-to-year basis. A method called COPERT is used in calculating emissions. This method has been recommended for the signatories to the United Nations Economic Commission Convention on Long-Range Trans-boundary Air Pollution, including the Slovak Republic. Calculation of road transport emissions under the more recent version of the COPERT III programme that includes the newest information in this area was done in 2002.

Heavy Metals Emissions



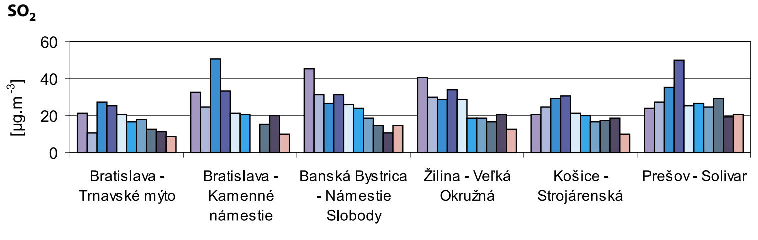
Source: Slovak Hydrometeorological Institute

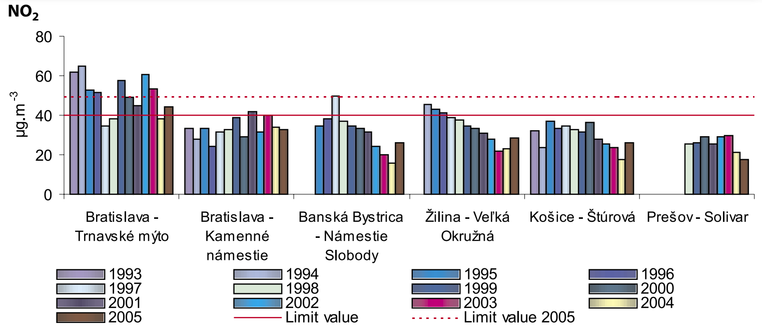
Heavy metals are metallic, or in some cases partly-metallic, elements and their compounds that are stable and have density higher than 4.5 g/cm^3. Heavy metals that are significant in terms of air pollution include mainly: lead, cadmium, and mercury.

Heavy metal emissions (Pb, Cd, and Hg) have had a decreasing tendency since 1990. Besides shutting off a number of old-fashioned and non-effective productions, this trend has been influenced by extensive reconstructions of separation equipment, change in raw material used, and, most of all, by transition to using unleaded petrol types. Total heavy-metal emissions as of 2004 increased, compared to the 2003 (especially the Pb emissions, increasing from 61 060 tons to 91 219 tons).

Air-borne heavy metals do not represent an environmental challenge of only one country. In 1998 in Aarhus, came into existence the **Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals**, whose only objective is the decrease heavy metal emissions (Pb, Cd, Hg) to the level of 1990. Slovak Republic signed this Protocol in that same year and is still meeting its objective. Today we can say that Slovak Republic is really apt to meet this obligation.

Air Quality in Cities (Average Annual SO_2 and NO_2 Concentrations)





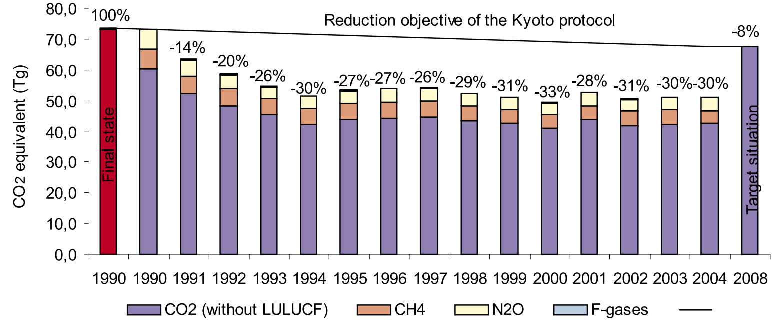
Source: Slovak Hydrometeorological Institute

Annual averages of SO_2 concentrations at selected monitoring stations in urban and industrial areas varied in 1993-2004 in the interval of 8.6 -51 µg/m³ and, with the exception of a few years, show a decreasing tendency in the SR. Highest average annual concentration of the mentioned hazardous agent was recorded in 1995 at the Bratislava – Kamenné námestie monitoring station. 24-hour limit value was exceeded in 2002 at 4 monitoring stations, with one of them once even exceeding the Regulation signal (500 µg.m⁻³). Overall air quality for this hazardous agent was relatively good for the given year. **SO_2 air concentrations in the cities do not represent a major issue in the SR**.

Annual average values of NO_2 concentrations at selected monitoring stations in urban and industrial areas in the years 1993-2003 varied in the interval of 20,3 - 65 µg/m³. Highest average annual concentration of the mentioned hazardous agent was recorded in 1994 at the Bratislava – Trnavské mýto monitoring station. **Annual limit value adjusted to include tolerance threshold (54 µg/m)** in 2003 was exceeded only at Bratislava – Trnavské mýto monitoring station, while at the station Bratislava – Kamenné námestie the value closely copied the limit level. Annual limit NO_2 value was exceeded several times during the years 1993-2002. Today we can say the average annual NO_2 concentrations have shown a falling tendency since 1993.

The SR legislation in the area of air quality assessment and control since 2003 is **fully approximated to the EU regulations**.

Greenhouse Gases Emissions



Source: Slovak Hydrometeorological Institute

Greenhouse gases (international abbreviation GHGs) are gases that let the short-wave solar radiation pass freely and partly absorb or deflect the long-wave radiation of the earth's surface, and are generally responsible for climate changes. Despite the existence of natural emissions of these gases, it is the anthropogenic emissions that have been identified as the source of climate changes. These are in greater part influenced by energy production and consumption, structure of industry, transport system, agriculture and forest management practices, and consumer habits of the population. Main share on aggregated GHGs emissions in the SR goes to the energy sector (electricity and heat production from burning fossil fuels, thermo processes in industry and other sectors, transport, etc.).

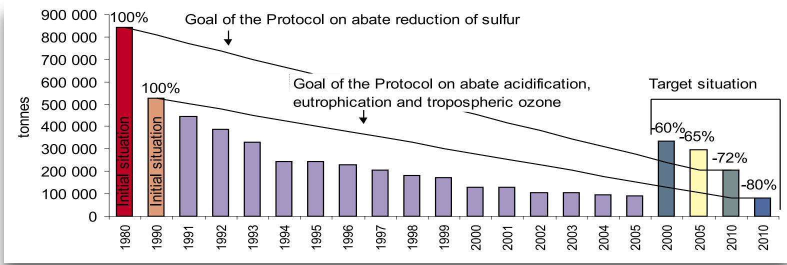
Greenhouse gases emissions reached the highest level at the end of the 1980s. In the period of 1990-1994 there was a reduction by approximately 28%, and since the year 1995 the GHGs emissions have been at approximately the same level. Total green gases emissions (expressed CO2 equivalents) in 2004 reached 51 046.16 Gg excluding the sinks from the sector of Landscape Use - Changes to landscape use and forestry (LULUCF), which represents a reduction by almost 30% (22 000 Gg). Emissions, also known in literature as the net emissions including the sinks in the LULUCF sector reached 46 795.27 Gg in 2004. Total emissions excluding LULUCF dropped by 50 Gg, compared to 2003. This reduction represents approximately 1%.

Methane (CH_4) emissions in 2004 reached the level of 203.90 Gg, which is 7% less than the 2003 figures, and 33% less than the reference year of 1990. Total **N_2O** emissions in 2004 reached 13.15 Gg, which is a slight increase compared to 2003; however, less by 33% than the reference year of 1990. N_2O emissions show a slightly rising tendency since 2000, reaching highest values in the reference time period. Overall, we can say that greenhouse gases emissions show a decreasing tendency, with the exception of several years, mainly as a consequence of reduction in industrial fertilisers and volume of livestock.

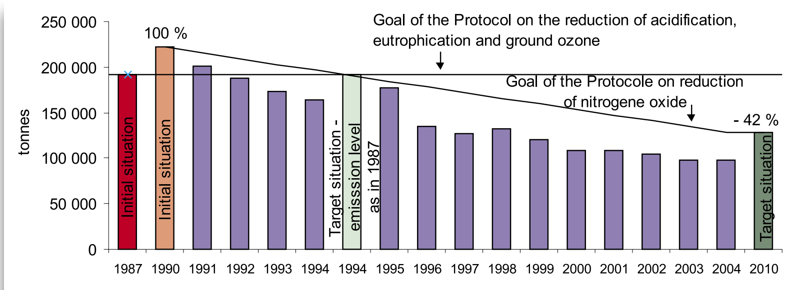
At the UN Conference on Environment and Development (Rio de Janeiro, 1992) was adopted **Framework Convention on Climate Change** – basic international legal instrument for protection of global climate. Convention came into force in the Slovak Republic on November 23, 1994. **Slovakia agreed to be bound by all obligations of the Convention**, including reducing the greenhouse gases emissions by 2000 to the level of 1990. Further, the Slovak Republic specified as its internal objective to meet the "Toronto objective", which is a 20% reduction in emissions by 2005, compared to 1998. At the conference of signatories to the UN Framework Convention on Climate Change in Kyoto, Japan, in December 1997, Slovakia bound itself to reduce the production of greenhouse gases by 8% by 2008, compared to 1990. Today we can say that Slovakia has a real potential to meet the above mentioned objectives.

Emissions of Acidification Substances

Trend in SO_2 emission with regards to following the outcomes of international agreements



Trend in NO_X emission with regard to following the outcomes of international agreements

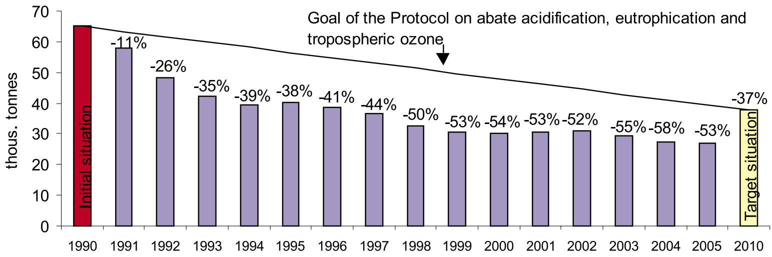


Acidification is caused primarily by escapes of emissions of three gaseous elements: **sulphur dioxide, nitrogen oxides,** and **ammonia**. These gases react in the atmosphere and give rise to acidic components that fall to the Earth mainly as acid rains and damage or are capable of damaging acid-sensitive aquatic, forest, and soil ecosystems. Main sources of the mentioned emissions on the Slovak territory are incineration processes, industry, transport, and agriculture. NH_3 emissions in 2004 contributed to the overall acidification by 26.474 thousand tones, the following year SO_2 emissions contributed by 96.856 thousand tones, and NO_x emissions by 97.701 thousand tones.

Sulphur dioxide (SO_2) emissions showed greatest values in the 1990s, while in the period between 1990 and 2004 they marked a reduction by 81.6% as a consequence of the reduction in energy production and consumption, also caused by change within the fuel group to more purified fuels and fuels with better quality characteristics. SR has reached one of the objectives to reduce SO_2 emissions in 2000 by 60%, compared to the reference year of 1980, to which it bound itself in Protocol on Further Reduction of Sulphur Emissions within the Convention. The same Protocol implies that SR reduce the mentioned emissions in 2005 by 65%, and in 2010 by as much as 72%, compared to the reference year of 1980.

Nitrogen oxides (NO_X) emissions showed the maximum level in 1990, since then they have continually had a decreasing tendency with slight fluctuations in some years. Decrease in the mentioned emissions has been caused mainly by a change to the emission factor considering the situation in technical and technological aspects of incineration, and by de-nitrification. Transport with its nitrogen oxides plays a significant role in air pollution. Compared to 1990, NOX emissions dropped by 56% in 2004. SR has reached one of the objectives to reduce NOX emissions in 1994 compared to the reference situation of 1987, to which it bound itself in Protocol on the reduction of sulphur missions within the Convention. Its next objective is to reduce NOX emissions by 42% by 2010, compared with the reference year of 1990. This objective stems from the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the Convention.

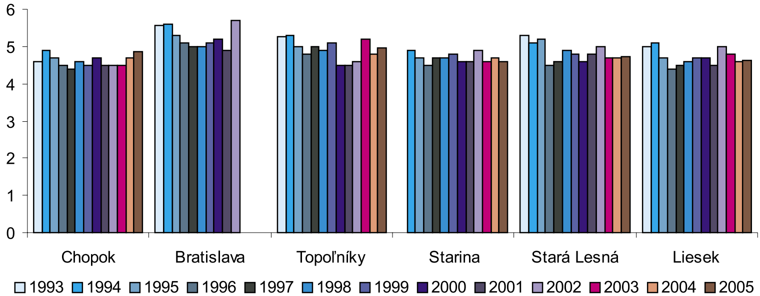
Trend in NH_3 emission with regard to following the outcomes of international agreements



Source: Slovak Hydrometeorological Institute

In 1990-2004, the volume of **(NH_3) ammonia emissions** dropped by 59.3%. This reduction was caused mainly by changes in agriculture. Numbers of livestock was reduced, which in turn contributed to decreased production of animal excrements. Organic and industrial fertiliser volumes on agricultural land were also reduced. SR, considering the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone within the Convention, is obliged to reduce NH_3 emissions by 37% by 2010, compared to the reference year of 1990.

Acidity of Precipitation



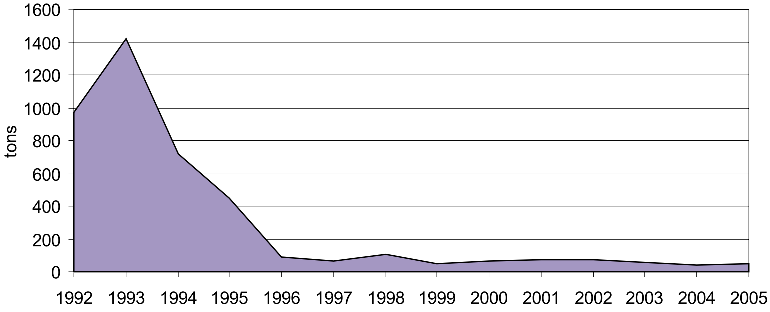
Source: Slovak Hydrometeorological Institute

Natural acidity of precipitation water in equilibrium with carbon dioxide has the pH of 5.65. Atmospheric precipitations are considered acidic if the bulk charge of the acidic anions is greater than the charge of cations, and the pH value is below 5.65. Sulphates by approximately 60 - 70%, and nitrates by approximately 25 - 30% contribute to the acidity of precipitation water. Main sources contributing to the overall acidity of atmospheric precipitations include incineration processes, industry, and transport.

Total pH interval in the period of 1993-2005 in the SR varied in the interval of 4.4 - 5.7 pH. **Chemical analyses of atmospheric precipitations** in 2003 document a slight increment in acidity at the majority of monitoring stations. Interval of pH values in monthly precipitations in 2003 varied at regional stations in the interval of 4.5 - 5.2. We may conclude that acidity of atmospheric precipitations since 1993 to 2005 has had fluctuating characteristics with a slight trend toward acidity reduction.

Slovak Republic contributes to reduction of acidification by having adopted legal, environmental, and economic measures. One of the measures is Convention on Long - Range Transboundary Air Pollution. SR also accessed to a number of Protocols have been developed in the framework of the Convention.

Consumption of Controlled Compounds



Source: Ministry of Environment of the SR

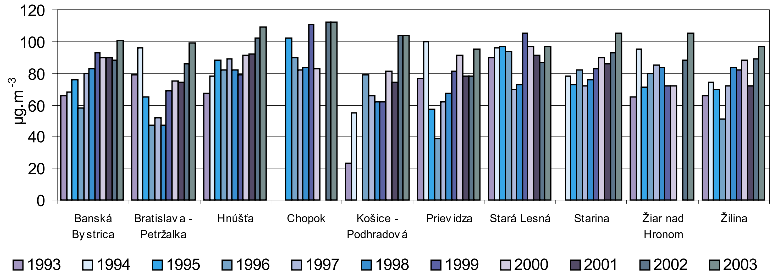
By **controlled compounds** (AI – freons, A II – halones, BI – freons, B II – CCI4, BIII – 1,1,1 3-chlorethane, C I, C II – HBFC22B1, E - CH3Br) we understand compounds that threaten the Earth's ozone layer. Greatest share on total volume of controlled compounds since 1992 to 2003 represented compounds fro the group of AI – freons, B II – CCI4, BIII – 1,1,1, 3-chlorethane, and C I. Since 1993 (1,419 tones) there has been a significant reduction in consumption of ozone-depleting compounds, and since 1996 the reduction has continued as a consequence of requirements of the London and Copenhagen amendment to the Montreal Protocol. In 2003, the mentioned compounds reached the level of 54.21 tones. In general, consumption of controlled compounds was reduced in 1993 to 2003 by 96%, which means very significant decrease. Consumption of the monitored substances in 2004 showed lowest values (total of 39.7 tons) in the whole monitored time sequence. Their total consumption in 2004 rose slightly to 49.78 tons. Today we can conclude that ozone-depleting compounds are present in the SR in low concentrations, and their future sharp increase is not expected.

At present, there is no ozone-depleting compound produced in Slovakia (since 1996), which means that consumption of such compounds is a consequence of their import. Consumption of compounds of the groups A I, B II, and B III in 1996-2003 represents import of these compounds for analytical and laboratory purposes in compliance with the general exception of the Montreal Protocol.

Slovak Republic is a signatory to the Vienna Convention on the ozone layer protection from 1985, and the Montreal Protocol on Substances that Deplete the Ozone from 1987, as well as stricter amendments adopted at negotiations of the signatories to the Montreal Protocol in London (1990), Copenhagen (1992), Vienna (1995), Montreal (1997), and Beijing (1999). Carrying on the objectives of the Montreal Protocol on Substances that Deplete the Ozone and its amendments called for update to the SR Action Programme on gradual exclusion of ozone-depleting substances, as well as for adoption of new legislation.

Ground- Level (Tropospheric) Ozone Concentrations

Average annual concentration between (9am-4pm) during vegetation season (April - September)



Source: Slovak Hydrometeorological Institute

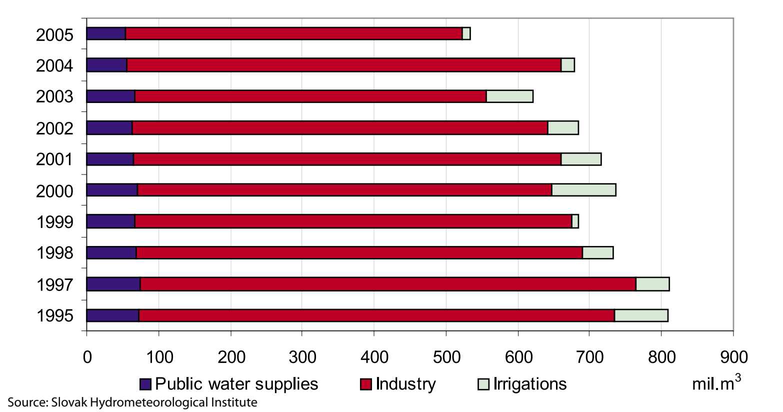
Ozone – a three-atom molecule of oxygen - O_3, is the most important natural trace ingredient in the Earth's atmosphere. It is generally known that vertical stratification of ozone in the atmosphere is not homogenous. The greatest amount is found in the altitude of 20 - 25 km, the so-called stratospheric ozone layer – ozonosphere. Unlike stratospheric ozone, tropospheric ozone and its concentration is rising, which negatively impacts especially the health of living organisms. One of the phenomena that contribute to the increase of ozone in the ground atmospheric level in the SR is hazardous emissions, most of all non-methane volatile organic compounds, NO_X, and CO, that are labeled as precursors of tropospheric ozone, since with the help of solar radiation they contribute to its formation.

Since the beginning of 1990s, just like many European stations, Slovakia has not experienced a definite trend in average annual concentrations between 9am - 4pm during vegetation season. It is important to mention the year 2003 that was exceptionally hot, where during the record-breaking first half of the year were detected increased values at all monitoring stations, showing exceeding values of the alarm level for the public (240 µg/m^3.) again after ten years. In the mentioned year, compared to the previous years, there were more cases of values exceeding the threshold limit concentration level for the public information (180 µg/m^3). We may also conclude that in this extremely warm and photochemical exceedingly active year, were detected greatest values of a number of indicators of the ground ozone level (e.g. the maximum daily 8-hour average, AOT 40, etc.).

Target value of ground ozone concentration in terms of public health protection is stipulated by the SR legislation at 120 µg.m^{-3} (max. daily 8-hour average). This value must not be exceeded on more than 25 days in of the year, for three consecutive years. For the period of 2001-2004, this target value has been exceeded, with the exception of several urban stations, at all monitoring sites in Slovakia. Greatest number of detected incidence of exceeded values was at the Chopok monitoring station (98 days).

In 1999, the **SR** accessed to the **Protocol to Abate Acidification, Eutrophication and Ground-level Ozone**, and also its legislation in the area of air quality assessment and control since 2003 has been **fully approximated to the EU legal regulations**.

Surface Water Abstraction by Utilisation Purposes



Source: Slovak Hydrometeorological Institute

Total extracted volume of surface water in 2005 was 532.79 mil.m3, which, compared to 1995, is a reduction by 275 mil.m3 (by 34.1%). Water use rate was also decreasing, reaching 8.91%. **Of all abstractions** in 2003, surface water abstractions represented 60%.

Total surface water abstractions for **industrial purposes** in 2005 were 88% (29.1% less than in 1995). Water abstraction for **water supplies** during the monitored period has not changed significantly, and they represented approximately 10% of all abstractions. Abstractions for **irrigation purposes** show fluctuating characteristics, depending on the number of rainfalls during the summer. In 2005, they reached only 2%.

Water consumption in individual years has shown significant fluctuations. Objective causes of the mentioned fluctuations may include impact of water consumption on irrigation activities, combined drinking water supply from more sources, and discharge of mining water. Non-objective causes behind the mentioned fluctuation are impacted by fluctuation in production, related to insufficient monitoring of abstracted and discharged water volumes.

In terms of water-management characteristics, total surface water abstractions have shown a long-term decreasing trend, even **when internationally compared**. In 2002, surface water abstractions in 15 EU countries reached the level of 175 700 mil.m^3, which represented a reduction in abstractions compared to 1980 by 47 000 mil.m^3, or by 21.11%.

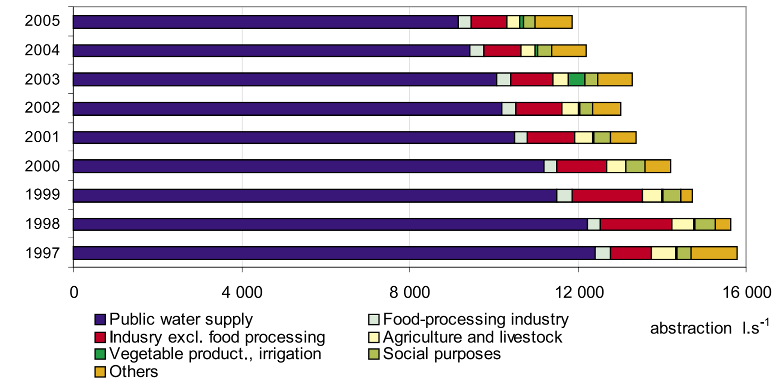
International comparison of surface water abstractions in mil.m^3

	Austria	Czech Rep.	Hungary	Poland	Slovakia	EU15
1980	2 207	2 820	3 551	11 899	1 575	222 700
1985	2 195	2 873	4 880	13 076	1 390	194 500
1990	2 561	2 787	5 266	11 928	1 388	193 600
1995	2 258	2 024	5 079	10 078	808	188 000
2000	2 553	1 363	4 720	9 151	723	175 400
2001 - 04	2 737	1 368		9 022	621	

Source: OECD

WATER ABSTRACTION

Groundwater Abstraction



Source: Slovak Hydrometeorological Institute

In 2005, monitored volumes of extractable groundwater in Slovakia were **76 806 l.s^{-1}**, which represents approximately 52.4% of all documented natural resources. In total, consumers **used 11 867.46 l.s^{-1}** of groundwater, which **represented 15.5%** of documented available volumes. Due to an unequal quantitative distribution of water resources and notwithstanding the positive balance, some areas and sites may show a deficit in drinking water resources, especially during dry seasons. Highest available volumes are documented in quaternary and Mesozoic regions, with greatest abstractions (24 825 l.s^{-1}) documented in the quaternary of the Poddunajská lowland – Žitný ostrov.

To evaluate groundwater abstraction in Slovakia by individual purposes, we could see reduced water abstraction for most of the monitored abstraction categories. **Major part** (app. 75%) represented abstraction of groundwater through **public water supplies**. This group shows the greatest reduction in abstractions after 1997, by 3 241 l.s^{-1}, i.e. 26.14%. Other sectors of the national economy, compared to previous periods, have shown a slight reduction in volumes by 2 to 6%. **Reduction in abstractions** after the year 1990 is the result of transformation of economy, reduction in production, as well as introduction of new technologies.

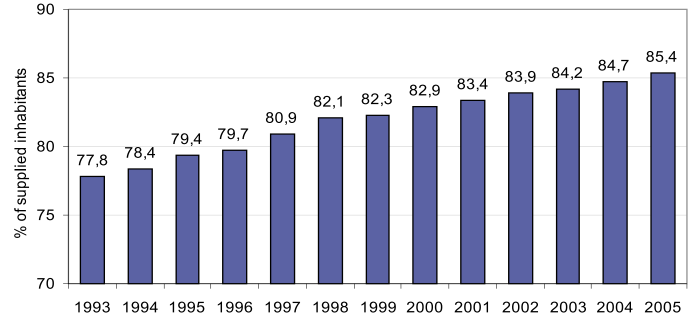
Groundwater **abstractions** in the SR, as well as in neighbouring countries, had a **decreasing tendency** in the period of 1980 to 2002.

International comparison of groundwater abstractions in mil.m³

	Austria	Czech Rep.	Hungary	Poland	Slovakia	EU15
1980	1 135	802	1 254	3 231	657	43 200
1985	1 384	806	1 386	3 333	671	44 800
1990	1 246	836	1 026	3 237	728	46 400
1995	1 164	719	897	2 846	578	45 000
2000	1 115	555	871	2 843	448	47 100
2001-04	1 079	540		2 526	420	

Source: OECD

Connecting the Public to Public Water Supply



Source: Statistical Office SR

Total number of inhabitants **supplied with drinking water** from the public supply in 2005 reached the number of 4 605 thousand, which represented 85.4% of supplied inhabitants. Number of municipalities supplied from public water supply grew to 2 196, which was 76% of total number of municipalities in Slovakia. The regions of Banská Bystrica, Košice, and Nitra show an inadequate development in public water supplies, compared to the national average values. Greatest number of supplied municipalities was in the following regions: Žilina (98.7%), Bratislava (95.9%), and Trenčín (91.3%).

Volume of produced drinking water in 2005 reached the value of 352 mil.m^3, which, compared to 1995, represents reduction by 126 mil.m^3 (or by 26.3%). Drinking water supply was decreasing despite the rising number of supplied inhabitants. **Specific water consumption** for households since 1993, in relation to rising drinking water prices, has been decreasing, and in 2005 reached the value of 104 l.inh^{-1}.day^{-1}.

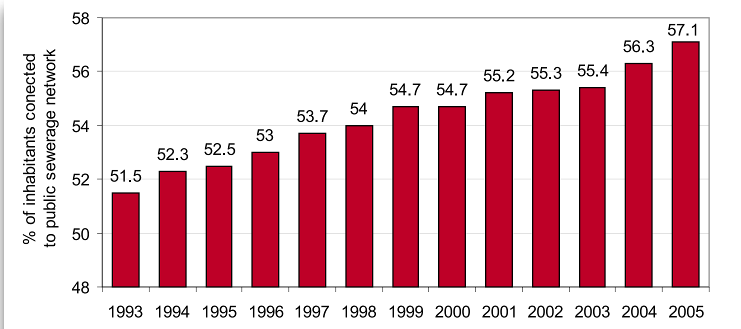
Development trend in public water supplies shows regional irregularity, with shortage of groundwater sources in passive areas being one of the critical factors. (e.g. south regions of central Slovakia and majority of east Slovakia) Most progressive trend was detected in west Slovakian regions, where the number of supplied inhabitants in 1990-2000 increased by 19%, and in east Slovakian regions (increase by 15%). Lowest development trend was shown in central Slovakian regions and in Bratislava.

From among the **V4 countries**, the highest level of public drinking water supply exists in Hungary, followed by the Czech Republic, and Poland.

	Austria (2002)	**Czech Republic** (2002)	**Hungary** (2002)	**Poland** (2003)	**Slovakia** (2005)
% of supplied inhabitants	90	90	93	85	85

Source: OECD

Connecting the Public to the Public Sewerage System



Source: Statistical Office SR

Connectedness of the public to **the public sewerage system** in 2005 was 57.1% of total number of inhabitants, with the number of inhabitants connected to the public sewerage system increased to 3 055 thousand. The number of municipalities with completed sewerage network grew to 612 (i.e. 21.2% of total number of municipalities), with 545 municipalities (i.e. 18.9% of all number of municipalities) discharging their wastewater to the wastewater treatment plants at the same time. Greatest increment in municipalities with public sewerage system was in the Bratislava region (54.8%), while other regions showed only a minimal growth.

Number of wastewater treatment plants (WWTP) in VaK administration in 2005 reached 442, with the greatest share of mechanical-chemical treatment plants – 86%. Total **capacity** of WWTP grew to 2 194 thous.$m^3.day^{-1}$, compared to 1995, and in 2005 reached the level of 343 thous.$m^3.day^{-1}$. Of total volume of discharged wastewater (443 mil.m^3), 428 mil.m^3 was purified, which represented 96.5% of total volume of wastewater.

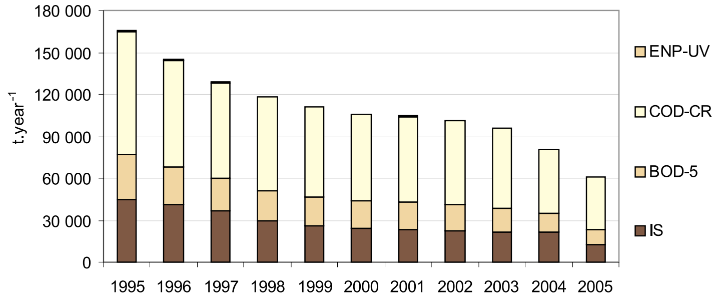
Due to the fact that some sewerage systems do not have a wastewater treatment plant, it is necessary to ensure development of treatment facilities in order to prevent discharging of municipal wastewater directly into watercourses. Despite that fact that many sewerage systems and WWTPs are still under construction, level of connectedness to wastewater sewerage system is still lagging behind development of public water supply.

Wastewater treatment plants with the secondary purification level are most developed **in the V4 countries**. In 2002 in Austria, as much as 80% of wastewater was treated at biological WWTPs with chemical post-treatment. (tertiary level of purification) In relation to the approximation of law within the EC, more attention will be given to this purification level also in Slovakia.

	Austria	Czech Rep.	Hungary	Poland	Slovakia
% of inhabitants connected to public sewerage system	81.5 (1998)	74.6 (1999)	48 (1998)	58 (1999)	53.9 (1998)
	86 (2002)	80 (2002)	61.9 (2002)	64.6 (2003)	55.4 (2003)

Source: OECD

Discharge of Wastewater into Watercourses



Source: Slovak Hydrometeorological Institute

Decreasing trend in discharged wastewater continued also in 2005 with 881 946 mil.m³ of wastewater discharged into surface watercourses. This was 285 978 mil.m³ less than in 1995. **Volume of discharged wastewater decreased by 25%** over the period of 1995-2005. This decrease was shown in all selected indicators of contamination (BOD_5, COD_{Cr}, IS, and ENP_{UV}). Most significant reduction in wastewater was detected in the indicators of insoluble substances and chemical oxygen demand by dichromate. Basic assessment of the level of connectedness to the sewerage system and wastewater treatment pursuant to the Directive 91/271/EEC is carried on in a number of agglomerate size categories. The directive addresses collection, treatment, and discharge of municipal wastewater and water from specific industries. Although the WWTP facilities have satisfactory capacities, due to their technological layout they are not able to meet current demands on runoff water quality and trends that are advocated in Europe.

Volume of discharge contamination has a decreasing tendency, which is related to continuous completion of municipal WWTP systems, as well as to reduction in production in some industrial areas. Of total volume of discharged wastewater in 2003, **627 770 thous.m³** treated wastewater was discharged into watercourses, which represents a decrease by 24.4% compared to 1995, while volume of untreated wastewater was **254 176 thous.m³**, e.g. reduction by 35.4%.

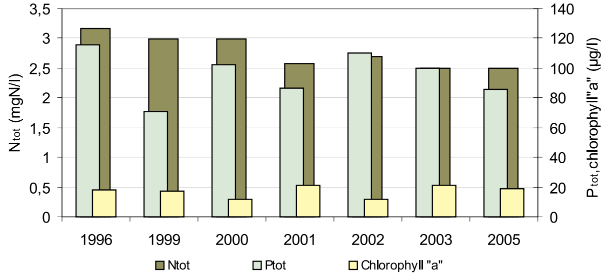
On international scale, concentrations of organic substances, phosphates, ammonia ions, and biochemical oxygen demand have generally decreasing tendency that maintains to be stable. On the other hand, nitrates concentration remains at the same level in all European watercourses. This situation is the result of improvements in the area of WWTP construction during the 1990s.

Concentration of selected organic compounds in European watercourses

	1992	1995	1996	1997	1998	1999	2000	2001
Nitrate (1 237) (mgN.l^{-1})	1.6	1.5	1.6	1.5	1.6	1.5	1.5	1.5
BOD_5 (605)	3.3	2.7	2.8	2.9	2.7	2.5	2.4	2.2
BOD_7 (45)	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9
Orthophosphate (1 033) (µgP.l^{-1})	98	79	83	77	71	68	67	64
Total ammonium (1 122) (µgN.l^{-1})	163	122	141	128	108	100	93	92

Notes: Concentrations are median of the annual average concentrations per year. Total number of stations in brackets. Source: EEA

Trend in Average Annual Concentrations of N_{tot}., P_{tot}. and Chlorophyll „a“
Station: Dunaj-Komárno stred



Source: Slovak Hydrometeorological Institute

Eutrophication as a process is not, however, dependent on the presence of nutrient in the water alone. Its process is substantially affected also by other factors, such as hydrological characteristics of streams, light intensity, temperature, etc.
Indicators that characterize eutrophication of surface water include for example N-NH_4, N-NO_3, P_{tot}., N_{tot}., that are classified under STN 75 7221 "Water Quality, Classification of surface water quality" into the group of **indicators – C nutrients.**

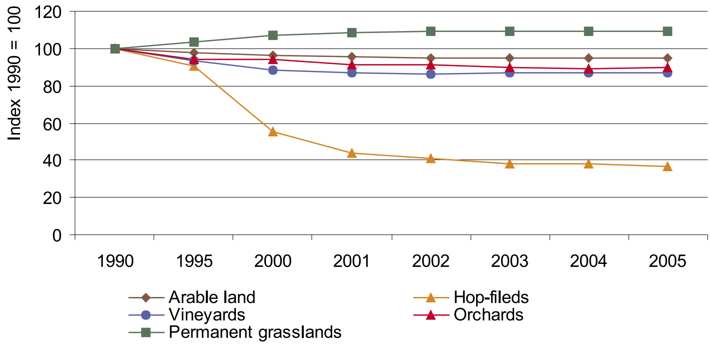
General requirements for the surface wate quality are set forth in the SR Government Decree No. 296/2005 Coll. which introduces requirements on the quality and qualitative goals of surface water, as well as the limit indicator values for wastewater and special water contamination. Annex 1 defines the recommended values for total nitrogen (9.0 mg.l^{-1}), total phosphorus (0.4 mg.l^{-1}), and chlorophyll „a" (50.0 µg.l^{-1}). In this sense, the most problematic watercourses include Morava, Nitra, and Ipeľ. Nutrient concentrations are generally higher toward the mouth of the river. Acceptable surface water quality that meets group II. and III. criteria for the years 2004-2005 was around 64%. Assessing the whole C - nutrients group and comparing it with the previous time period, no major changesthere have been recorded.

Eutrophication processes appear to be most apparent in water reservoirs. The amount of chlorophyll "a" is an indicator of trophic situation that determines the amount of phytoplankton biomass. Water with chlorophyll "a" values beyond 25 mg.m^{-3} is assessed as strongly eutrophic and unsuitable for recreational purposes. In 2005, the maximum value for chlorophyll „a" did not exceed this concentration in the monitored water recreation areas, which could be caused by adverse weather patterns.

Importance of the issue of eutrophication, which on one hand decreases recreational value of areas suitable for swimming, on the other hand complicates technological treatment of drinking and industrial water, as well as threatens the stability of watercourses, was reflected also into the **Act** No. 364/2004 Coll. of Laws on water and on change to the National Council Act No. 372/1990 Coll. on offences as amended (Water Act). The law defines and stipulates criteria for so-called **sensitive areas and vulnerable areas**.

Effect on nutrients concentrations in the EU countries may be seen in agriculture and other industries that produce nitrates, as well as in hydrological conditions of individual countries. Unlike phosphorus, nitrates concentrations in rivers remained relatively stable and are higher in those west European countries with most intensive agricultural activity. New member states show a falling tendency in nitrates, which may be caused by a gradual decrease in agricultural production and more orientation on the market economy.

Land Structure Development in the SR



Source: Institute of Geodesy, Cartography and the Cadastre of the SR

Land is a critical production base and social support of the SR. Soil cover provides for economic activities (agriculture, forest management, tourism, etc.) and meanwhile performs irreplaceable functions in the nature, without which there would be no life possible. The SR represents a balanced mosaic of lands composed of urbanised residential environments and agricultural and forest lands that also play a production and restoration function in small and larger Slovak residential areas.

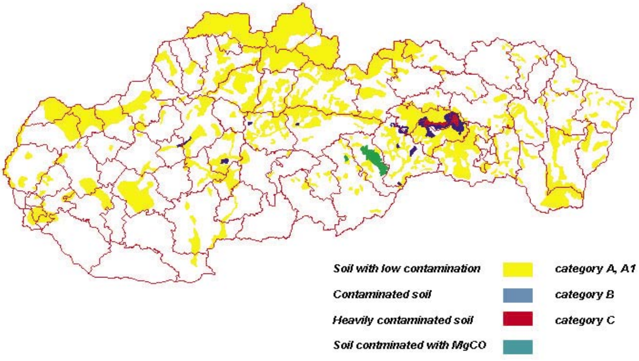
Within transformation of the national economy, there is a gradual **natural shift in lands**, mainly between agricultural and forest lands, as well as other land categories. According to the utilisation type in the conditions of the SR, agricultural land is divided into individual categories – **arable land, permanent grasslands, hop-fields, vineyards, gardens, and orchards**.

Average size of agricultural land per 1 inhabitant is 0.45 ha, including 0.27 ha of arable land per 1 inhabitant. This places the SR among the countries with average potential for agricultural land. Size of arable land per capita over the last ten years, after its slight initial reduction, has remained at approximately the same level. In 1970, this value represented 0.37 ha/inhabitant, in 1990 it was 0.28 ha, and 0.27 ha in 2005.

Mainly forestation and construction of residential and public houses contribute to **losses of agricultural land**. Tendency of gradual loss of agricultural and arable land continued also in 2005 with slight reduction in areas of hop-fields and vineyards, and meanwhile increasing of permanent grassland areas.

There was noticed **increase of built-up areas** that has been impacted by demographic trends and transformation of economy, as well as by construction of industrial parks and commercial chain facilities, while these, with small exceptions, do not introduce new, better quality of environment.

Soil Contamination



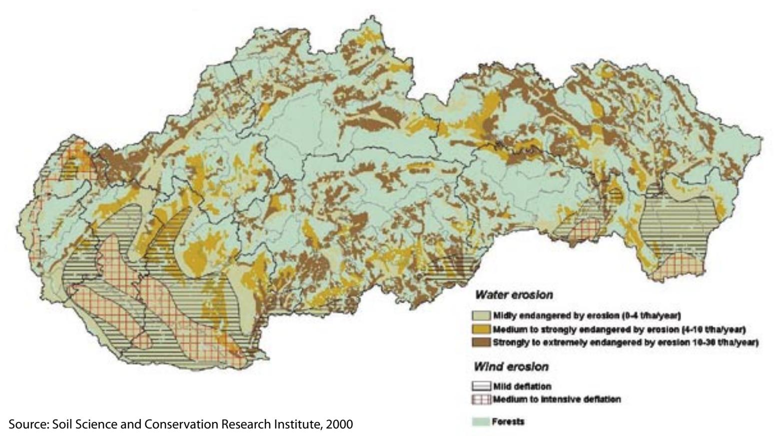
Source: Soil Science and Conservation research Institute, 2000

Of all SR area of 4 903 467 ha, **agricultural land** represents 2 432 979 ha (49.6%). Partial Monitoring System – Soil, provides information on the state and development of contamination of agricultural land.

In 1999, the first monitoring cycle has shown that 69.5% of agricultural land of the SR belonged into the category of **non-contaminated soils** in areas with most productive agricultural land. 27.7% of agricultural land belonged into the category of slightly contaminated soil. They are present mostly in mountainous areas with high percentage of natural geo-chemical anomalies, as well as in areas with impact of emission transfer. Only **1.4%** of agricultural land belonged into the category of **contaminated soils with exceeded B limit** and **0.4%** into the category of significantly contaminated soils **with exceeded C limit**. **0.7%** of agricultural land was **contaminated through ambient air pollution from the magnesite production**. Average content of polycyclic aromatic hydrocarbons in agricultural land of the SR was around 200 $\mu g.kg^{-1}$, which represents reference values. Values beyond 1 000 $\mu g.kg^{-1}$ were only of local character (Linkeš and coll., 1997). Results from the third monitoring cycle in 2002 showed that the content of the majority of risk elements in selected agricultural land of Slovakia are below the limit, especially being the case of arsenic, chromium, copper, nickel, and zinc. In case of cadmium and lead, excessive limit values were recorded only in soils situated in higher altitudes, podzols, and andosols, which might relate to remote transfer of emissions (Kobza and coll., 2002).

In terms of land protection also against contamination, adoption of **Act No. 220/2004 Coll. of Laws on protection and use of agricultural land** appears important. This law stipulates protection of properties and functions of agricultural land. Limit values for risk substances in agricultural land constitute the appendix to the law.

Soil Erosion



Source: Soil Science and Conservation Research Institute, 2000

Dominant in Slovakia are symptoms of **water erosion** that threaten **47.7% of agricultural land**. Most areas **not threatened by erosion** are in regions with dry climate, in Poddunajská and Východoslovenská lowlands. Agricultural land in these regions, located on slight slopes is under **medium risk** of water erosion. **Substantially threatened** are areas of agricultural land that are located on slopes in regions with colder and more humid climates, especially in the regions of Banská Bystrica, Trenčín, and Košice. Land extremely threatened by water erosion includes mainly soils on significant slopes, in regions with cold and humid climates – Prešov, Banská Bystrica, and Žilina.

Wind erosion threatens **6.2% of agricultural land**.

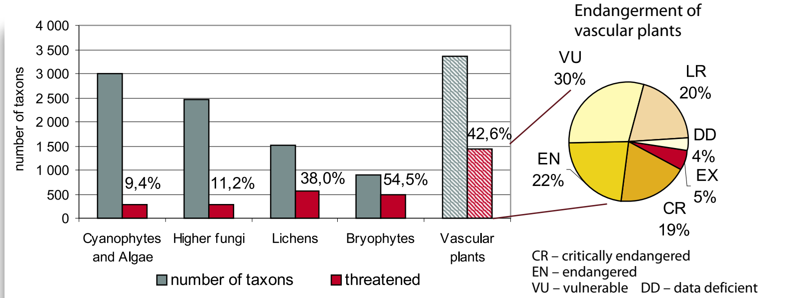
Agricultural land in the SR threatened by erosion

Intensity of soil erosion	Water erosion		Wind erosion	
	ha	% of agricultural land	ha	% of agricultural land
Non or low	1 274 857	52.3	2 286 822	93.8
Medium	217 487	9.0	73 186	3.0
High	368 704	15.1	45 753	1.9
Extreme	575 831	23.6	31 118	1.3
Total	2 436 879	100.0	2 436 879	100.0

Source: MoA SR

In terms of land protection also against erosion, adoption of **Act No. 220/2004 Coll. of Laws on protection and use of agricultural land** appears important. This law stipulates protection of properties and functions of agricultural land, as well as ensures its sustainable management, agricultural use, and protection of its environmental functions.

Endangerment of Flora



Source: State Nature Conservancy SR

Slovakia belongs to three basic phytogeographical areas – *Pannonia flora* (Pannonicum), *West-Carpathian flora* (Carpaticum occidental), and *East-Carpathian flora* (Carpaticum oriental).

Original and natural floristic communities of the West Carpathians form a unique and important element for Slovakia. However, at present, **more than one third** of the original vascular plants floristic taxons is classified under different degrees of **endangerment**.

Red list of bryophytes and seed-bearing plants of Slovakia contained 1 009 endangered and rare taxons **as of 1993**, which represents **40.36%** of 2 500 species of vascular plants of Slovakia, including 199 critically endangered ones (7.96%). Other 92 taxons are endemic (3.68%) and 32 taxons disappeared (1.28%). **At present**, pursuant to the IUCN categories, there are 1 428 taxons endangered (42.6%) of total number of 3 352 species of Slovakia, including 77 extinct species (2.3%) and 220 species (6.6%) classified as endemic species of *Carpathians* and *Pannonia*. Approximately 16% of non-vascular plants in Slovakia are endangered.

Generally it may be concluded that there is slightly increasing number of endangered plant taxons, mainly due to anthropogenic impacts. Most of the critically endangered species of the Slovak flora come from biotopes that are globally endangered in the whole of the Central Europe (peatlands, wetlands, flooded meadows, salt meadows, sands). Fundamental **cause of flora endangerment** is the very destruction of these habitats – either direct (e.g. change to ecosystems, construction, mineral exploitation), or indirect (e.g. contamination, changes to aquatic regime), with sites where their real causes are still unknown.

The number of taxons **under state protection** increased from 252 original ones (in 1958) to 779 taxons (1999) and in 2003 to 1 368 (vascular plants – 1 208; bryophytes – 46; higher fungi – 85; lichens – 21; algae – 8). Nowadays, there are legislatively protected even the **species of the European importance** of the 92/43/EEC *Council Directive on the conservation of natural habitats and of wild fauna and flora*, which does not occur in the SR area. From the total number of 1 368 protected taxons there are **850 taxons** occurring in Slovakia (vascular plants – 713, bryophytes – 23, higher fungi – 85, lichens – 21, algae – 8).

Actual problem endangering the diversity of plant species in last years has been becoming **invasive species** - introduced species of plants that are spreading beyond control, push out the original local species. There was observed approximately **175 allochtonous species** of plants in Slovakia, whereof in the presence about **20** species behaves as invasive ones. The following species were recorded most frequently: *Falopia japonica, Impatiens parviflora, I. glandulifera, Helianthus tuberosus, Ailanthus altissima, Echinocystis lobata, Solidago canadensis, and S. gigantea.*

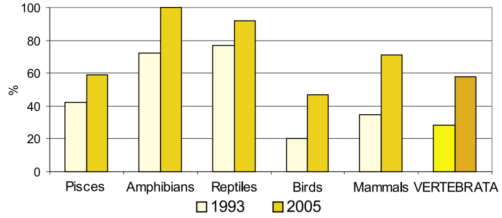
Comparison of the vascular plant endangerment* in selected countries (%)

	Slovakia	Austria	Hungary	Poland	Czech Rep.
Vascular plants	26.9	39.2	19.8	12.1	43.3

Source: OECD

* Among "endangered" taxons are those taxons classified under categories: CR, EN, and VU under IUCN.

Endangerment of Fauna



Source: State Nature Conservancy SR

Fauna composition of the SR has varying characteristic and is based on geographical conditions. In terms of **zoo-geographical** aspect, we divide Slovakia into two extensive areas – Carpathian mountainous complex (including mainly West Carpathians and part of East Carpathians), and Inner-Carpathian depression (the Pannonia region). Geographical location of Slovakia determines the richness of faunistic diversity. More than **28 800 faunistic species** were monitored and enlisted, however, their endangerment is still more and more relevant. Currently, the problem of species loss is significant on the global measure. Alarming is especially the situation with chordates that are in various degrees of endangerment. In case of all animals, the critical requirement is to ensure protection of their biotopes – sufficiently large and preserved territories where the animals can live on their own and reproduce.

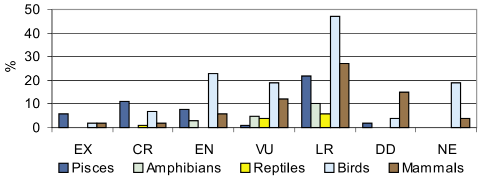
In 1993, of 536 species of wild living vertebrates, 153 were disappeared, endangered or critically endangered (**28.5%**), including 27 fishes and jawless fishes, 13 amphibians, 10 reptiles, 71 birds and 32 mammals. Currently, of total number of 544 species, there are 244 species entered in the red list of vertebrates by individual endangerment categories pursuant to IUCN, which represents more than half of the known **vertebrates** in Slovakia (**57.8%**). It includes 49 fishes, 18 amphibians, 11 reptiles, 102 birds, and 64 mammals. Of more than 21,000 taxons of **invertebrates** in Slovakia, around **17%** of them are endangered pursuant to the IUCN categorisation.

The number of **animal taxons under state protection** has increased from 384 original taxons first to 749 taxons on the level of species and subspecies and to 16 of genus (1999) and later to **792 taxons** on the level of species and subspecies and to 12 taxons on the level of genus (2003).

Over the last decade, there has been an intensive research on individual floristic species, with introduction of further changes to categorisation of species endangerment introduced in 1990s (under IUCN), thus any comparison would at least not be representative. Nevertheless, it may be concluded that there is slightly increasing number of endangered animals, mainly due to increased anthropogenic impacts.

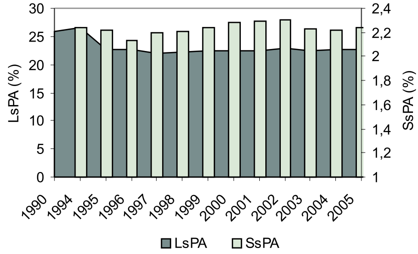
Different **measures** of nature and landscape protection authorities contribute to dealing with the issue of endangerment of fauna. These include annual rescue programmes of selected species, operation of 8 breeding and 3 rehabilitation stations, breeding stations, guarding the nests of the bird of prey, doing transfers, rehabilitation and restitution of individual animals, improving nesting and living conditions of animals, as well as building barriers for Amphibians.

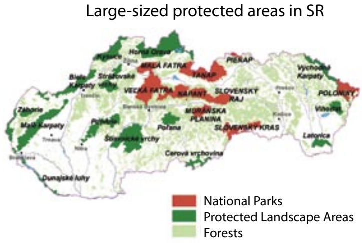
Endangerment of the particular vertebrate taxons in 2005



Source: SNC SR

Trend in Size of Protected Areas in Slovakia





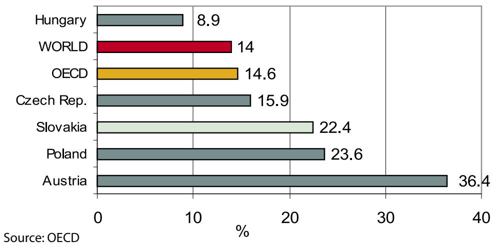
Source: State Nature Conservancy SR

At present, the whole territory of the Slovak Republic is under legal protection (1st degree of protection). **Special protected areas** (PA - degrees of protection 2 – 5) include national parks (NP) and protected landscape areas (PLA) – (large-sized protected areas - LsPA) and protected sites (PS), nature reserves (NR), nature monuments (NM), protected landscape fragments (PLF), and spetial protected areas (SPA) – (small-sized protected areas - SsPA). Nature protection and creation of conditions for legal existence of protected areas date back to the times of feudal ownership of lands (13. – 18. century). **First protected area in the SR** was Kvetnica in NNR Velická dolina (TANAP) from the year 1876, **the oldest reserve** is NNR Ponická dúbrava and NNR Príboj from the year 1895. **The Tatras National Park** (1948) was the first national park, with **Slovenský raj** being the first protected landscape area (1964).

- In 2005, total size of **9 NP** was 6.48% of the SR territory, protective zones of NP represented 5.51% of the SR territory, and **14 PLA** represented 10.66% of the SR territory (**22.65% of large-sized PA** of the SR territory)
- Size of small-sized PA represented 2.24% of the Slovak territory.
- **Total size** of spetial protected nature elements in the SR represents **1 135 429.1 ha**, which represents 23.16% of the Slovak territory. Apart from this, cave protective zones represented 633 ha.

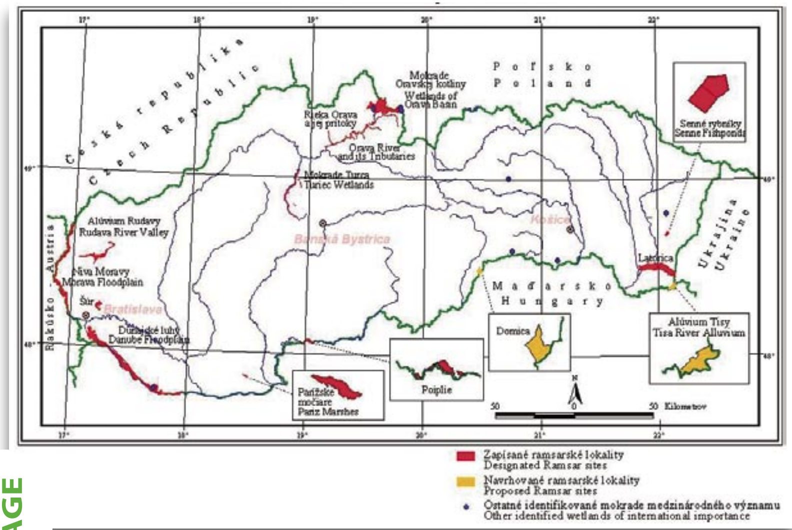
Share of large-sized PA on total Slovak territory increased especially in the course of 1980s. Since 1995, this share has not changed significantly and remains approximately 23%. Size of the **small-sized PA** has slightly increased over the last years. Their number increased from 901 (102 465 ha – 2.09%) to 1 069 (109 704 ha – 2.24%). Significant improvement is shown in the **condition of PA** in the 4th and 5th degree of protection, with 74.8% of total SsPA territory being in optimal conditions (in 1992 this was 48%), 25.0% of the area is endangered (unlike former 49%), and 0.2% is degraded (unlike former 3%).

Proportion of PA on total size for selected countries (2004)



Source: OECD

Wetlands of International Importance



Wetlands constitute no less important, rather, one of the most important parts of the natural heritage of Slovakia and as such are object of increasing attention from nature protection leading to their conservation. **Convention on wetlands** *of international importance, especially as waterfowl habitat (Ramsar convention, Iran, 1971*) binds us to protect and use them wisely. SR has been a full member of the Convention since as early as the former CSFR signed it on July 2, 1990. Meeting the obligations stipulated by the Convention is governed and coordinated by the **Ramsar Committee of the SR.**
As one of special obligation of this convention is nomination of selected wetlands to be enlisted into the ***World List of wetlands of international importance***.

The Slovakian Ramsar sites include different types of wetlands - marshes, peateries, flooded meadows, swamps, dead river branches, standing water, watercourses, as well as other human-made wetlands (fishponds). Many of them represent the last remnants of the original natural biotopes. Domica is an interesting site - a unique and rare type of wetland in Europe - natural underground wetland.

State of wetlands of international importance in Slovakia (2002)

	number	areaa (ha)	% of SR territory
international importance	22	42 227.73	0.86
including Ramsar sites	12	38 206.42	0.78

Source: MoE SR

NATURAL AND CULTURAL HERITAGE

In Slovakia, we have **13** of such sites (**Ramsar sites**) taking up the size of **38 941.1 ha:**

Name of wetland	Size	District	Listed
1. NPR Parížske močiare *(NNR Parížske swamps)*	184.0	Nové Zámky	2.7.1990
2. NPR Šúr *(NNR Šúr)*	1 136.6	Pezinok	2.7.1990
3. NPR Senné – rybníky *(NNR Senné – ponds)*	424.6	Michalovce	2.7.1990
4. Dunajské luhy *(PLA, including Čičovské dead branch)*	14 488.0	Bratislava II, V, Senec, D. Streda, Komárno	26.5.1993
5. Niva Moravy *(Flat of the Morava river)*	5 380.0	Bratislava IV, Malacky, Senica, Skalica	26.5.1993
6. Latorica *(PLA Latorica)*	4 404.7	Michalovce, Trebišov	26.5.1993
7. Alúvium Rudavy *(Alluvium of Rudava)*	560.0	Malacky, Senica	17.2.1998
8. Mokrade Turca *(wetlands of Turiec)*	466.9	Martin, Turčianske Teplice	17.2.1998
9. Poiplie	410.9	Levice, Veľký Krtíš	17.2.1998
10. Mokrade Oravskej kotliny *(wetlands of Oravská basin)*	9 264.0	Námestovo, Tvrdošín	17.2.1998
11. Rieka Orava a jej prítoky (Orava river and its tributaries)	865.0	Dolný Kubín, Tvrdošín	17.2.1998
12. Domica	621.8	Rožňava	2.2.2001
13. Tisa	734.6	Trebišov	4.12.2004

Slovak Contribution to the World Heritage

Acknowledging the protection and care given to the most valuable sites of cultural and natural heritage of every nation, a UNESCO General Conference was organised in Paris in 1972, which adopted ***Convention concerning the protection of the world cultural and natural heritage*** and consequently elaborated the **World Heritage List.**
For the **Slovak Republic** as part of the former CSFR, the Convention came into effect on February 15, 1991, that means three months after storing the document on adoption of the Convention by CSFR of November 15, 1990 with the depository – UNESCO general director.
In 2005, the **World Heritage List** contained **811** sites (including 630 cultural, 159 natural, and 23 mixed from **137** signatory countries to the Convention), **five** of them from the Slovak territory. They include:

- **Vlkolínec** Folk Architecture Reserve in the nature framework (Cartagena, 1993),
- **Spišský castle** National Cultural Monument with surrounding historic residential structures - Spišská Kapitula, Spišské Podhradie, the Church of the Holy Ghost in Žehra (Cartagena, 1993),
- **Banská Štiavnica** Historical Town Reserve with technical monuments of its surrounding (Banská Štiavnica, Hodruša – Hámre, Štiavnické Bane, Banská Belá, Voznica, Vyhne, Banský Studenec, Počúvadlo, Kopanica, Kysihýbel, Antol, Ilija; especially 23 water reservoirs - tajchy) (Cartagena, 1993),
- **Bardejov** – Historical Town Reserve also with the protective zone including the Jewish suburb (Cairns, 2000),
- **Caves of the Slovak and Aggtelek karst** (Berlin, 1995), to which was added **Dobšinská ice cave** in 2000, including Stratenská cave and Psie diery cave as a one cave system in Duča hill (Cairns, 2000).

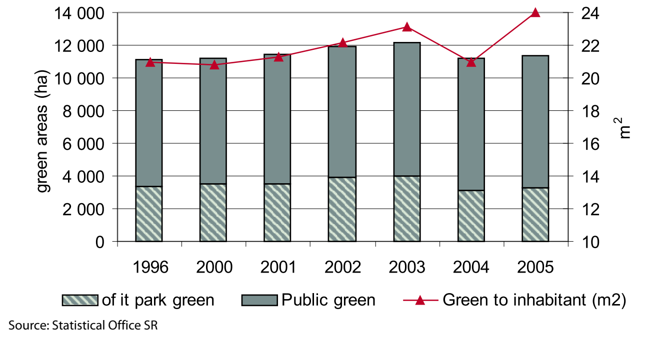
Comparing the number of World Heritage sites with neighbouring countries as of 2005

Country	Number of WCH sites
Slovak Republic	5
Czech Republic	12
Poland	12
Hungary	8
Austria	8

Source: UNESCO

NATURAL AND CULTURAL HERITAGE

Area of Public Green Sites

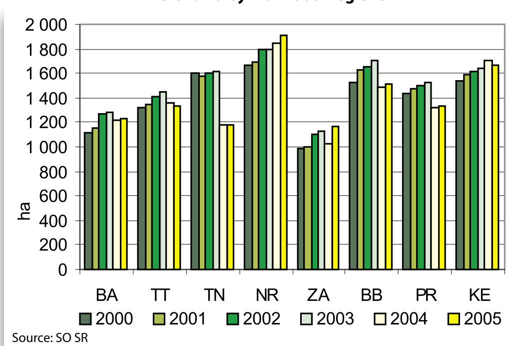


Source: Statistical Office SR

Green areas represent a source of vitality for residential areas. Urban environment especially, so characteristic for its increased pressure on the quality of environment, is balanced by positive effects of green and water. Green in residential areas is considered the most effective, spatial, protective, healing, and decorative element. Basic functions of municipal green sites include the **hygienic-health** function *(decreasing the temperature, creating shades through tree foliages, increasing their humidity, decreasing the wind speed, filtration impacts of the greenery, reduction in noise level in the urban environment)*. Greenery plays also other important functions, among them for example **psychological, aesthetic, and recreational**. Urban green is evaluated through size **indicator in ha**, which only partially expresses efficiency of green areas. It is only the intensive and grown green that may contribute to healing and aesthetic improvement of our residential areas.

As of **2005**, areas of public green in the SR reached **11 334 ha**, including 3 308 ha of park green areas. Its share per one inhabitant was **24 m²**. Trend in size of urban and rural green areas has shown positive characteristics over the last years, while since 1996 it grew by 245 ha (2.2%) or by 3 m2 (14.3%) per inhabitant, respectively. Greatest size of public green areas exists in Nitra region, however, when calculated per one inhabitant, most green is found in Trenčín region.

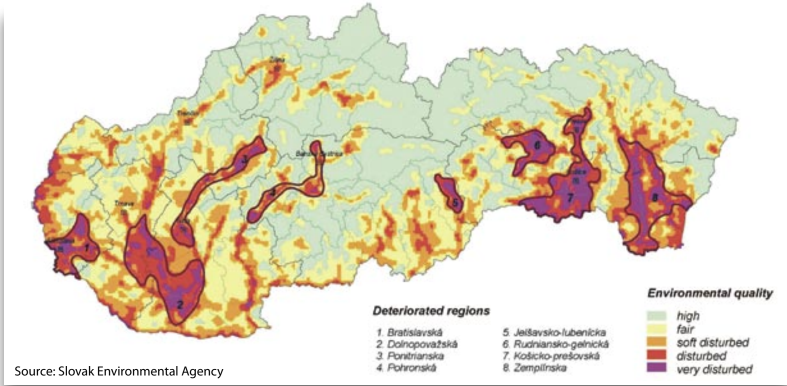
Area of public green sites (ha) and green sites per inhabitant (m²) in Slovakia by individual regions



Source: SO SR

Over the last decade in Slovakia, we have seen a continuous trend in using the green sites for construction purposes. However; urban green sides have recently taken on a unique significance, **related to the global warming and climate change**. It is necessary to ensure that investments put into healing of residential zones become more permanent through equipping municipal terraces and green areas with irrigation networks.

Environmental Regional Classification of the SR



Source: Slovak Environmental Agency

Environmental regional classification of the SR (map with the scale of 1:500 000) is a spatial synthesis of analytical maps of selected environmental characteristics by structure of components of environment and rate of impact of risk factors. It represents basic differentiation of the SR territory in terms of cross-sectional assessment of quality of environment by complex of selected environmental indicators (air, water, geological base, soil, biota, and waste).

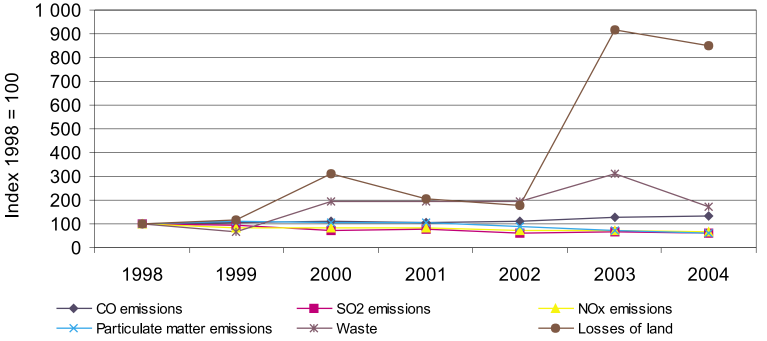
Standard of quality of environment is assessed in **5 degrees** that form basis for identification of environmentally most deteriorated regions.
In the SR, there are **8 deteriorated regions** with the size of 4 980 km^2 and 1 808 000 inhabitants.

Territories under the 5th degree of protection with greatest level of damaged environment represent the core of individual deteriorated regions. To this core were also added territories mainly in the 4th degree of environmental quality, taking into account geo-morphological, hydrological, and other relevant criteria.

Deteriorated regions	Area of km^2	Number of inhabitants	Position in frame of regions - rate in %
Bratislavská	488	432 000	Bratislava 93 %, Trnava 7 %
Dolnopovažská	1 261	247 000	Nitra 66 %, Trnava 34 %
Ponitrianska	450	272 000	Nitra 51 %, Trenčiansky 49 %
Pohronská	203	186 000	Banská Bystrica 100 %
Jelšavsko-lubenícka	137	21 000	Banská Bystrica 100 %
Rudniansko-gelnická	357	52 000	Košice 95 %, Prešov 5 %
Košicko-prešovská	1 044	425 000	Košice 81 %, Prešov 19 %
Zemplínska	1 040	173 000	Košice 83 %, Prešov 17 %
Total	**4 980**	**1 808 000**	

Source: SEA

Selected Indicators in Industry



Source: Slovak Hydrometeorological Institute, Slovak Environmental Agency, Institute of Geodesy, Cartography and the Cadastre SR

Industry impacts individual components of environment mainly through emissions of pollutants into the atmosphere, water, soil and rock environment, through accidents, production of industrial waste and occupancy of agricultural and forest land.

In case of **CO emissions** from industry in 2004, there has been a **slight increase** (32.7%) compared to 1998, while increase in emissions was shown mainly for manufacturing (35.2%). Manufacturing in 2004 constituted 96.4% of all industrial CO emissions.

In case of industrial **SO_2 emissions** there was an opposite trend – as of 2004, emissions **dropped** by 41.2%, compared to 1998. Such reduction in emissions was related to decreased production and energy consumption, as well as by change within the fuel group to more purified fuels and fuels with better quality characteristics. Greatest reduction of industrial SO_2 emissions was in manufacturing with SO_2 emissions dropping by 53.1% in 2004, compared to 1998.

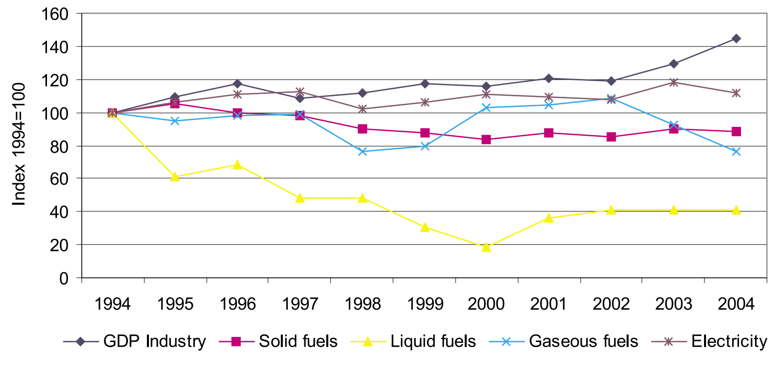
In case of **industrial NO_x** emissions there was also a **reduction**, since these were reduced by 31% as of 2004, compared to 1998. Greatest source of industrial NO_x emissions in 2004 was manufacturing (53.9%).

In case of **particulate matter emissions** from industry in 1998-2004, there were also **reduced** by 36.6%.

In 2004, industry generated 5 958 104 tones of **waste**, including 302 768 tones of hazardous waste, and 5 655 336 tones of other waste. Waste generation as of 2004 **grew** by 74.9%, compared to 1998.

Losses of land for the purposes of industrial construction were increased by 750% as of 2004, compared to 1998.

Eco-efficiency of Industry



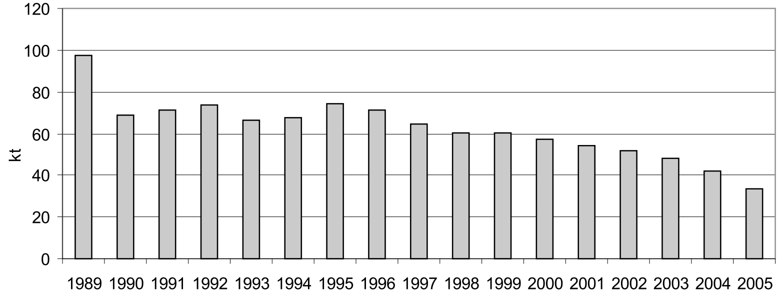
Source: Statistical Office of the SR, Ministry of Environment of the SR

Eco-efficiency is relationship between economic activity and negative impacts of environment associated with it. Main objective of sustainable development is to cut, severe or disconnect this connection.

In the area of **eco-efficiency of industry**, there are no significant break-through tendencies. This effectiveness is mostly impacted by a continuous growth of GDP from industry, as well as a gradual introduction of environmental technologies, together with more dominating production areas with less demand on energy and material resources. Decrease to the consumption of solid fuels was seen in reduced emissions from basic pollutants (SO2, NOx, particulate matter). Negative trend in environmental effectiveness from industry is related only to greenhouse gases emissions, CO emissions and volumes of waste generated by industry.

Improvement in the impact of industry on environment may be achieved through introducing **environmental technologies** that will improve the quality of environment and limit or eliminate its contamination, including waste generation. Especially things such as tax incentives, public procurement, raise in awareness of businesses and consumers and information on increased demand for enviro-technologies, help create room for application of new enviro-technologies. So far, the Slovak Republic has been involved in the area of individual research and development of enviro-technologies only at the minimum level. Implemented enviro-technologies in industry are in great majority of cases imported.

Extraction of Crude Oil and Gasoline



Source: Main Mining Office SR

Extraction of energy raw material decreased in the beginning of the 1990s to the level from 55% (extraction of natural gas), through app. 70% (in the area of extraction of **brown coal and lignite**) to 70% (extraction of **crude oil and gasoline**). This fact was reflected in drastic cut to employment in the mentioned sectors of the extraction industry, as well as in permanently growing negative balance in the SR international trade for minerals, with grow in import of mineral fuels significantly exceeding their international export.

Slovak Republic has limited **deposits of energy raw material**, while in the long run, extraction of crude oil covered only 1% of domestic consumption, in case of natural gas the number is approximately 3% of domestic consumption. Moreover, energy raw material represent only approximately 7% of all SR mineral deposits, while extraction of this type of raw material in the SR represents as much as 12.5% of total extracted minerals at exclusively designated sites in the SR.

Durability of balanced deposits of exclusive sites of crude oil or natural gas in the SR with extracted volumes for 1999-2000 was estimated at 9, or 34 years, respectively. After reallocation of part of non-balanced crude oil deposits or natural gas into balanced deposits (taking into consideration the manifold increase in prices at global markets compared to 1994) it is however possible to extend durability of these deposits to 10 – 15 years (in case of crude oil), or 50 – 60 years (in case of natural gas).

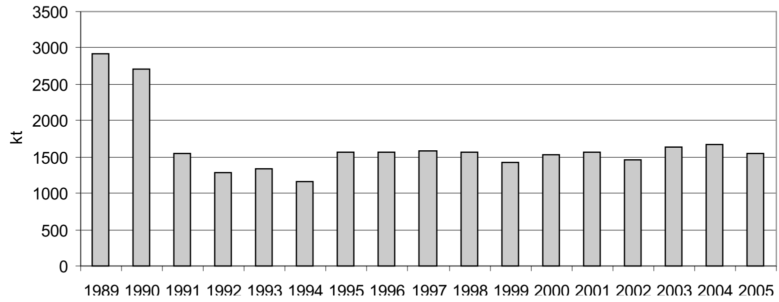
Extraction of brown coal and lignite covered app. 80% of domestic consumption, while the SR continues to be permanently dependent on the import of **lignite and coke**. Durability of **balanced deposits** of brown coal or lignite in the SR with extracted volumes for 1999-2000 was estimated at 20, or 70 years, respectively (including balanced deposits of analysed and non-loaded sites).

Trend in extraction of energy raw material in 1990-2005

Extracted mineral	1990	1991	1993	1995	1997	1999	2001	2003	2005
Brouwn coal and lignite (kt)	554.9	4653.5	4029.2	4140.2	4297.6	4041.6	3761.9	3508.8	2513.0
Crude oil Including gasoline (kt)	68.9	71.5	66.5	74.3	64.4	60.3	54.1	47.9	33.2
Natural gas (mil.m^3)	443.9	311.5	256.5	345.2	289.4	218.6	211.7	200.8	150.9

Source: MMO SR

Magnesite Extraction



Source: Main Mining Office SR

Deposits and extraction of nonmetallic and construction raw material (magnesite, limestone, dolomite, gypsum, building stone, etc.) in the Slovak Republic essentially cover their **domestic consumption** and also represent significant export commodity. In terms of **export**, most significant nonmetallic raw material in the SR is limestone and cement production raw material, magnesite, dolomite, rock salt, bentonite, and baryte. Balanced deposits of most of these raw materials, their quality and processing into final products for consumption, give their extraction a long and promising future. Nonmetallic raw material represent approximately 90% of **all SR mineral deposits**, while extraction of this type of raw material in the SR represents 47% of total extracted minerals at exclusively designated sites in the SR, and 42% in case of construction raw material.

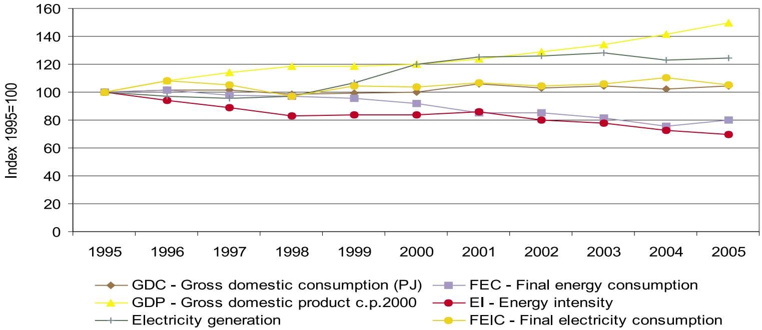
Extraction of nonmetallic and construction raw material in the SR represents in reality the only areas of extraction industry that have not been significantly impacted by structural changes in the society after 1989. Year-to-year comparisons in extraction volumes at the level of 1991 to 2005 point to the fact that in case of some commodities (e.g. salt, magnesite) extraction levels were maintained, in other types of these raw materials (e.g. brick raw material) there was a relative stabilization of extraction output, following steep reduction during the years 1991/1992, while for others (e.g. ballasts and sands) extraction oscillates depending on demand from construction industry.

Trend in extraction of nonmetallic and construction raw material in 1990-2005

Extracted mineral	Measure unit	1990	1991	1993	1996	1999	2002	2003	2004	2005
Magnesite	kt	2 702.6	1 552.6	1 341.8	1 571.6	1 423.8	1 464.5	1 640.9	1 668.9	1 555
Salt	kt	92.1	91.9	98,4	125	100.2	102.7	104.8	104.3	105.1
Building stone	thous. m^3	10 789	6 151	5 511.1	4 848.8	3 473.9	4 478.3	4 503.3	4 527.5	6 016.2
Gravel sands and sands	thous. m^3	7 669	4 122.2	2680	3 038	2 874.4	2 933.1	3 872.7	3 951.7	4 870.1
Bick clay	thous. m^3	1 514	1 021.7	572.2	388.2	480.3	433.4	507.4	591.7	466.8
Limestone and cement raw materials	thous. m^3			869.3	301.9	294.1	332.7	384.9	569.5	690.6
	kt	4 870	2 242	2 281	1 445	1 398.1	1 547.4	1 649.4	3 479.8	3 743.3
Limestone for special purposes	kt	2 980	1 858	2 986.9	3 559	4 603.4	4 356.8	4 093	3767.3	4 035.5

Source: MMO SR

Selected Indicators in Energy Sector



Source: Statistical Office SR

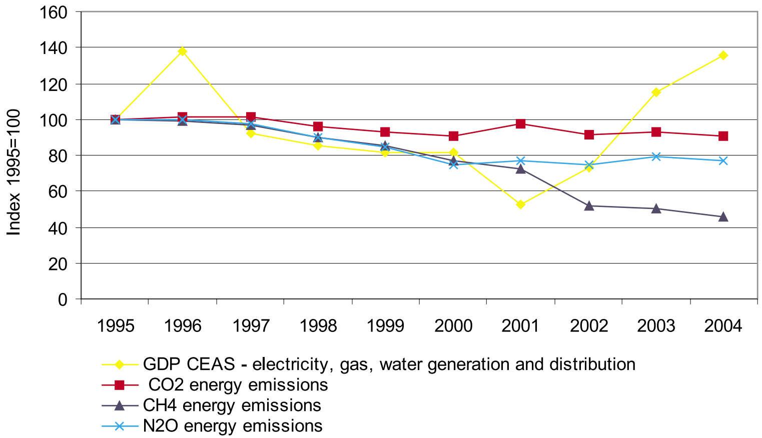
Economic transformation in the 1990s in Slovakia was connected with reduction in economic activities, as well as restructuring of industry, causing reduction in energy consumption. Structure of primary energy source consumption (PES) shifted toward non-fossil PES and natural gas; this PES consumption trend will be even more impacted by reduction in coal consumption resulting from stricter emission limits.

Final energy consumption (FEC) showed reduction by app. 20% as a result of the mentioned drop in economic activities. Permanently greatest EEC is by industry, while when making comparison with the EU countries, consumption by the public is still low. Structural changes have apparently impacted positive trend in reduction in energy intensity (EI=GDC/GDP). Nevertheless, considering the purchase power parity, EI SR still remains 1.9 times greater than the EU average.

More that a half of **electricity production** in the SR is provided by nuclear power plants, steam power plants represent app. 30%, the rest of produced electricity comes from water power plants. After launching the first (1998) and second (1999) block of the Mochovce Nuclear Power Plant, value of produced electricity grew significantly; in 2000 this represented the SR electricity production increase by app. 20%.

Total electricity consumption in the SR over the monitored period increased. Final electricity consumption in 2004 per capita in the SR was 5 089 kWh, which represents significantly lower value that the average of the 15 EU countries. It is expected that the SR will not reach the level of EU 15 even by 2020, due to very low electricity consumption in households and services.

Eco-efficiency of Energy Sector



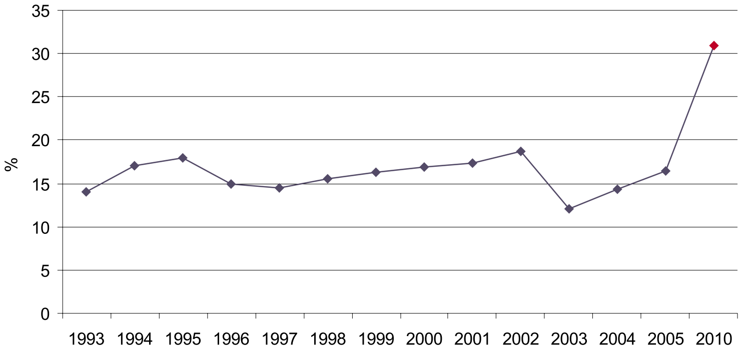
Note: CEAS – Classification of economic activities by sectors
Source: Statistical Office SR, Slovak Hydromeorological Institute

All in all, there is a positive trend in **eco-efficiency of energy management**. Since 2000, extensive reconstruction has been carried out in all significant businesses involved in different energy sectors. The reconstruction increased economic effectiveness. In recent years, growth of the GDP has been accompanied by a balanced consumption of primary energy sources and a reduction to the final energy consumption, as well as by a trend of gradual reduction of harmful agents released into the atmosphere.

Compared to the reference year of 1995, the energy sector showed an increased share on total GDP, meanwhile **reducing greenhouse gas emissions**, basic pollutants, and consumption of fossil fuels with negative impact on environment.

Future plans expect improvements to eco-efficiency of the energy sector based on implementation of the Energy management policy (2006). The goal is to decrease adverse affects of the energy sector on environment in light of sustainable development. Specifically, this will be done through advocating programs that will increase the share of environmentally friendly and economically feasible energy systems, especially on the basis of new and renewable energy sources, and through advocating more effective and less polluting ways of transformation, transfer, distribution, and use of energy with equitable and adequate present and future energy supply.

Electricity Volumes Produced from Renewable Energy Sources



Source: EUROSTAT

In the period between 1993 and 2004, **electricity production from renewable energy sources** (RES) in the SR increased from 3.47 TWh to 5.402 TWh (by 55.7%). Share of electricity production from RES on total electricity production in 1993 was 14.1%, while as of 2002 it grew by almost 19%. Large water power plants constituted majority of this production. Other renewable sources contributed to electricity production in the following order: biomass, biogas, geo-thermal energy, and solar energy.

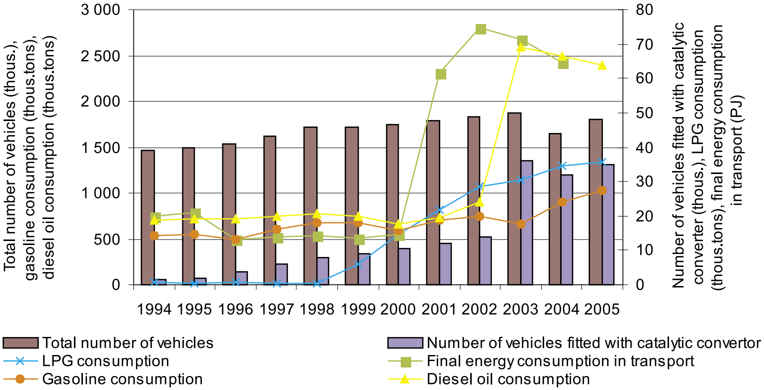
In ***Act on accession condition of Slovakia and on adjustments to agreements*** in Chapter 12: Energy management, the SR has set an indicative target for electricity production from RES at 31% by 2010. This corresponds to the production of 9.24 TWh from RES with estimated total electricity consumption (back then) of 29.8 TWh in 2010. Reachable maximum of electricity production on the basis of available potential of all RES is 10.6 TWh.

Generation of electricity from RES in 2002-2004

Source	**2002 (GWh)**	**2003 (GWh)**	**2004 (GWh)**
Hydro plants total	5 483	3 671	4 207
from which pumping	215	192	107
Hydro plants (excluding pumping)	5 268	3 479	4 100
Wind energy	0	2	6
Biomass	159	84	33
Biogas	1	2	2
Total	**5 428**	**3 567**	**4 141**
Share in total gross electricity consumption	18.6%	12.4%	14.4%

Source: Progress report on development of renewable energy sources including setting up national indicative targets in using renewable energy sources, MoEc SR, MoE SR, MoEd SR

Selected Indicators in Transport



Source: Statistical Office SR, Transport Research Institute, Inc.

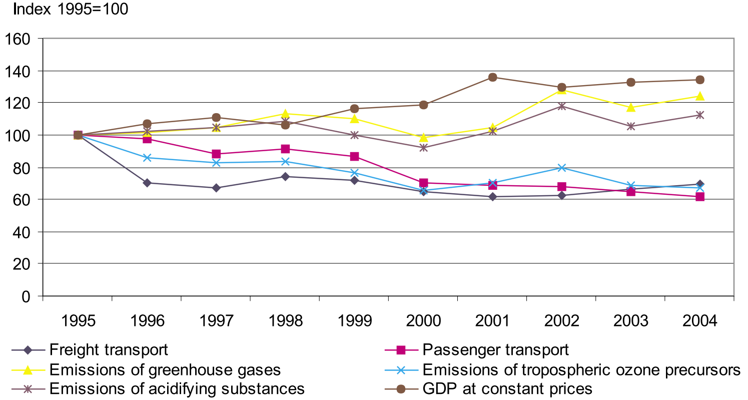
Transport sector belongs in the SR among important factors in energy management problems and environmental problems, being one of the biggest consumers of fossil energy sources. In the course of the 1990s, a significant progress was made in quality of motor fuels and in automobile technologies, significantly reducing emission volumes.

Rising trend in **fuel consumption** per thousand transported persons in road transport is influenced by increasing contribution of individual automobile transport and decreasing contribution of road public transport. Over the monitoring period of the years 1994-2005, growth in diesel and gasoline consumption was more than doubled. Most dramatic increase was detected in consumption of LPG, with consumption of 580 t in 1994 rising to 35 840 t in 2005.

Globally monitored dramatic increase in the **number of motor vehicles** in road transport caused it to become a priority issue today. Increased motorisation inevitably leads to deterioration of air quality in cities, causes increased exposition of the public to noise from road traffic, threatens health and life of the public (road traffic accidents), takes up space for building transport infrastructure, contributes to intensification of impacts of climate changes, etc. Number of motor vehicles in 1993-2005 grew by 18%. The category of **personal motor vehicles** grew by 31%. Biggest problem related to the increase in number of passenger cars in road transport is the fact that public means of transportation in the area of modal split are not able to compete on a larger scale with individual automobile transport. Over the period of 13 years (1994-2005), there was reported a 24.9% decrease in the number of carried passengers.

Automobile industry currently produces new motor vehicles fitted with still more advanced technologies. Trend in the number of motor vehicles in the SR has also brought several positive changes in the area of passenger cars, e.g. increased number of vehicles fitted with catalytic converter with high energy effectiveness, reduction in the number of passenger cars with two-stroke motors, and it lead to overall improvement in technical condition of vehicles.

Eco-efficiency in Transport Sector



Source: Statistical Office SR, Transport Research Institute, Inc.

Eco-efficiency of transport is determined through correlation between economic transport indicator expressed by the GDP indicators – gross domestic product, and emissions of pollutants from transport and outputs in passenger and freight transport.

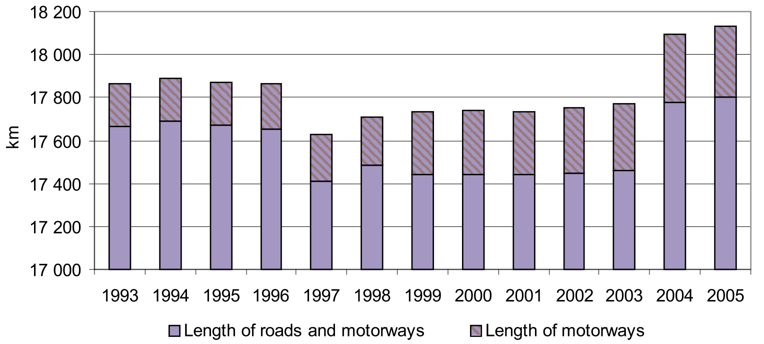
The area of transportation showed **stagnation or slight improvement** in the trend of environmental effectiveness due to the transformation process in Slovakian economy, and creation of new conditions with continuous transition to free movement of people, goods, services of transport providers in transport market after 1989, but especially after 1993 (creation of the sovereign SR).

Indicators of **modal split in passenger and freight transportation** show a positive tendency (increase in % share of transport on GDP and decrease in modal split in passenger and freight transportation). **Positive trends in environmental effectiveness** resulted in reduced emissions of basic pollutants from the sector of transportation. Stagnation and adverse trend in environmental effectiveness of transportation results in the volumes of greenhouse gas emissions produced therein (fluctuating characteristics with rising tendency over the whole monitored period.)

Modal split in road freight transportation and air freight transportation since 1993 has grown continuously (model split in road freight transportation grew by more than 200%, compared to 1993, and by more than 100% in air freight transportation). On the other hand, in 2005, modal split by railroad transportation dropped by more than 30% compared to 1993. Modal split in road and railway transportation continues its long-term downtrend. Compared to 1993, reduction in modal split in road passenger transport was more than 30%, in case of the railway transport the reduction was even by more than 50%.

Decoupling of indicators of **emissions of basic polluting substances**, and especially greenhouse gases generated by traffic, from gross domestic product indicators has been much more serious. More significant decoupling of pollutants in transport from GDP happened only recently in connection to continuous introduction of environmentally adequate technical measures into transport. Greenhouse gases emissions grew during the monitored period (1995-2004) by 19%. Greatest growth of greenhouse gases emissions compared to 1995 was in 2002 (28%). Basic pollutants emissions showed greatest reduction in 2004 from the whole monitored period (30%).

Length of Transport Infrastructure



Source: Statistical Office SR

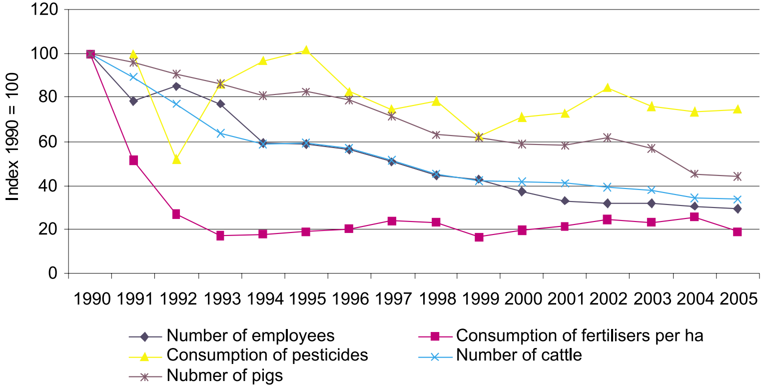
Development in transport is always connected to changes in the given country. It is a direct impact that could take on the form of construction of transport infrastructure, as well as a secondary one through impacting individual components of environment, landscape, and landscape units. Acceleration of integration processes of the SR into European structures result in increasing need for development in transport infrastructure and its modernisation. Over the last years, significant changes have taken place in development of transport infrastructure in Slovakia, related to political and economic processes.

Current situation in road infrastructure is characteristic for a relatively dense road network but at the same time with low share of motorways, while especially on the main international road connections their existing capacity is being exceeded. In 2005, the SR transport network included 17 803 km of roads and motorways. Motorways represented 328 km of the network. Over the period of 13 years, the **length of motorways** in the SE has increased **by 66%**. The length of railways was 3 665 km, with 1 535 km of electrified tracks. Length of navigable watercourses was 172 km, with channel length of 38.45 km.

The SR traffic strategy places its priority in the area of road infrastructure development, especially completion of the construction of transport infrastructure under TEN-T. Ensuring proportional motorways development in the context of planned international road connections to completed transbordér connections with the neighbouring countries, will lead to classification of the SR road network into unified European transport system. It is necessary to complete the **transformation of road economy** in order create more effective administration and development of highway network, motorways, and other road infrastructure. Most significant transformation steps in the area of road management include **transfer of ownership** of roads of the II. and III. class from the state ownership into the ownership of local self governments, as well as **creation of the "Motorway society"**. Administration and development activities of motorways in the SR will be carried out through the Motorway society.

Infrastructure of the railway transportation does not fulfill the conditions required to reach the speed of 160 kph on railway lines classified under the AGC and AGTC Agreements, which decreases its competitiveness when compared to direct road freight transportation. In Slovakia, there are no modern transit points between railway and road freight transportation - intermodal transportation terminals, which, connected to the logistic centers, would allow for transportation of goods from the road freight transportation to railway transportation.

Selected Indicators in Agriculture



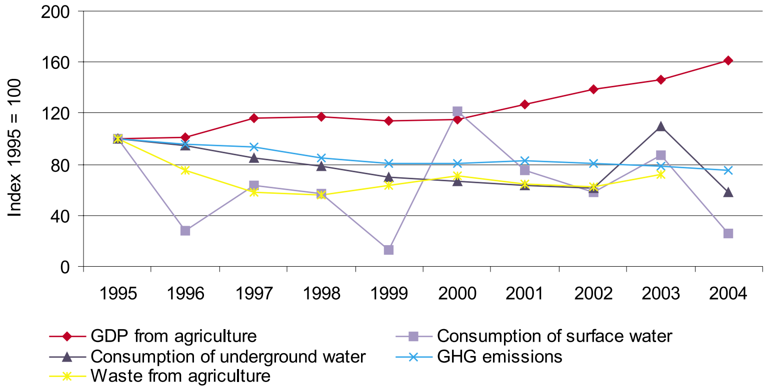
Source: Slovak Hydrometeorological Institute, Statistical Office SR

The 1990s are characteristic for their transformational and restructuring processes in the Slovak agriculture, which resulted in a sharp **increase in the number of farms, and significant reduction in the number of workers** in the area of agriculture.

The last decade has been characteristic for **radical reduction in application of agrochemicals** into the production process. In the period of 1990 to 2005 there was **reduction in the consumption of industrial fertilisers by 80%** (reduction by 194 kg of pure nutrients (p.n.) of industrial fertilisers per ha). Of this volume, **nitrogen fertilisers dropped by 65%** (reduction by 60 kg of p.n. per ha), **phosphorus and potassium fertilisers dropped approximately by 90%** (reduction by 62 kg of p.n. per ha in case of phosphorus fertilisers, and by 73 kg of p.n. per ha in case of potassium fertilisers). In the years of 1991-2005, **pesticide consumption dropped by 25%** (by 1 204 t).

In the years 1990 to 2005, **there was a reduction in the number of livestock** of all categories. Numbers of **cattle dropped by 66%** (reduction by 1 035 000 pcs.), **pork by 56%** (reduction by 1 413 000 pcs) **sheep by 48%** (reduction by 291 000 pcs.), and **poultry by 15%** (reduction by 2 394 000 pcs.).

Eco-efficiency in Agriculture



Source: Statistical Office SR, Slovak Hydrometeorological Institute, Slovak Environmental Agency

Eco-efficiency of agriculture in the Slovak Republic after 1995 **improved** for most of the indicators. This positive tendency is the result of economic changes implemented after 1989, which resulted in decreased intensification of crop and animal production. This relates especially to reduced inputs (water, energy, agrochemicals) into agriculture and the number of livestock.

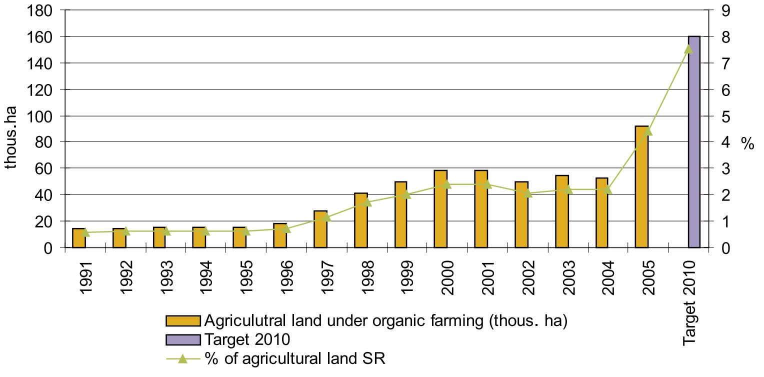
In the period since 1995, we may see **favourable trend** in eco-efficiency of agriculture **with regard to groundwater and surface water abstraction**.

Notwithstanding certain exceptions, the eco-efficiency of agriculture **with regard to greenhouse gases emissions** has shown **an overall positive trend**. The growth of GDP was accompanied by a gradual reduction to greenhouse gases emissions. This positive effect has been caused by reduced emissions from agriculture as a result of decreased numbers of livestock and lower level of application of industrial fertilisers.

Positive trend in eco-efficiency of agriculture has also resulted in the volumes of **generated waste**. This has been documented by a correlation between the GDP growth and the volumes of generated waste from agricultural activities.

In relation to **consumption of selected fuel types** in agriculture, there has been a **slight positive tendency** over the last decade (growth of GDP and reduction in fuel consumption) in case of brown coal and lignite, light heating oil, diesel, and coal.

Area under Organic Farming



Source: Central Controlling and Testing Institute in Agriculture, 2005

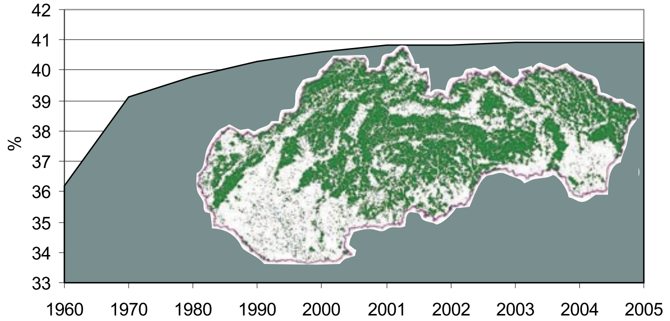
As of the end of 2005, there were **210 subjects** enlisted in the system of organic farming in the SR, on the area of **92 190 ha of agricultural land**.

Compared to 1991, the number of subjects in organic farming has increased from 38 to 210 in 2005, while in the same year, **share on the area** of agricultural land by organic farming increased **from 0.59%** to **4.4%**. Products of these farms are mostly being exported to the EU countries.

One of the **objectives** of the agrarian policy is to carry out organic farming on **7% of agricultural land till 2010**.

In 2005, the **Action Plan of Organic Farming in the SR until 2010** was adopted. This plan supersedes the former Strategy of Organic farming in Slovakia from 1995. Radical change in legal execution of organic farming happened in 1998 with the adoption of **Act on organic farming and production of bio-food**. This law was cancelled in 2004 and succeeded by **Act No. 421/2004 Coll. of Laws on organic farming**.

Trend in Forest Area



Source: Forest Research Institute

Slovak Republic belongs to the European countries with the highest rate of forestation. **Forest land in 2005** were **40.9%** (2 006 172 ha) of total territory of the state. **Stand area** in 2005 represented app. 96.3% (1 931 645 ha) of total size of forest lands.

Positive fact is that **the size of forest land in Slovakia remains stable**. In a long run, however, size of forests and stand area is on the increase. Since 1920, it has grown by more than 29%, and since 1990 by 1.5%.

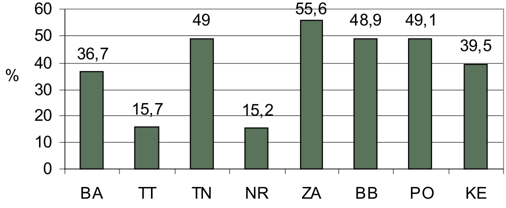
In south-western part of Slovakia, **forestation** does not reach even 10%, in basins the share is only 10-15%; however, in north-eastern and northern part of Slovakia, forestation is more than 50%. Slovak areas with most forestation include Vihorlat (90%), Slanské vrchy (90%), Low Carpathians (80%), Vtáčnik (70%), Tatras (60-65%), Low Tatras (60-65%), Malá Fatra (60-65%), Veľká Fatra (60-65%), Považský Inovec (60-65%), Slovenské Rudohorie (55%).

Gradual **increase in size** of forest land and stand area is influenced especially by forestation of agricultural unused land, transfer of agricultural land covered with forest trees (e.g. white areas), as well as continuing approximation of forest land registers with real-estate register at restoring works on forest management plans, with this trend slowly progressing.

Country	Hungary	Poland	EUROPE	Czech Rep.	Slovakia	Austria
Forest land of total country area (%)	19.9	29.3	32.5	33.5	41.9	46.5

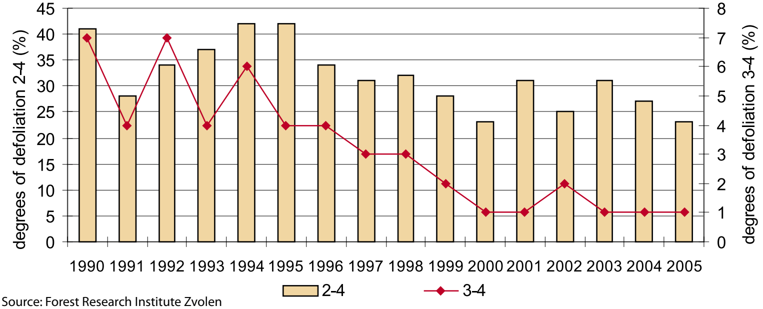
Source: Forest Resources of Europe, UN, 2000

Area of forest land by regions of SR (2005)



Source: Forest Research Institute Zvolen

Forests Condition by Degree of Defoliation



Source: Forest Research Institute Zvolen

Ratio of trees in the 2-4 degrees of damage – those above 25% of defoliation is the determining factor for assessment of deterioration or improvement to the forests condition.
2 - defoliation 26 - 60 % (trees with medium damage)
3 - defoliation 61 - 99 % (trees with substantial damage)
4 - defoliation 100 % (dying and dead trees)

According to WWF, after Sweden and Switzerland, Slovakia has the most well-preserved forests in Europe. Nonetheless, the state of Slovak forests is damaged, mainly due to ambient air pollution or other damaging factors, as well as the past character of forest management. Persisting malfunctions of forest ecosystems ultimately lead to their gradual degradation and breakdown, with 49% of the SR forests showing symptoms of damage (in degrees 2-4) in 1989. Loss of assimilation organs – **defoliation**, is being used as the basic symptom of forest health status assessment.

In 2005, the SR carried out already the 19th monitoring cycle from the national monitoring network (111 permanent monitoring areas in the network of 16x16 km) being part of the UN/ECE ICP Forests.
As early as in 1991, there was significant improvement (only 28% of trees in degrees 2-4). Since then, the forests condition gradually deteriorated until 1994, while 1995 did not show any significant changes. The years 1996-2000 belong to years with the best health condition of trees. In 2000 there was recorded the lowest share of damaged trees (23%) since the beginning of monitoring. In 2001, forests condition deteriorated, especially in the case of broad-leaved trees (31%), while in 2002 there was again improvement (25%). In 2003, percentage of damaged trees was again 31%, however, in 2004 there was a slight reduction in the proportion of damaged trees, mainly due to broadleaf trees. **In 2005**, average defoliation generally improved in the majority of trees (by 0.9%). Only the pine showed a slight deterioration. The category of broadleaf trees showed a significant improvement in defoliation by 1.7%.

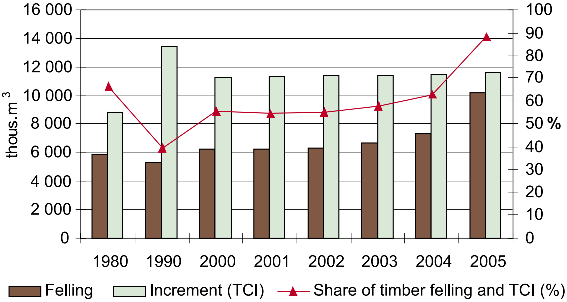
We can say that **condition of SR forests** has improved over the last years, or it has been stabilised, respectively, and fluctuations in individual years are caused mainly by climate factors. Increased level of defoliation is also in seed-dominant years. Intensity of damage shows significant territorial differentiation, also dependent on the altitude. Worst situation exists in forests at the upper forest zone limit that perform important global social roles and are threatened by acute breakdown. Condition of SR forests should still be considered as very negative, it is worse than the whole-European average (mainly due to poor state of the conifers). Worse situation of forests in the Central and Western Europe exists only in the Czech Republic and Poland.

Results of tree defoliation in selected European countries in 2004

	Czech Rep.	Hungary	Poland	Austria	Slovakia
Number of assessed trees	6 585	28 313	25 520	3 582	4 216
Degree of injury 3-4	1.1	5.9	2.1	2.8	1.0
Degree of injury 2-4	57.3	21.5	34.6	13.1	26.7

Source: MoA SR

Utilisation of Forest Resources



Source: Forest Research Institute

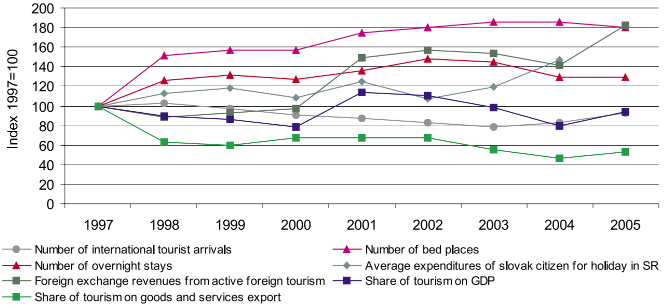
The indicator **Utilisation of forest resources**, defined as the proportion between timber felling and wood increment, may help assess the degree of forest utilisation, in longer time intervals, related to their real productivity. It is related to sustainable exploitability and real felling in terms of relative balance between forests growth and felling activities in them.

Timber felling in the SR forests in 1980-2005 **showed a fluctuating characteristics**, however, they are gradually growing. Its volume dropped from over 5.2 mil.m^3 in 1990 to below 4.5 mil.m^3 in 1991-1993. In the following years, timber felling was showing increasing tendency. In **2005**, harvested timber volumes reached as much as **10.2 million m^3**, due to the wind calamity of November 2004. Compared to 1980, volume of timber felling increased by 73.8%, and by 93.1% compared to 1990. On the basis of data on trend in standing volume and its age classification, we can see suitable conditions for slight increase in timber felling in the SR also for the next 20-30 years, if regulations of forest management plans are followed (in 2005 the volume is expected to reach 5 926 thous.m^3, and 6 051 thous.m^3 of timber in 2010). However, planned annual intentional tending and restoration timber felling activities are complicated by **incidental felling**. In 1990-2000, this represented almost half of total felling activities. Due to large extent of incidental felling, annual volume of total timber felling planned within actual forest management plans is exceeded.

Besides the standing volume, **wood increments** are equally important in assessing production capacity of forests and felling possibilities. **Total current increment (TCI)** expresses the real annual volume timber production. Still relatively high volume of TCi is determined by existing age composition of the SR forests. TCI was increasing **until 1990**, when it reached 13 428 thous.m^3 (6.8 m^3 per ha). After 1990, we can see a reduction in forest increment until 2000 (by 16.6%) followed again by a slight increase. **In 2005**, the increment was 11 584 thous.m^3 in total, which represents **reduction by 13.7%** since 1990. This trend since 1990 relates to gradual shift of over-average green vegetation (presently 50 – 90 years old) into higher age category with lower increment ability. Trees with greatest increment ability (coniferous trees of age 30 – 50 years) have smaller spatial representation than normal, which is ultimately reflected in reduction to TCI.

Share of timber felling and TCI ultimately **grew from 39.9% (1990)** to **63% (2004), and to 88%** in 2005 (with significant impact of incidental felling following the wind calamity in the Tatras in 2004). **Forest utilisation in Slovakia** may be considered sustainable, since timber felling is lower than the annual increment. Actual annual volumes of timber reach 40 to 60% of net annual increment, which points to new possibilities for increase in future timber felling.

Selected Indicators on Tourism



Source: Ministry of Economy SR, Statistical Office SR

Overall **number of visits of international tourists** in the period of 1998-2003 showed **a permanent and very significant reduction**. In 2003, there is a critical shift, with Slovakia showing an **increase** in the number of international visitors in 2003-2005. Greatest numbers of international tourists entering the territory of the SR were shown on the common border strip with the Czech Republic; on the other hand, the lowest numbers where on the border with Ukraine, due to bilateral visa policy existing until 2005. National border with the **greatest load** is the border with Austria, due to its length.

Increase in the number of accommodation facilities and **their bed capacities** is a positive indicator. On the other hand, Slovakia still does not reach the level of the European average and other countries in terms of the number of beds per square kilometre. Number of beds in accommodation facilities in the SR in the years **1997-2003 showed a permanent growth**. This has been the result of a growth in small capacity accommodation facilities including pensions, hostels, cabin settlements, camps, and other accommodation facilities. **In 2004-2005**, this positive trend stopped, while today there is **stagnation** in the number of beds in all categories of accommodation facilities.

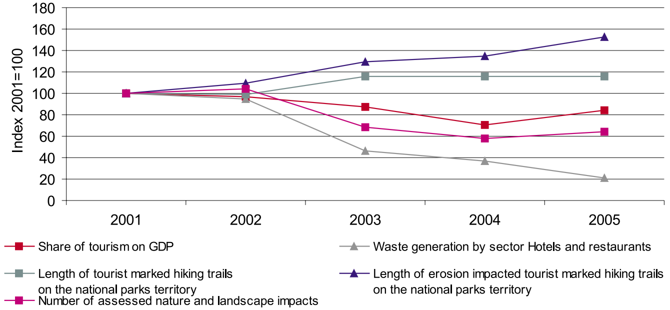
Notwithstanding the fluctuating characteristics of statistical data in **1997-2005, number of overnight stays** is still **stagnating**. Most importantly; however, **average** number of overnight stays **decreases** continually. This relates to the attractiveness of the tourist destination. In comparison with the neighbouring countries, the SR lags behind in reaching values of this indicator, the main cause for this situation probably being unsatisfactory state in development of the tourist infrastructure that impacts the length of actual stays.

Average costs per capita for domestic vacation stay in Slovakia, after a long period of stagnation, showed a **significant increase in 2002-2004**; however, t**hey are still one third of the costs of international vacation stays**. This may point not only to a probably less measure of attractiveness of domestic tourist destinations, compared to the international ones (especially coastal countries), but in general to a lower degree of development of various miscellaneous activities and services for tourists. At the same time, these data also point to the fact that **the Slovaks are willing to invest a considerably higher amount of money for international vacation than for the domestic one**.

Foreign exchange revenues for active tourism balance in 1997-1998 were decreasing, while in 1999-2002 notwithstanding the fluctuating characteristics of statistical data, they were on the rise. In 2002-2004 there was a reduction due to significant changes outside of the sector (the Slovak crown getting stronger especially in relation to the US dollar and the Polish zloty, an increase to the original GDP rate from 14 to 19%). However, **in 2005, there is again a significant growth** in the mentioned revenues.

Share of tourism on the GDP and export of goods and services does **not show a positive trend**, especially when compared to the countries with lower potential for its development. Both indicators depicted in 1997-2005, notwithstanding a significant fluctuation of statistical data, showed a significant stagnation in the development of their values, with no signs of a long-term and stable trend in their growth.

Eco-efficiency of Tourism



Source: Statistical Office SR, State Nature Conservancy SR

Due to the fact that there are no relevant and methodologically systematic data over a longer period that would point to the impact of tourism on environment and its demands on exploitation of natural resources, there is no reliable way to assess the eco-effectiveness of the present tourism situation in Slovakia.

When **comparing** the levels of reached values in the **share of tourism on the GDP** and the **production of waste by hotels and restaurants** (these statistical report units do not cover all economic subjects active in the area of tourism), we can see a **positive trend** over the monitored period of **2001-2005** with a very significant reduction in waste production by as much as 78.8%, and especially since 2004, with concurrent growth also in the share of tourism on the GDP in Slovakia.

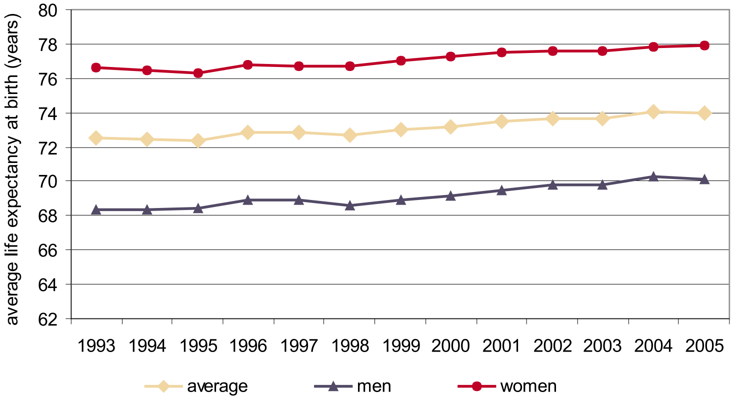
In terms of the **length of marked tourist trails**, the most **fragmented territories**, considering their size, are areas of the Pieniny national park, NP Muránska planina, NP Low Tatras, NP Slovenský raj, and NP Veľká Fatra. When comparing the level of reached values of tourism's share on the GDP and the length of tourist marked trails on the territory of national parks, we see a negative trend and 2001-2004, with an increase in the length of tourist marked trails (significant growth specially and 2002-2003) and at the same time a decrease in reached values of tourism's share on the GDP. **A partial positive change of this trend comes in 2004-2005**, with the growth of tourism's share on the GDP in the SR.

A significant environmental problem is increase in **length of erosion-impacted tourist marked hiking trails** situated in the zone above the upper forest border and precipes where, due to extreme climate conditions, exist greatly deteriorated local conditions for regeneration of soil and the flora. **Critical soil erosion** may be seen at marked tourist hiking trails in the territory of the **national parks of Malá Fatra** and **Low Tatras** (substantial erosion increase over the years 2002-2003) and **Muránska planina** (substantial erosion increase over the years 2004-2005), substantial erosion exists also in the territory of the national park of **Slovenský raj**. In 2004-2005, significant increase in erosion of marked tourist hiking trails was recorded also in the territory of the **Tatras National Park**.

When **comparing** the level of reached values of tourism's share on the GDP and the length of erosion-impacted tourist marked trails on the territory of national parks, we see a negative trend and 2001-2004, with a very significant increase in the length of tourist marked trails and at the same time a decrease in reached values of tourism's share on the GDP. **A partial positive change of this trend comes in 2004-2005**, with the growth of tourism's share on the GDP in the SR.

Although the **territories with the highest degree of nature protection**, together with territories of individual NP's and PLA's take up only as much as 18% of the Slovak territory, they show 60-80% of **assessed impacts into nature and landscape** that require the permission of a pertinent nature and landscape protection authority and are demanding in terms to time, funds, and their professional management. In terms of total assessed impacts into nature and landscape, the major territories that **dominate** include **TANAP, NP Low Tatras, NP Slovenský raj, and NP Malá Fatra**. A significant reduction in the number of impacts into nature and landscape in 2002-2003 has been caused, besides other things, by a different classification of assessed activities under corresponding sections of the pertinent Act on nature and landscape protection number 543/2002 and then valid Act number 287/1994 Coll. For that reason, it is not possible to assess in a relevant and satisfactory manner the environmental effectiveness of tourism related to the number of impacts into nature and landscape.

Average Life Expectancy at Birth



Source: Statistical Office SR

After 1990, there has been observed reduction in overall mortality, especially in case of newborn and infant mortality, which is reflected in increase to average life expectancy at birth. In 2005, average life expectancy at birth reached 70.1 years in men, for women it slightly grew to 77.9 years. Compared to 1993, this is an increase by 2.5% in men, and 1.6% in women.

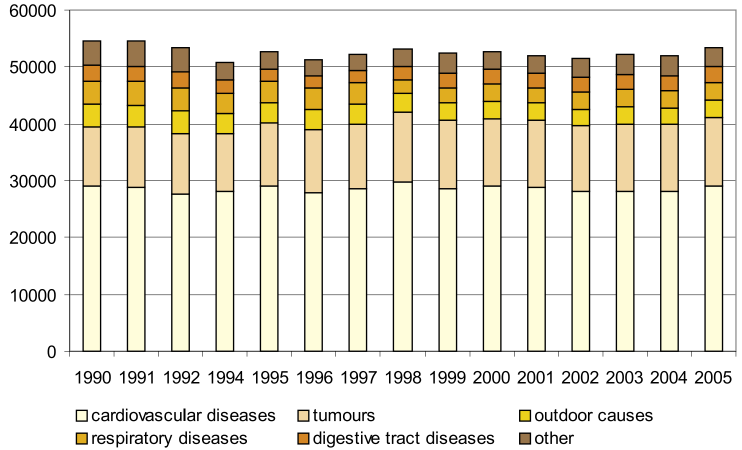
Average life expectancy in Slovakia is gradually increasing; however, from the global European perspective Slovakia belongs to countries with average level of average life expectancy. International comparisons show (as of 2005) that in this indicator the SR men are lagging behind the Islanders by 9 years, compared to the Spanish women, Slovak women are short of almost 6 years.

Average life expectancy at birth

	Austria	Poland	Hungary	Czech Rep.	EU	Slovakia
Men	76.7	70.8	68.6	72.9	75.8	70.1
Women	82.2	79.4	76.9	79.1	81.9	77.9

Source: EUROSTAT

Mortality by Causes of Death



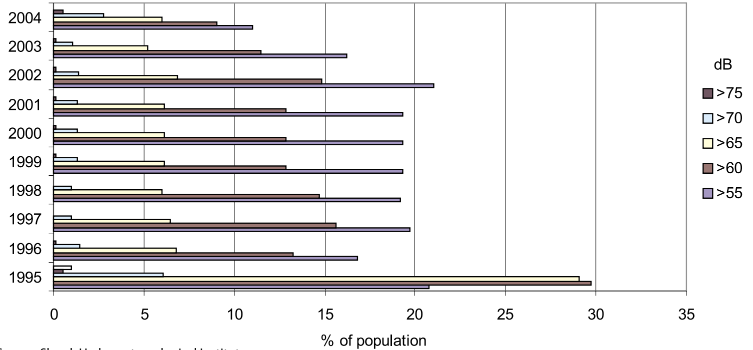
Source: Statistical Office SR

Basic development tendencies in mortality in the 1990s showed a slight improvement over the previous time period. This most recent tendency has been undoubtedly caused also by social transformation that encourages the people to more responsible behaviour and consequently to more responsibility for their own health.

In 2005, 28.1 thousand man and 25.3 thousand women died in the Slovak Republic, which, after a slight reduction to the gross mortality rate, represents an increment of 0.3 point to 9.9‰.

Substantial part of public mortality falls into the 5 major categories of **causes of death**, including circulatory system diseases, neoplasms, diseases of the respiratory and digestive systems, and external causes of death. In 2003, these 5 death categories constituted 94.9% of all deaths in men, and 94.4% of all deaths in women. Greatest public mortality both in men and women over a long time period has been from circulatory system diseases, specifically from the acute heart attack, as well as from vascular cerebral disease. Second most frequent cause behind public mortality in both sexes is neoplasms, with 11 874 persons died in 2005. Most frequent causes of death are tumours of the trachea, bronchi, and lungs, as well as malignant tumours of the stomach and colon. In men, third most frequent cause of death is death caused by injuries and poisonings (8.7%) with the rate almost 4 times the rate in women. In women, third causes of death are diseases of the respiratory system (5.2%). **Overall mortality trend by the mentioned causes of death has been stabilized since 1990**.

Number of the SR Population Exposed to Respective Equivalent Levels of External Noise L_{Aeq} (dB) from Road Transport



Source: Slovak Hydrometeorological Institute

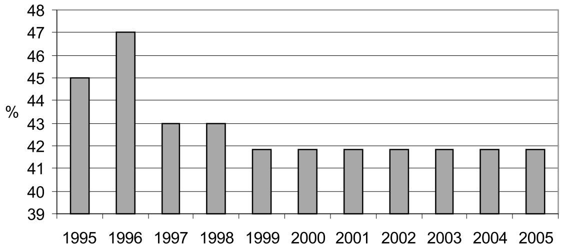
Mainly the inhabitants of larger cities show the greatest exposure to excessive noise levels. Main sources of noise include **road transport**, railway and air transports, noise from disco parties, and pubs. **State Health Institute** of the SR studies the issues of noise and vibrations in Slovakia. More complex noise monitoring in the SR has been carried out since 1995 in all district cities. Until then there was a shortage of adequate monitoring outputs from railway transport, industrial activities, and other noise sources. Monitoring of noise load from air traffic is still not being implemented. During the pre-accession period, the Ministry of Health of the SR was designated as the competent institution for the approximation of the Slovak legislation to **the European Parliament and the Council Directive 2002/49/EC of June 25, 2002**, relating to environmental noise assessments and management. On 2 December 2005, the Act **No. 2/2005 on assessment and control of noise in the exterior** and on amendment **to the NR SR Act No. 272/1994 Coll. on public health protection** as amended, was adopted. The law aims to gradually decrease the noise in the exterior, especially in the built areas, public parks, or other quiet areas in agglomeration, and in the open landscape.

Systematic monitoring of public noise load has not been carried out since 2004. Available are only the results from monitoring activities implemented at random sites (within investigation proceedings following public complaints, etc.). Based on the knowledge of the Ministry of Health, the **noise level of 65 dB(A)** represents the level beyond which the vegetative nervous system is beginning to be negatively effected. When exposed to noise, one can experience problems in concentration, reduction in work performance, sleep difficulties, increased sensitiveness to noise, aggravation of a number of diseases, functional problems in the circulatory system, increase in blood pressure, etc.

Proportion of monitored inhabitants exposed to high-risk noise level of 65 db from road traffic **does not drop below 6%**, with the exception of the year 2003. However, there has been a reduction in those exposed to the highest noise level of 75 dB. Monitoring of excessive noise and vibrations load carried out in the industrial area has been focused mainly on work safety assessment. **Number of employees exposed to high-risk noise level** in 2002 was **92 791**. This number represents the greatest value in the category of high-risk activities. A PHARE project called **"Environmental noise assessment and management"** was successfully completed at the end of **2004**. Its goal was to prepare all necessary technical and human resources for direct implementation of measures related to directive **2002/49/EC** on environmental noise assessment and management in the SR.

Competent authorities in the EU countries are required to elaborate strategic noise maps for main roads, railways, airports and agglomerations, as well as develop action plans for noise reduction in those areas where necessary and for keeping the level of environmental noise wherever it is good.

Percentage Share of $_{222}$Rn Radio Nuclide on Irradiation of the Public



Source: Preventive and Clinical Medicine Institute

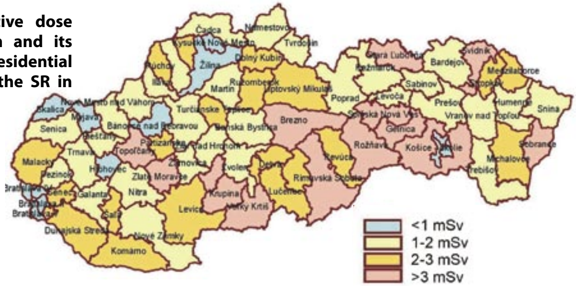
Radon (Rn) is a natural radioactive gas that originates from natural, radioactive change of $_{236}$Ra as one of uranium – radio change elements and subsequently penetrates as gas from solid natural material to the atmosphere, and which, when inhaled together with other daughter products of the change, impacts epithelial cells of the bronchi. **$_{222}$Rn** is a source of the **alpha radiation** with the halftime of 3.825 days. Among factors undermining **carcinoma of the lungs**, irradiation of the population caused by the exposition to Radon and its daughter products ranks second, just after smoking. **The most significant** population **radiation source** in the SR is **Radon (Rn)** and products of its radioactive change. Annual share on the effective irradiation equivalent is **41.86%**. Radon radiation load of the individual is **1.30 mSv/year.**

During his or her lifetime, the person is exposed especially to ionising radiation and its components – cosmic and terrestrial radiation. This has even been coupled with radiation formed by operation of nuclear facilities, as well as radiation from radio nuclides used in medical diagnosis. **Radon** together with radioactive decay products is the **most significant radiation source** of the Slovak population. Annual share on the effective irradiation equivalent is **41.86%**. Radon radiation load of the individual is **1.30 mSv/year**. After measurements in 1992-1993, when **values of the equivalent volume Radon activity (EVRA)** were measured in 1 832 Slovak residential apartments, geometric average of the equilibrium volume activity of Radon and products of its change was **40 Bq.m^{-3}**. Nevertheless, greatest concentration levels reached the value above 1 400 Bq.m^{-3}.

In relation to volume Radon activity in soil air and soil permeability, Slovak territory may be divided into three groups, based on the value of Radon risk – with he following proportions: **low** 53%, **medium** 46.7%, while only 0.3% are with **high** radon risk. Districts with **highest EVRA values** are Rožňava, Krupina, Zlaté Moravce, Rimavská Sobota, and Košice-vidiek, with EVRA exceeding 100 Bq.m-3.

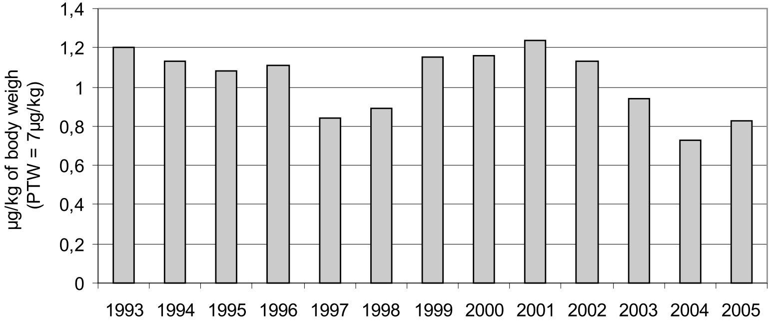
Based on the outcomes of measurements, we believe that the main source of radon in the houses of the Slovak population is radon in the soil air, which relates to the volume of uranium and the geological structure of the territory.

Average annual effective dose from Radon inhalation and its daughter products in residential zones and districts of the SR in 2004



PHYSICAL RISK FACTORS

Weekly Intake of Cadmium by Human Organism (µg per kg of Body Mass)



Source: Food Research Institute of the SR

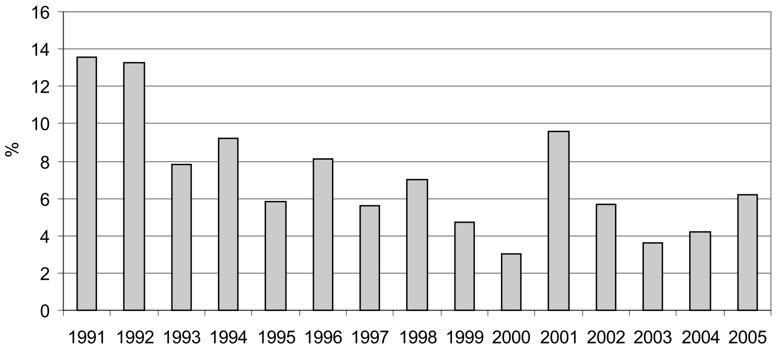
Various hazardous substances are being released into the environment as a result of a broad number of anthropogenic activities. They penetrate into the food chain from soil and water. Heavy metals, due to their toxicity, represent a big risk. System of **Consumption Monitoring System** focuses on acquiring objective data on contamination of foodstaff in consumer network. Consumption basket includes 26 basic foods and drinking water. Sampling and analyses are carried out by the **Slovak agriculture and food inspection, State veterinary administration of the SR**, and **Water management research institute**. Heavy metals are the most risk-posing group of xenobiotics that are absorbed by the human organism on a weekly basis, (PTWI) expressed as percentage. People have not used **cadmium**, unlike many other toxic metals, for centuries. It, however, accompanies many metals.

Food groups show low cadmium content; however, its exposition risk is given by the volume of food consumed. Cadmium can **accumulate** in the human body, especially in kidneys and liver. Higher concentrations are found in some cereals, e.g. rice and grains, also carrots and potatoes. Only as much as 6% of Cadmium from food is absorbed by the organism. Its absorption is enhanced by, for example, calcium or proteins. The **PTWI** limit value for Cadmium is **7 µg** per kilogram of body weight. Approximately 80% of the adult population in Slovakia has a daily intake of Cadmium into organism at the level of 6.5 µg to 14 µg. Values of weekly intake into organism during the first four years of monitoring reach approximately the same value – 1.0 µg per kilogram of body weight. In 1997 and 1998 there was a reduction noticed; however, in 1999 – 2001 the value increased again. Differences were in the interval of 0.81 - 1.19 µg per kg of body weight.

In 1997 and 1998 there was a reduction noticed, just as in 2004-2005; however, in 1999-2001 the intake value increased again. Differences were in the interval of 0.81 - 1.19 µg per kg of body weight.

In terms of Slovak geographic areas, **highest** percentage values exist in territories of the **East-Slovakian region**, while **lowest values** were measured in territories of the **Middle-Slovakia region**.

Percentage of Exceeding Xenobiotic Samples (in All Commodities and the Same Time)



Source: Food Research Institute of the SR

Monitoring of the occurrence of xenobiotic substances in the products of agricultural and food production in the SR is carried out in two ways: through **monitoring and control activity**. Goal of the **monitoring** is to acquire information on health safety of available foods and the situation in relevant components of environment. **Control activity** focuses on detection of unsatisfactory foods. Partial monitoring system called: **Xenobiotic in foods and forage** is composed of three subsystems: Coordinated purpose-oriented monitoring (CPM), Consumption monitoring system, Monitoring of game, wildlife, and fishes.

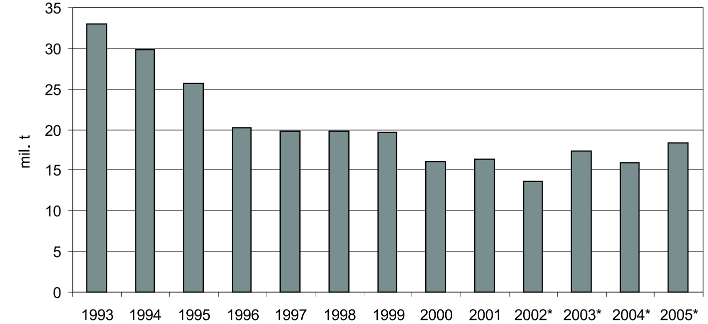
CPM has been carried out since 2003 in yearly intervals with monitoring the crop from 650 – 800 hunts annually, and animal production from farms in the same cadastre territory. In total, there were **2 222 samples** collected **(16 884 analyses)** that were analysed for content of chemical elements (lead, cadmium, mercury, arsenic, chromium, nickel), polychrome biphenyls, nitrates and nitrites. Of total number of samples, 7.2% (110 samples) did not comply with set limit values. **Mercury** and **nickel** showed unacceptable levels (0.4%). There was no single exceeded limit value in the samples of cadmium, lead, chromium, arsenic, and PCB. In case of the feed water in 2005, **limit values were exceeded** for **nickel** and **nitrates**, and for **nitrites** in the irrigation water.

When comparing the average findings in the mentioned soil metals from **1991** until **2005**, there was a **reduction in their average findings**.
In terms of the overall assessment of contamination by all xenobiotic substances at once per individual commodities, percentage of the limit-exceeding samples **dropped** since **1991 by 7.5%**, while it must be noted that the limit values have been changing over the last 15 years.

Cadmium belongs to **most critical contaminants** of all monitored chemical elements. However, since 2000 the number of limit-exceeding samples has gradually decreased, with **no single** sample exceeding the limit valid in the SR in 2005.

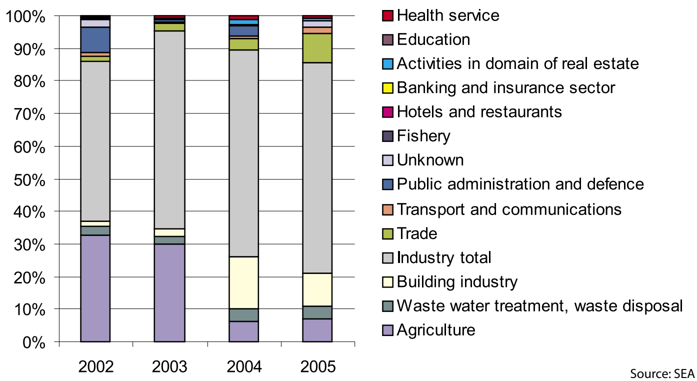
Compared with available international data, the SR may be considered among countries with **lowest values** of weekly intake of arsenic, cadmium, mercury, chrome, nickel, lead, and nitrates by the human organism.

Waste Generation



* balance according to Act No. 223/2001 Coll. on Waste
Source: Slovak Environmental Agency

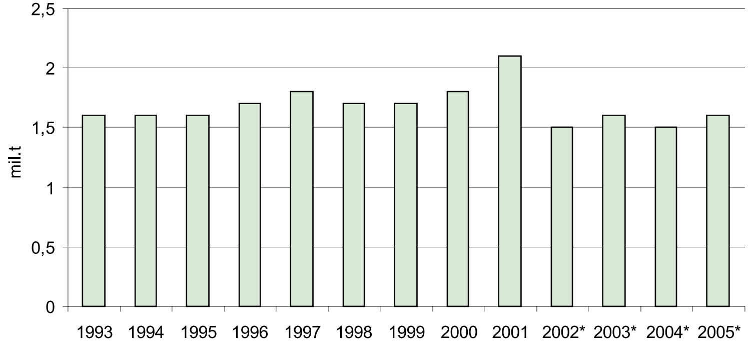
Since the existence of the SR (1993), situation in **waste generation and handling** has improved, thanks to a number of legal measures together with stricter control in waste handling.
In the period between **1993-2005**, the volume of generated waste showed **decreasing trend**. Unlike 1993, with 33 mil. tones of generated waste, in 2005 (18.4 mil.tons), there was **approximately 44%** reduction. **Since 2002**, assessment of **waste generation** has been carried out under new valid legislation, harmonized with legal regulation of the EU waste management (WM) policy, and due to this fact (change in waste categorization and introduction of new classification of waste handling methods) it is impossible to compare it with data from previous years.



Source: SEA

In **2005**, of total volumes of generated waste (18.4 mil. tones), **most waste** has been generated **by industry** (app. 64%) , there was approximetely 13% increase unlike year 2002.

Municipal Waste, its Generation and Handling

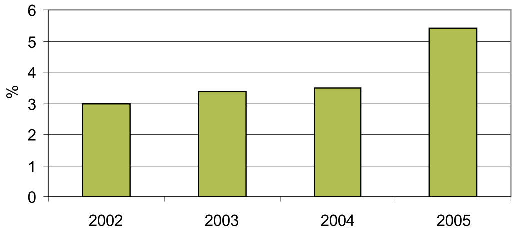


* balance according to Act No. 223/2001 Coll. on Waste
Source: Ministry of Environment SR, Statistical Office SR

Municipal waste generation (MW) in 1993-2005 was in the interval from 1.5 to 2.1 mil. tones (volume of waste calculated in relation to dry matter). Increase in waste generation in 2001 by 0.5 mil. tones, compared to 1993, is caused by growth in gross domestic product, increasing living standard, as well as better quality of waste generation monitoring. During this time period, great majority of MW was **disposed of**, most of it through landfills.

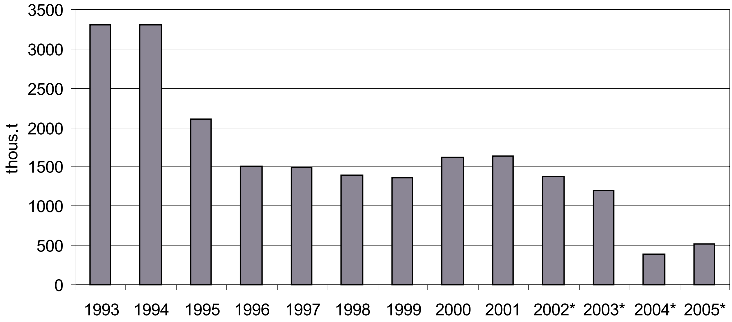
Since 2002, assessment of **waste generation** has been carried out under new valid legislation, harmonized with legal regulation of the EU waste management (WM) policy, and due to this fact (change in waste categorization and introduction of new classification of waste handling methods) it is impossible to compare it with data from previous years. **In 2005**, there was 289 kg/year of MW per capita, which shows slight increase about 6 kg/capita compared to 2002. Of total generated MW in 2005, only 3% was recovered (a reduction by 9% compared to 2002), and the rest was disposed of, with the ratio of landfilled waste being as much as 79%.

In waste handling practices in Slovakia there is a growing tendency to separate the municipal waste; however, it's still not sufficient. In 2005, there was 16 kg of separated municipal waste components per capita, which is more by 2.4% compared to 2002 (8.6 kg/inhabitant). A more effective system that takes into consideration the quality of separated waste components and the subsequent connection to reclamation capacities will soon have to be created.



Source: SO SR

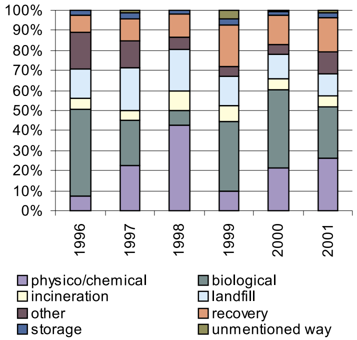
Hazardous Waste Disposal

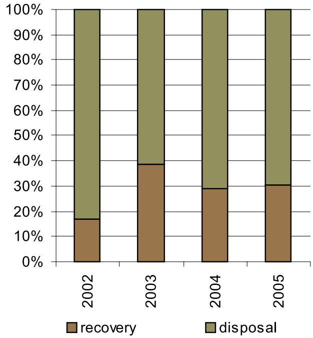


* balance according to Act No. 223/2001 Coll. on Waste
Source: Slovak Environmental Agency

Situation that exists in the area of hazardous waste (HW) generation and handling has substantially improved since the existence of the SR (1993), due to a number of legal measures, as well as stricter control of waste handling. Data comparison on HW generation from 1993 (3.3 mil. tones) and 2005 (0.52 mil. tones), points **to its decreased generation** by 84%. Since 2002, assessment of **waste generation** has been carried out under new valid legislation, harmonized with legal regulation of the EU waste management (WM) policy. It is important to take into consideration this fact (change to waste categorization and introduction of new separation methods in waste handling) when making comparisons within a given time period.

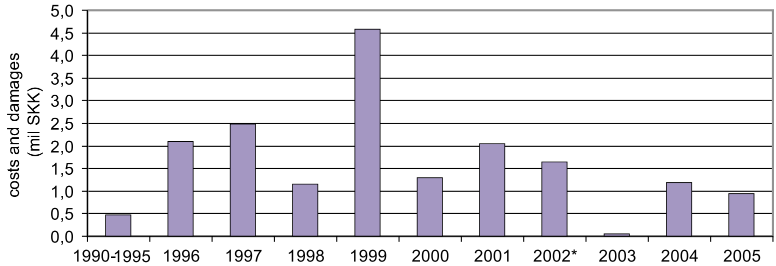
SR, since its birth, has been a member state to the **Basil convention** on management of HW cross-border transfer and its disposal.





Source: SEA

Financial Aftermath of Floods



* including also the sum of 6.0 mil. SKK – cost of anti-mosquito chemical spray treatment
Source: Water Research Institute

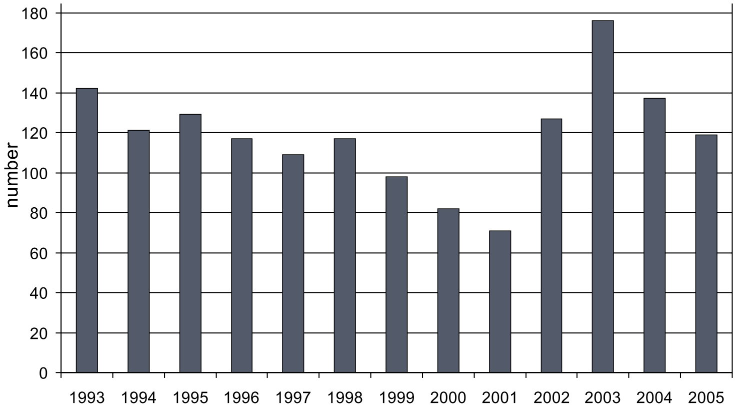
Occurrence of floods in Slovakia is a **frequent and natural phenomenon**. In Slovakia, there are on average **5 to 12 floods per year**, with varying degrees of spatial magnitude, intensity, and impact on people and economy. The years 1996-2000 belonged to the period of **most extensive floods**. This has been caused by intensive rainfalls or large water deposits in snow that melts rather quickly during the Spring months. In most cases in 1997 and 1998, floods were caused by long-lasting, intensive rainfalls. Frequently, floods are the **result of synergetic action** of more anthropogenic factors, as well as global climate changes. In 2003, floods afflicted 41 SR municipalities, with total costs and damages being incomparably smaller – only 53.79 mil. SKK. Over the period of January-August 2005, there were **237 affected municipalities** in total in Slovakia. **Total damages and costs** represented **948 916 thous. SKK**.

A program was launched with the help of the European Union under the ISPA platform, called **Technical support of preparation of preventative measures for high priority flood protection in the SR**, including as one of its components the **Flood alarm and forecasting system of the SR (POVAPSYS)**.
To solve individual tasks under the **POVAPSYS** project in 2003-2005, the state treasury released 470.5 million SKK, with 70 million SKK secured for the year 2006.

"Program of flood-protection in the SR by 2010" has become the basis for strategy and fight against floods. It also includes "File of scientific industrial projects". Proposed measures must lead **to restoration of water-retaining functions**, which will improve the aquatic and terrestrial space in general, and specifically in lowland river catchments. Meanwhile, there will be improvement to ecological situation together with elimination of ecological deficits from the previous years. **Long-term easures** implemented in the framework of Program of flood protection, include the following tasks:

– **Issue maps** with marked high-risks areas, together with data on probability of occurrence of flood currents;
– Systematically **improve the performance of alert and prognosis service** through international cooperation;
– **Do not permit the rise in flood levels** on important water management watercourses (by 2005), or reduce them in critical zones by 30 cm by 2010, respectively;
– Increase the rate of manageability of the flood trend through construction of protective facilities in the upper zones of river catchments;
– Ensure continuous outsourcing of fire protection unit with material and technologies for the execution of rescue works in 2001-2010, with 2 500 thous. SKK per year.

Number of Listed Accidental Deteriorations in Water Quality



Source: Slovak Environmental Inspection

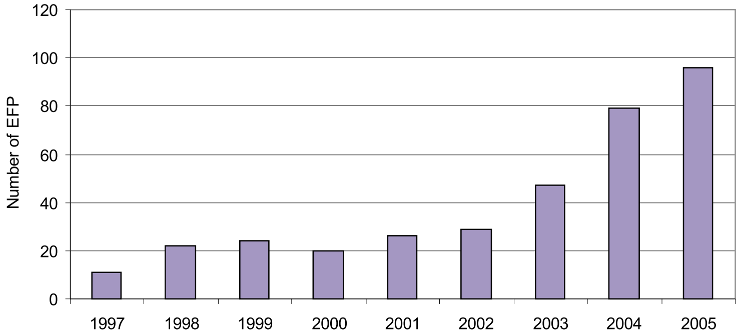
Since 1993, the Slovak Inspection of Environment, department of water management inspection, has recorded **decreasing tendency in the number of emergency deteriorations or threats to water quality (EDW)**. Since 2001; however, the number of EDW is on the rise. **In 2003**, there was another dramatic increase in these occurrences, compared to previous years - especially in case of surface water.

In terms of **water-threatening compounds** (WTC), exceptional deterioration of water quality in a long run has been caused mainly by **crude oil compounds** - as was also the case in 2003. Wastewater has smaller impact on EDW, together with livestock excrements, insoluble substances, alkali, pesticides, other toxic substances, most of all those WTC where it was impossible to determine the type. Major causes of accidental deterioration of water quality and 2005 included traffic and transportation (45 cases), and human factor (21 cases).

Unknown originators and so-called foreign organizations are contributing to EDW by significant percentage (in the year 2005 it was 27.7% for unknown originators, and app. 12.6% for foreign organizations). Number of EDW generated outside the SR territory in 1993-2005 fluctuated significantly, and its share on EDW in 2005 was only 2.5%.

Most frequent **major causes** of accidental deterioration of water quality include failure to comply with work and technology discipline, unsatisfactory condition of equipment due to insufficient maintenance, inappropriate technical condition of equipment, transport, and transportation. Leakage of crude oil from oilduct pipes, as well as leakage of oil products from vehicles at accidents, may be considered as relatively most frequent reasons behind accidental water contamination, Companies contributing to EDW generation include for example NCHZ Inc. Nováky, Biotika Inc. Slovenská Ľupča.

Number of Products with the Right to Use the EFP International Eco-Labelling



Source: Ministry of Environment SR

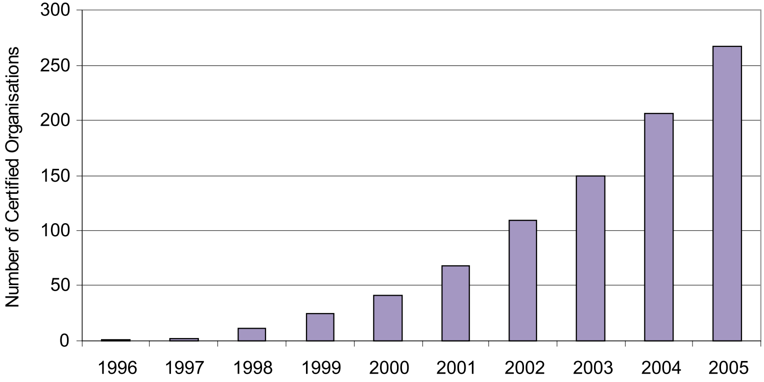
National programme of environmental assessment and eco-labelling of products belongs to one of the indirect instruments of economic and environmental SR strategy that directs, on the macro, as well as micro level, production processes, consumer behaviour, and uses the market force to implement strategy of sustainable development.

Conditions and strategy for licensing and using the national label **"Environment-friendly Product" (EFP)**, as well as the EC environmental label „European Flower" are governed by the **NC SR Act 469/2002 Coll., on environmental product labelling** as amended by Act 587/2004 Coll. The MoE SR Directive 258/2003 Coll. was subsequently adopted, which executes the act on environmental product labelling. With the goal to insure reduction of negative impacts of the products on the environment, the **Program of environmental product labelling for the years 2004-2008** was adopted in 2004. The program follows up on the National program of environmental assessment and labelling of products in the SR (NPEHOV), approved by the Slovak government resolution No. 97/1996.

In February 2005, 3 new MoE SR Decrees came into effect. They define special conditions for a group of products based on wood (MoE SR Decree 1/2005), paint substances (MoE SR Decree 2/2005), material for winter maintenance (MoE SR Decree 3/2005). Decree for construction machines used for terrestrial works (MoE SR Decree 4/2005) came into force in April 2005. For the group of shredded limestone products, a new directive came into force in July of the same year (Directive 0024/2005). In total, **there were nine directives and six decrees** that set up special conditions for licencing the national environmental label.

The year of 2005 was the ninth year of implementation of the voluntary **system of environmental product assessment and labelling at the national level**. The greatest increase in the number of products with the right to use the EFP national environmental label was in 2004 (32 products). In 200, **96 products** had the right to use the **Environment-friendly Product** label on the basis of licence agreements with the MoE SR.

Number of Certified Organisations under the ISO 14001 Norm



Source: Slovak Environmental Agency

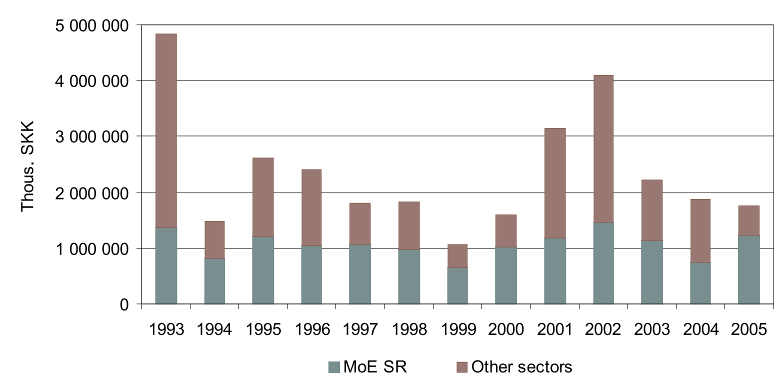
System of environmental management (EMS) may generally be considered a system of organisational management with the end to protect the environment. Its efficiency is determined through assessing the compliance with accepted norm. In essence, there exist two most significant norms: **EMS under international norms of the ISO 14000 line** represented by the STN EN ISO 14001certification norm called "System of environmental management, Specification with user manual", and **EMAS, which is the Council Regulation No. 1836/93 EEC**, scheme of environmental management and audits (EMAS) valid in the EU countries.

Companies adopt progressive system of environmental management on a voluntary basis and at their own cost, with the goal to create conditions for maintaining and improving their economic effectiveness, international competitiveness, and meeting sustainable development requirements of the society.

In December 1996, the SR established Technical Committee No. 72 called Environmental Management, at the Slovak Institute of Technical Normalisation, which has been focusing its activities on adopting all ISO norms issued under ISO. As of today, there are **twenty norms of environmental management** adopted into the STN. By the end of 2005, there were 266 organisations in the SR under the ISO 14001 norm. Greatest increase in the number of certified organisations under ISO 14001 during 1996-2006 was recorded in 2005 (60 organisations).

In 2002, in Slovakia adopted the NC SR Act 468/2002 Coll., on the system of environment-focused management and audit, and subsequently the MoE SR Resolution 90/2004 Coll., which executes Act on the system of environmental management and audit. In order to reach full harmonization of the Slovak legislation with the EU provisions, in 2005, the legislation was replaced by a newly adopted Act No. 491/2005 Coll., on environmental inspection and registration within the European Community scheme for environmental management audit, and on amendment of certain laws by MoE SR Directive 606/2005 Coll., which executes Act No. 491/2005 on environmental inspection and registration within the European Community scheme for environmental management and audit, and on amendment of certain laws.

Environmental Investments

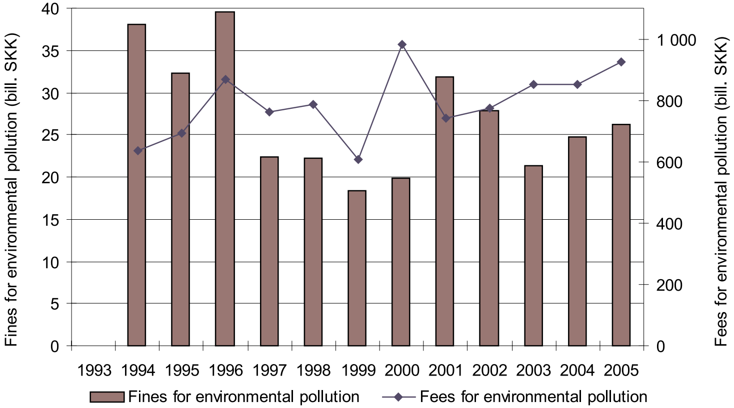


Source: Ministry of Environment SR

During the period of 1993-2005 there was 30.77 bill. SKK from the national budget designated to **environmental investments**. Of this amount, **MoE SR** designated the sum of 13.9 bill. SKK. Biggest value of money to environmental investments was invested in 1993 at the amount of 4 843 901 thous. SKK. Lowest value to environmental investments was invested in 1999 at the amount of 1 060 361 thous. SKK.

In 2005, total sum of investment funds was 1 769 504 thousand SKK, with MoE SR contributing by 69.17%.

Fines and Fees for Environmental Pollution



Source: Ministry of Environment SR

Extent of **fines for environmental pollution** in 1993-2005 shows a fluctuating tendency. For instance in 1993, State administration authorities imposed fines at the amount of 28.88 mil. SKK, in 1996 fines reached the highest amount of 39.57 mil. SKK, while lowest amount of fines was collected in 1999 – 18.43 mil. SKK. Total volume of imposed fines since 2001 decreased, with increased sums of individual fines since 2004. In 2005, there was a reduction by 9% in total amount of imposed fines, compared to 1993.

In 2005 total volume of fines reached the sum of 26.3 mil. SKK. Greatest amount of fines in the given year was imposed in the area of water protection (10.6 mil. SKK) and in the area of waste management (6.9 mil. SKK).

Economic instruments implemented in the area of economy of environment protection also include fees for environmental pollution and fees for natural resource exploitation. Total **fees for environmental pollution** in the assessed time period show increasing tendency. Since 1994 (635 mil. SKK) the fees have been rising gradually until 1996 (866 mil. SKK). Following years showed reduction until 1999 (607 mil. SKK). In 2000, fees for environmental pollution reached the highest amount (980 mil. SKK) and 925.499 mil. SKK in 2005.

In the framework of environmental pollution fees, **fees for ambient air pollution** reached 743.238 mil. SKK, **recompense for wastewater discharge** reached 181.704 mil. SKK, **fees for waste storing** reached 360 thous. SKK, fees **for handling ozone depleting substances and products** reached 173 thous. mil. SKK and fees for EIA reached 24 thous. SKK.

International Conventions in the Area of Environment Adopted in the SR

Environment in general

- The Antartic Treaty *(06.05.1962)*
- The UN ECC Convention on Environmental Impact Assessment across national boundaries *(20.08.1991)*
- The Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment *(21.06.1993)*
- The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters *(31.10.2005)*
- The Convention on the protection and sustainable development of the Carpathians *(22.05.2003)*

Air and Ozone layer protection

- The United Nations Framework Convention on Climate Change *(19.05.1993)*
- The Kyoto Protocol to the United Nations Framework Convention of Climate Change *(26.02.1999)*
- The Convention on Long - Range Trans-boundary Air Pollution *(25.05.1993)*
- The Vienna Convention for the Protection of the Ozone Layer *(28.05.1993)*
- The Montreal Protocol on Substances that Deplete the Ozone layer *(28.05.1993)*
- The Stockholm Convention on Persistent Organic Pollutants (POPs) *(05.08.2002)*

Water protection

- The Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes *(07.07.1999)*
- The Convention on Cooperation for the Protection and Sustainable Use of the Danube River *(29.06.1994)*

Waste and Waste Management

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal *(24.07.1991)*

Nature protection

- The Convention on Biological Diversity *(25.08.1994)*
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) *(28.02.1992)*
- The Convention on the Conservation of Migratory Species of Wild Animals *(14.12.1994)*
- The African-Eurasian Migratory Water Bird Agreement (AEWA) *(20.06.2000)*
- The European Bat Agreement *(09.07.1998)*
- The Convention on wetlands of international importance especially as waterfowl habitats *(02.07.1990)*
- The Convention concernig the protection of the world cultural and natural heritage *(15.11.1990)*
- The Convention on the Conservation of European Wildlife and Natural Habitats *(28.04.1994)*

Soil protection

- The United Nations Convention to Combat Desertification in Those Countries Experiencing Serious. Drought and/ or Desertification, particularly in Africa *(07.04.2002)*

Ionising radiation and nuclear safety

- The Vienna Convention on Civil Liability for Nuclear Damage. *(25.01.1995)*
- Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention *(25.01.1995)*
- The Convention on nuclear safety *(07.03.1995)*

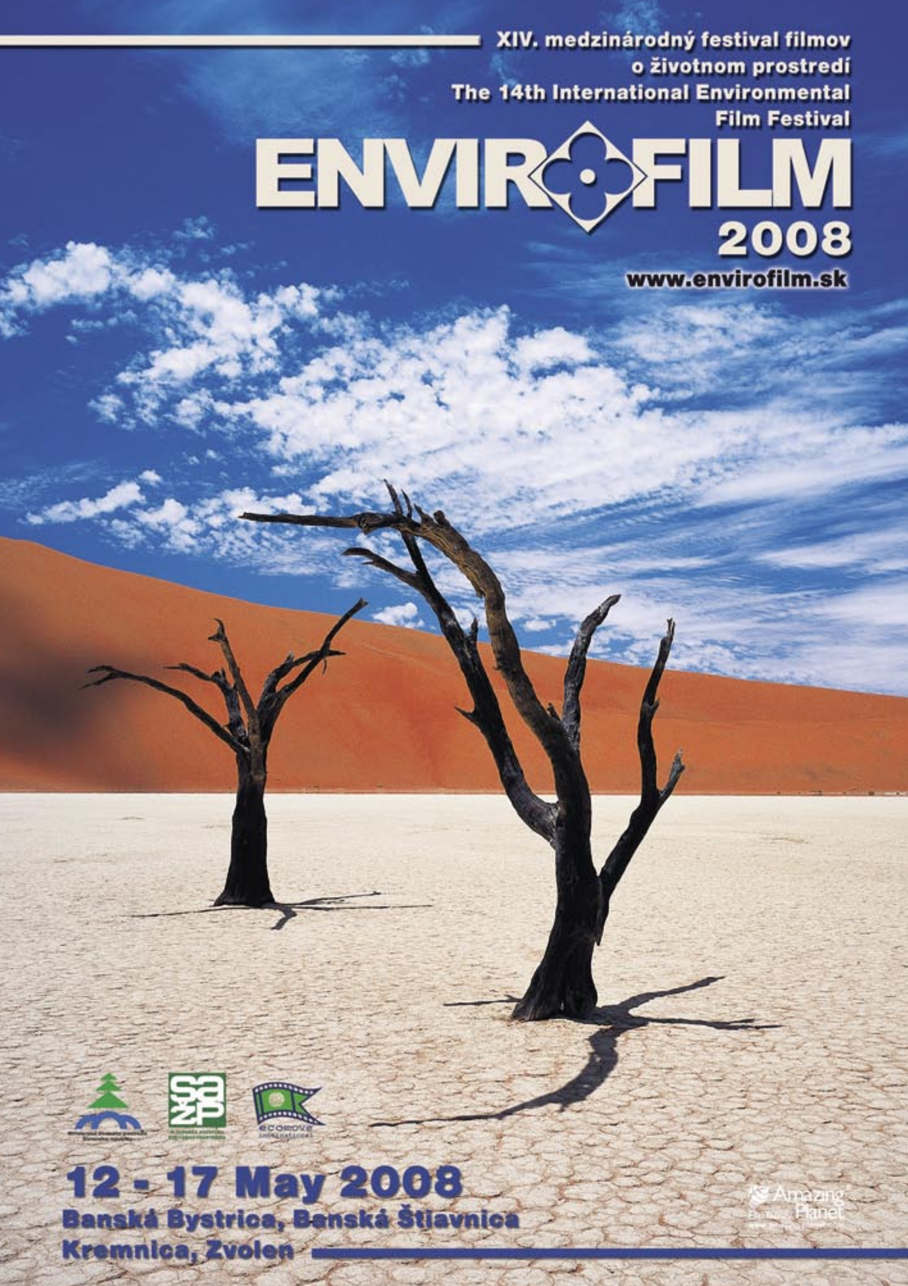
Energy management

- Energy Charter Treaty and Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects *(07.09.1995)*

Health and Environment

- The UN Framework Convention on Tobacco Control *(04.05.2004)*

Note: Date of adoption of international treaty or protocol in the SR is in parenthesis.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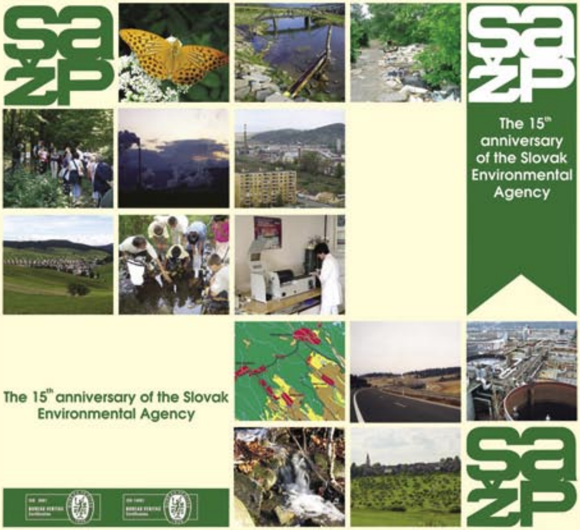

SLOVAK ENVIRONMENTAL AGENCY

Slovak Environmental Agency (SEA) is a professional organisation of the Ministry of Environment of the Slovak Republic with nationwide scope of powers, which focuses on the environment protection and landscape planning in accordance with principles of sustainable development.

Main activities of SEA are as follows:

Fulfilment of selected international commitments of the Slovak Republic in the field of the environment

Environmental monitoring and informatics

Waste management and packaging

Environmental protection and environmental risks

Environmental assessment

Environmental regionalisation and landscape-ecological planning

Landscape planning and protection

Programming and implementation of environmental projects

Environmental education, trainings and promotion

Environmental management

1993 - 2008

www.sazp.sk

Slovak Environmental Agency (SEA)

Slovak Environmental Agency is a professional organisation of the Ministry of Environment of the Slovak Republic (MoE SR) with nationwide scope of powers, which focuses on the environment protection and landscape planning in accordance with principles of sustainable development.

SEA was established by the Decision of the Ministry of Environment of the Slovak Republic of 17 May 1993 as a state agency financed from the budget of the Ministry of Environment. Since 1 January 2001 it has been operating as a subsidized organisation co-financed by the Ministry. In 2005 SEA was awarded the Management Quality System Certificate and the Environmental Management System Certificate in accordance with ISO 9001 and 14001 standards.

Main activities of SEA are as follows:

- **Fulfilment of selected international commitments of the Slovak Republic in the field of the environment**
- **Environmental monitoring, informatics and archiving**
- **Waste management and packaging**
- **Environment protection and environmental risks**
- **Environment assessment**
- **Environmental regionalisation and landscape-ecological planning**
- **Landscape planning and protection**
- **Programming and implementation of environmental projects**
- **Environmental education, trainings and promotion**
- **Environmental management**

In the above areas SEA provides the Ministry of Environment with expert and supporting documentation for drat strategies, concepts, programmes and legal regulations; moreover it coordinates activities, holds conferences, seminars, trainings, exhibitions and other events, compiles plans and assesses their fulfilment, prepares or procures projects, standpoints, expert opinions, information and documents, provides professional supervision over application of environmental legal regulations and expert activities focused on fulfilment of commitments of the Slovak Republic resulting from international conventions, provides the Ministry with expert assistance in harmonisation of environmental legislation of the Slovak Republic with regulations and procedures of the European Union and cooperates with concerned expert institutions in the Slovak Republic and abroad.

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http://enviroportal.sk/spravy-zp/zoznam-sprav.php?typ=1

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