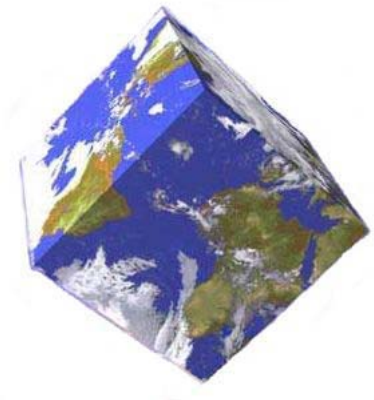
Slovak Environmental Agency
Centre of Environmental Policy and Informatics

ENVIRONMENT OF THE SLOVAK REPUBLIC IN 1993-2003 IN FOCUS



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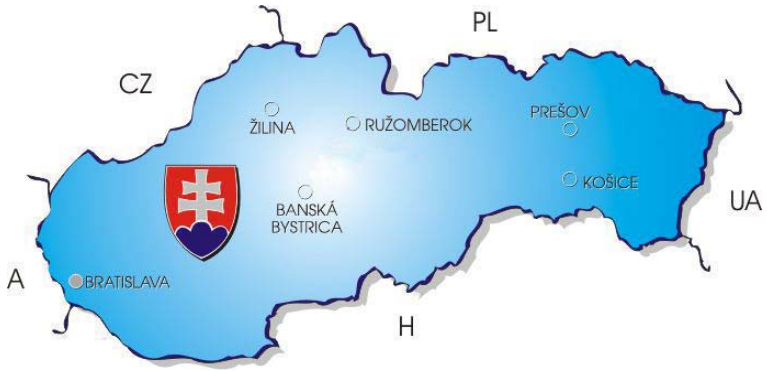
Department
for the Assessment of the Environment

CONTENTS

BASIC INFORMATION ABOUT THE SLOVAK REPUBLIC

Slovak Republic is located in the heart of Europe, on the territory of 49,033 km^2. Geographic centre of Europe is located near a Central Slovakia historical town called Kremnica, at Krahule.



Relief of the landscape is characteristic for significant differences in altitude. Lowest located place is the village of Streda nad Bodrogom (95 m.a.s.l.), while the highest point is the Gerlachov peak (2,655 m.a.s.l.) in the High Tatras. Northern and Central Slovakia is a mountainous territory of the inner arch of the West Carpathians that are divided by inner mountain basins. Lowlands are dominant in southern part – e.g. Podunajská lowland, while the Východoslovenská lowland is a dominant agricultural area in the eastern part. Danube is the biggest river that connects Slovakia with the Black See through the aquatic route, and with West Europe through the canal of Rhine-Mohan-Danube. Today, Slovakia is becoming a crossroads of economic and commercial routes between the east and the west.

Territory of Slovakia is situated in the mild climate zone with regular changes to seasons of the year. Average temperature varies in the interval of 3.7° to 10° C. Slovak territory has a huge natural potential with high biodiversity on a relatively small area. Vegetation belongs to the zone between the Pannonia, West-Carpathian, and East-Carpathian regions. With the exception of the Mediterranean and Flat zones, Slovakia has developed all other vegetation zones of the mild region. Forestland covers significant part (app.41%) of the territory. Notwithstanding the strong impact of ambient air pollution and related damage and weakening of timberland, there are still extensive areas of preserved original forest vegetation that represent major part of the European, or World natural heritage, respectively. In terms of biodiversity, many territories of secondary communities created by human hand are also very valuable. Most damaged and degraded landscape parts include valley, marsh, and wetland ecosystems. Whole territory is also rich in fauna, and majority of animal species live in mountainous forest areas. Visitors to Slovakia may admire the oldest cave in Europe, as well as the beauties of other 11 caves. Biggest natural park is the Low Tatras National Park (81 thous. Ha), while the oldest is the High Tatras National Park.

This piece of land inclining toward the south has suitable natural conditions that contributed to its very early population. Imprint of a Neanderthal man's skull has been found in the travertine deposit in Gánovce. Slovak history is the history of Europe, despite the fact that we have never been in the centre of major events, we have always been connected with significant activities of the European history.

Slovakia has 5 380,053 **inhabitants** (5 324,632 in 1993). In 1991, 44% of total Slovakian population was living in rural areas (consequence of concentration of population into cities), in 2000 it was 43.5%. Nevertheless, rural population in Slovakia during 1991 – 2000 grew by 27,042 persons (growth index of 101.2). Average population density in Slovakia is 109,7 inhab./km^2, with 55.2 inhab./km^2 in rural areas, and 400.6 inhab./km^2 in cities. Urbanisation process in the SR reached its climax in the 1990s, over the last decade there have not been significant changes to the proportion between urban and rural population, while at present we can see a slight growth in the number of people living in villages. In general we can say that the age composition of population is very positive in cities, and negative in the rural areas. Ethnic population split in Slovakia represents 85.6% of Slovaks, 10.8% of Hungarians, and the remaining 3.6% are the Roma people, Czechs, West Russians, and Germans. Majority of people are Roman Catholics. Average life expectancy is 69.8 years in men, and 77.6 years in women.

Slovak Republic began its recent history as an independent country on January 1, 1993. In terms of its strategy of **international politics**, the SR has become member of the most important international governing institutions such as the EU, Council of Europe, OECD, WHO, WTO, CSCE, IMF, EBRD, INTERPOL, and other 49 organisations.

ENVIRONMENT IN THE SR IN 1993-2003

Last **decade** has brought radical changes to Slovak public. Independent Slovak Republic came into existence, building of market economy was launched, and integration process of Slovakia into European and trans-Atlantic structures started Trend in politics, economy, and social area have been seen also in environment. Together with global impacts, the trend is seen especially in the quality of its individual components.

A period of ten years makes it possible to seriously analyse the process of environmental development in Slovakia, and assess its indicators. Negotiation in the area of environment – **Chapter 22**, and its subsequent implementation, impacted the environmental situation of this time period the most.

Since 1993, **average life expectancy** in men has grown by 1.4 years, and in women by 1 year, while **infant mortality** decreased by 47.9%, and **neonatal mortality** dropped by 57.5%, which apparently contributes to the improvement of environment. In the area of **air quality** assessment, we can see a positive trend in discharge of basic pollutants. In all of these, there has been a significant reduction over the last decade. In terms of meeting its international obligations, the SR has been a relatively successful country over the monitored time period.

Volume of **wastewater** discharged into watercourses dropped by more than 19% over the assessed time period. On the other hand, notwithstanding the growth in the number of **wastewater treatment plants** by 84.6% and increase to their overall capacity, surface water treatment and surface water quality do not reach the required level.

Of total **size of the SR lands,** 1.4% of them are **contaminated,** and 0.4% of lands are **substantially contaminated** with heavy metals. 0.7% of agricultural land is **contaminated through ambient air pollution from the magnesite production.**

Despite partial successes in the area of **nature and landscape protection** by type and territory, 27% of the size of protected areas under the IV and V degrees is endangered.

Compared to 1993, the volume of generated **waste** dropped by app. 50%. Hence, total trend in the reduction of waste generation continued. However, there still persists undesirably high percentage of waste disposal through landfilling.

Total **expenditures to environment** under the MoE SR show **fluctuating trend.**

The SR already accessed to majority of **international conventions** of environmental character, chairing the top institutions of the Convention on Biological Diversity and the UNEP Board of Governors. In 2000, the SR became member country to **OECD,** which fully opened the space for the SR participation in environmental activities carried out by this organisation.

The mentioned facts suggest that the area of environmental care in the SR is given due attention. Despite all this, number of objectives directed toward improving the environmental situation has not yet been reached. Environmental education directed toward increasing public environmental awareness significantly helps reach the set objectives.

Adoption of **the act on environmental impact assessment** in 1994 was a significant landmark in environmental protection and prevention of environment's devastation. Its purpose is the complex, professional, and public assessment of the impacts of proposed constructions, facilities, and activities on environment before decision on their permission. **Adoption of the act on integrated prevention and control of environmental pollution** in 2003 was an important impetus for further improvement in the area of environmental protection in the SR.

One of the most significant factors for environmental prevention during the monitored time period was the adoption of **the act on state administration of environmental protection** (2003).

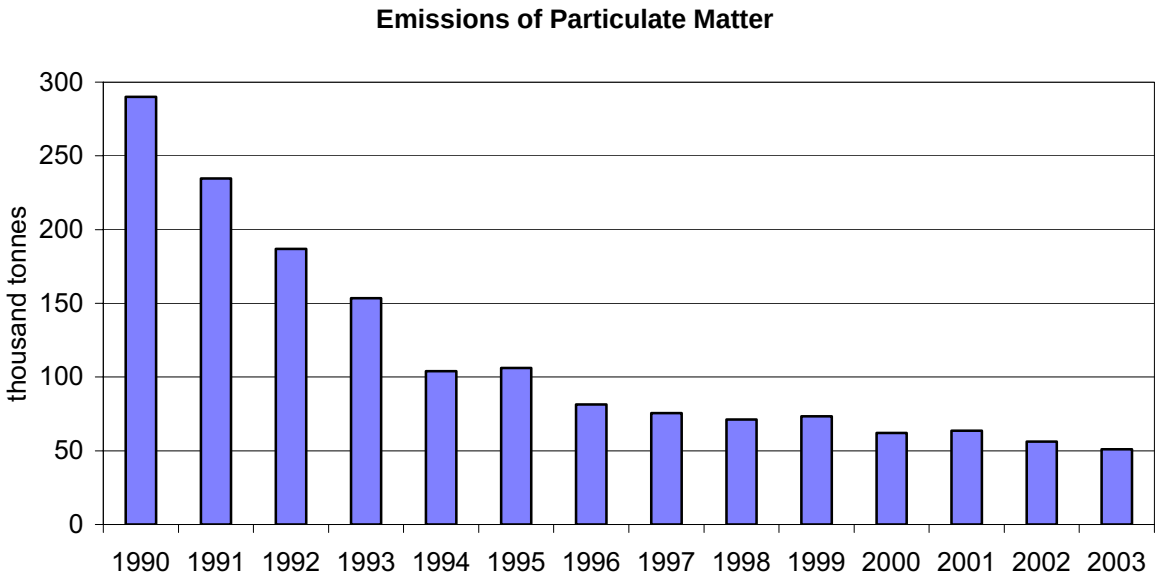
National Biodiversity Strategy in Slovakia (1997) was developed and approved in accordance with the Convention on Biological Diversity, as the basic nature protection document.

In 1999, a complex programme document called **National Environmental Action Plan** (NEAP II) was approved. The plan follows up on middle-term and long-term objectives of environmental policy of the Slovak Republic.

National strategy for sustainable development approved in 2001 represents an important strategic document not only in the area of environment. This document assesses main issues in development of the Slovak public and basic trends of its further development, on the basis of extensive analyses of cultural-historical, social, economic, environmental, and institutional aspects.

AIR

AIR QUALITY



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 ($PM_{2,5}$).

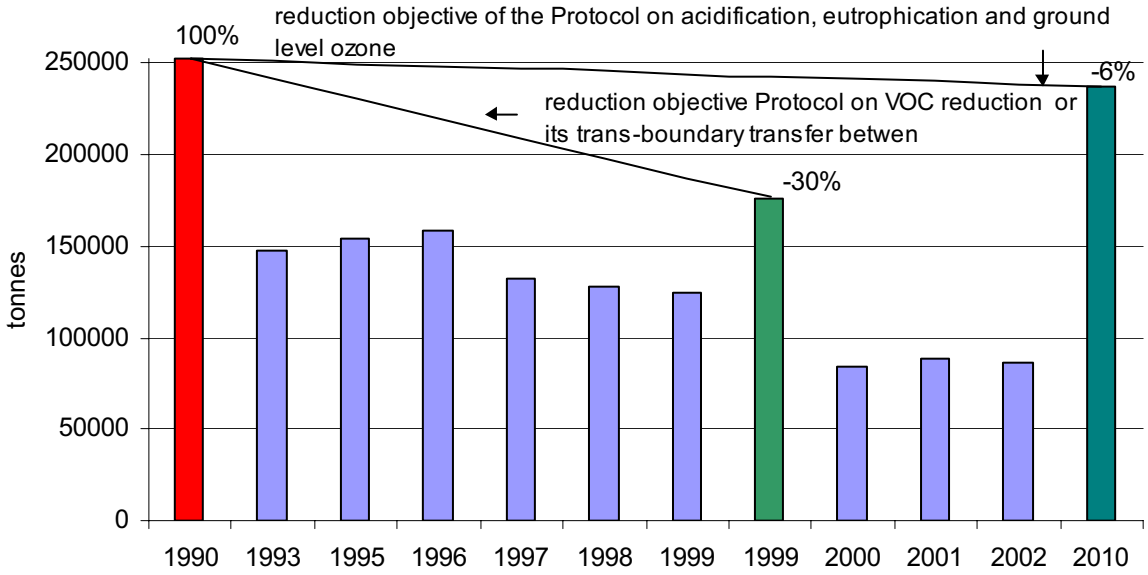
Since 1990, PM emissions have had a decreasing tendency (290.06 thousand tonnes), with the exception of several years. Most significant reduction in PM emissions was shown in 1990 - 1994. Compared to 1990, the amount of mentioned emissions as of 2003 (50.69 tonnes) dropped by 82.4%, which is considered significant reduction.

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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- National Development Plan
  http://www.build.gov.sk/www/Docs/Nrp/Amendment%20to%20NDP%20final.doc
- Air Quality in the Slovak Republic-Monitoring of Air Pollution and Audit of Quality System
  http://www.shmu.sk/File/Flemish/MinutesBE12-16May.pdf
- Environment of the Slovak Republic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/2/6_emisie.pdf
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf

Emissions of Non- Methane Volatile Organic Compounds



Source: Slovak Hydromeorological Institute

Emissions of non-methane volatile organic compounds (NM VOC) in 1990 – 2002 varied in the interval of 252,281 to 237,144 tonnes, 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 65.7% as of 2002.

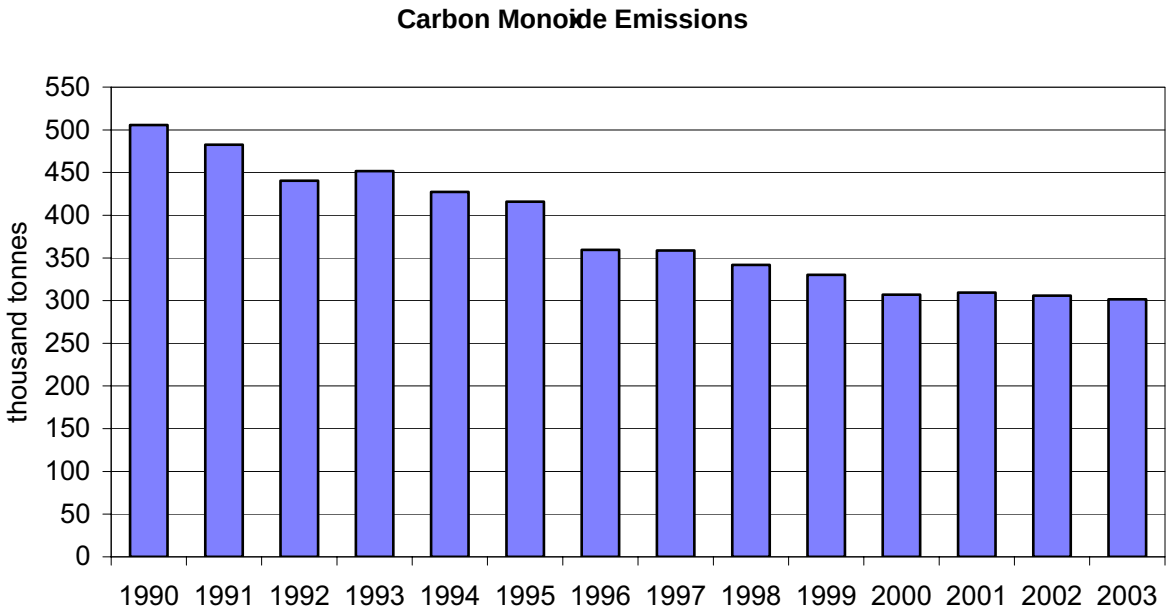
Inventory of NM VOC emissions in SR builds on definition of sectors relevant for individual pollutants pursuant to SNAP 97, with attention to, and recommendations of international task force groups of emission inventory (UNECE TF on emission inventory) working under the auspices of the UN EEC. Emissions 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/08_air%20and%20ozone.pdf
- National Programme of VOC Emission Reduction
  http://www.sazp.sk/slovak/periodika/sprava/psr/ozon/tr_ozon/response/ozon_c3.html
- VOC Emissions by Sources
  http://www.sazp.sk/slovak/periodika/sprava/psr/ozon/tr_ozon/pressure/ozon_a2.html
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf

AIR QUALITY



Source: Slovak Hydrometeorological Institute

Carbon monoxide emissions (CO) between 1990 and 2003 in the Slovak Republic varied in the interval of 301.765 - 505.458 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 2003 dropped by 40%, compared to 1990.

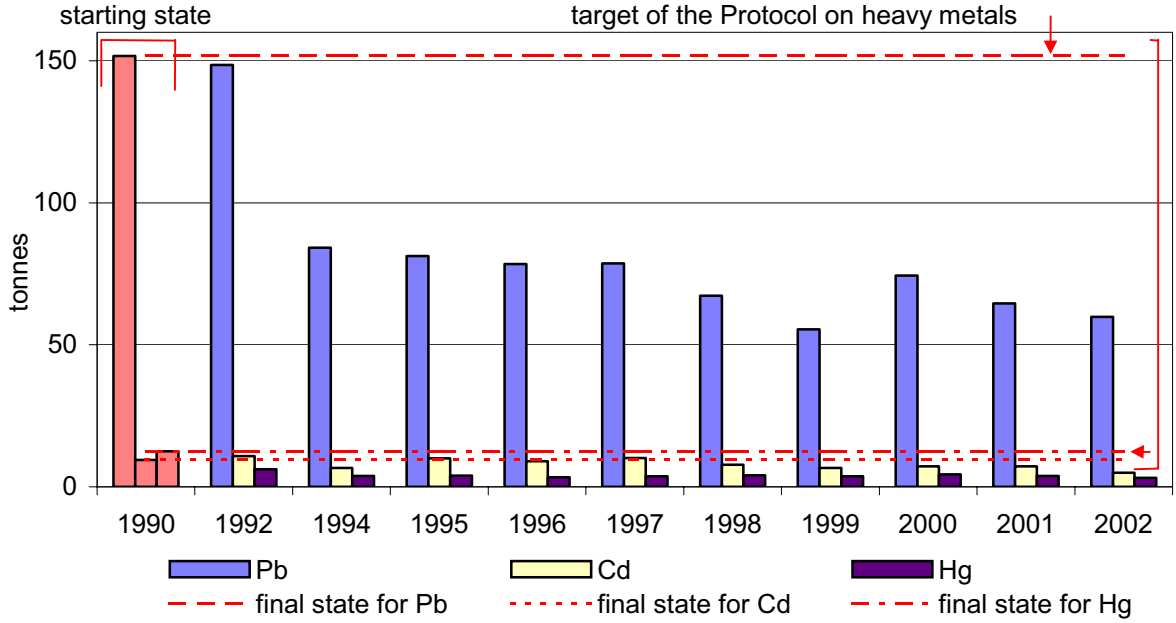
Mobile sources, especially road transport emissions, also contribute to total CO emissions in Slovakia. Mobile sources emissions have been monitored since 1990 and are determined on the year-to-year basis. A method called COPERT is used in calculating emissions. This method has been recommended for the 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Environment of the Slovak Republic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/2/4_emisie.pdf
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf

AIR QUALITY

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. As of the year 2002, and compared to 1990, total heavy metal emissions dropped by 60.9% (Pb by 60.5%, Cd by 47.9%, Hg by 75.1%).

Air-borne heavy metals do not represent an environmental challenge of only one country. In 1998 in Aarhuse, 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 the its objective. Today we can say that Slovak Republic is really apt to meet this obligation.

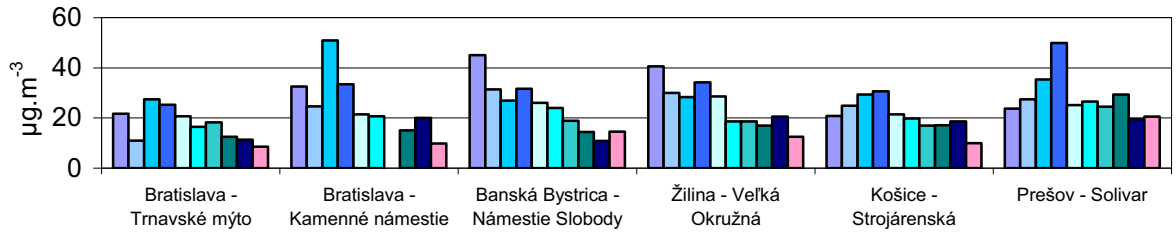
More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/08_air%20and%20ozone.pdf
- Air Quality in the Slovak republic Monitoring of Air Pollution and Audit of Quality System
  http://www.shmu.sk/File/Flemish/MinutesBE12-16May.pdf
- Environment of the Slovak Republic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/2/6_emisie.pdf
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf

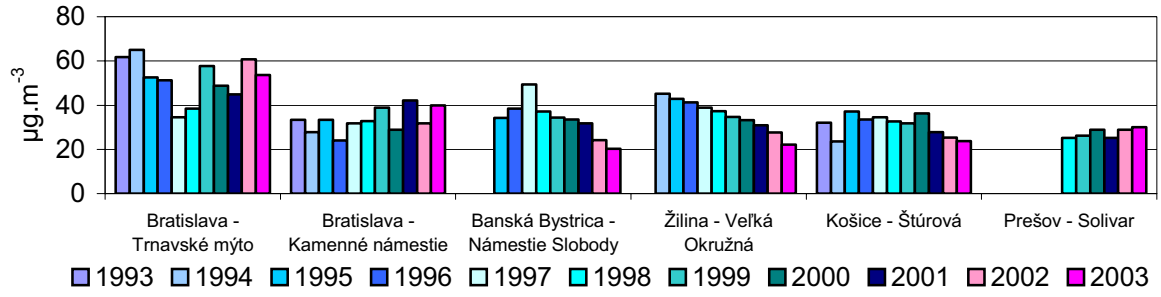
AIR QUALITY

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

SO_2



NO_2



Source: Slovak Hydrometeorological Institute

Annual averages of **SO_2** concentrations at selected monitoring stations in urban and industrial areas varied in 1993 – 2002 in the interval of 8,6 - 51 µg/m^3 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.**

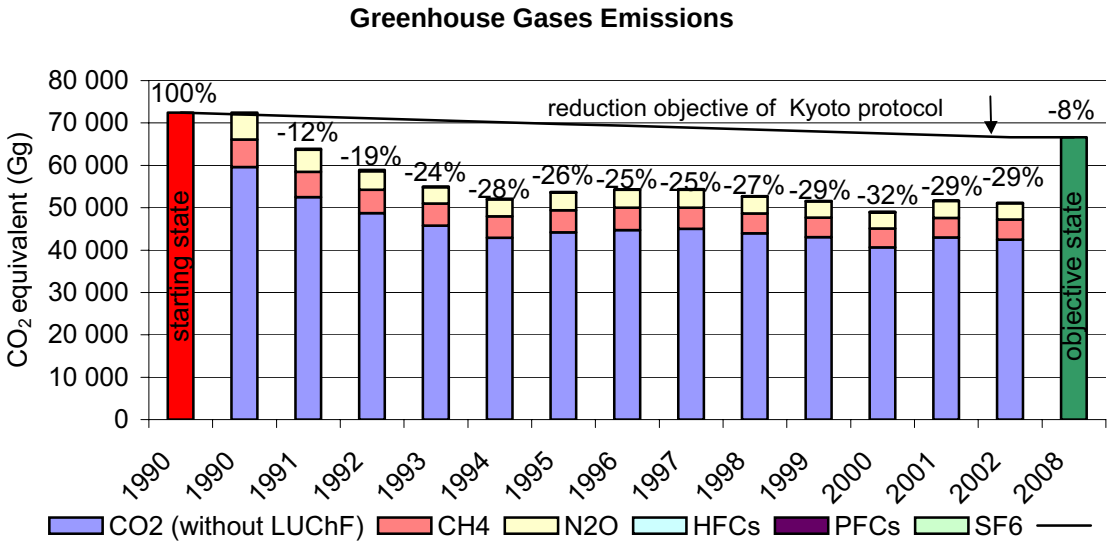
Annual average values of NO_2 concentrations at selected monitoring stations in urban and industrial areas in the years 1993 – 2003 varied in the interval of 20,3 - 65 µg/m^3. Highest average annual concentration of the mentioned hazardous agent was recorded in 1994 at the Bratislava – Trnavské mýto monitoring station. **Annual limit value adjusted to include tolerance threshold (54 µg/m^3)** 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.

More info:

- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report) http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/08_air%20and%20ozone.pdf
- Environment of the Slovak Republic in 1993 - 2003 http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/2/2_lokal_znec.pdf
- Air Pollution in the Slovak Republic http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf
- National ISPA Strategy of the Slovak Republic: Environment http://www.lifeenv.gov.sk/minis/ispa/dokumenty/strategia_ang.doc
- Air Polution Monitoringin in Slovakia http://fsp.shmu.sk/document/reViterepor ton1stMCfinal.pdf

CLIMATE CHANGE



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 Slovak Republic goes to the **energy sector** (electricity and heat production from burning fossil fuels, thermo processes in industry and other sectors, transport, etc.).

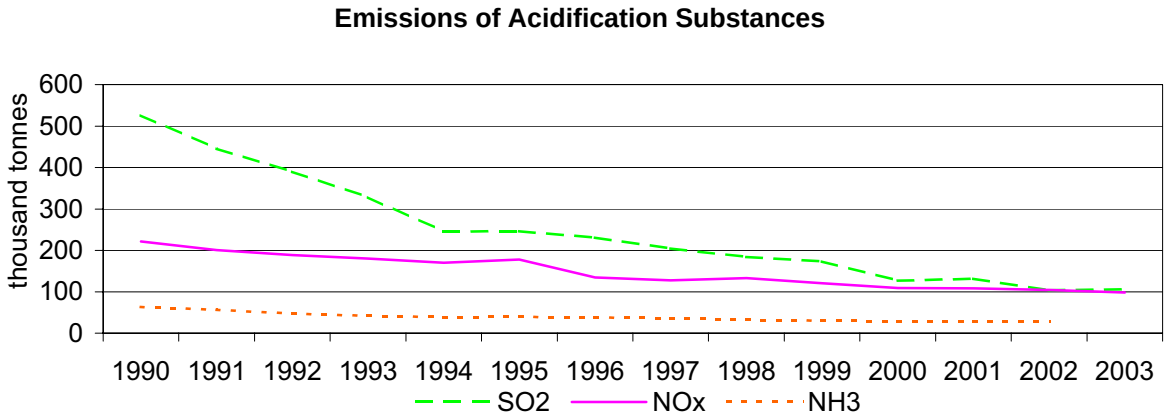
Greenhouse gases emissions reached the highest level at the end of the 1980s. In the period of 1990 – 1994 there was a reduction by approximately 28%, and since the year 1995 the GHGs emissions have been at approximately the same level. Compared with 1990, aggregated GHGs emissions dropped by 29% as of 2002 to the level of 66,641 Gg. Based on the greenhouse emission assessment following the IPPC methodology, in 2002 **total anthropogenic CO_2 emissions** reached 42,479 Gg (in 1990, they reached 59,619 Gg, which represents reduction by 28.7%), while sink of carbon dioxide in forest ecosystems was approximately 5,300 Gg. **(CH_4) methane emissions** in 2002 reached the level of 224.8 Gg (in 1990 it was 309.8 Gg, which represents reduction by 27.5%) and **N_2O** emissions reached the level of 12.4 Gg (in 1990 they were at 19.5 Gg, which represents reduction by 36.4%). 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Climate Change - Forest Ecosystem
  http://www.fris.sk/en/lvu/podujatia/2005/climate_change/climate_change.htm
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf

ACIDIFICATION



Source: Slovak Hydrometeorological Institute

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 2002 contributed to the overall acidification by 28.8 thousand tones, the following year SO_2 emissions contributed by 106.1 thousand tones, and NO_x emissions by 97.7 thousand tones.
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 (hereinafter only "Convention") that the SR adopted through succession in 1993. The Slovak Republic also accessed to a number of Protocols have been developed in the framework of the Convention.

Sulphur dioxide (SO_2) emissions showed greatest values in the 1990s, while in the period between 1990 and 2003 they marked a reduction by 79.8% 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. The Slovak Republic 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, NO_x emissions dropped by 56% in 2003. The Slovak Republic has reached one of the objectives to reduce NO_x emissions in 1994 compared to the reference situation of 1987, to which it bound itself in Protocol concerning the Control of Emissions of Nitrogen Oxides within the Convention. Its next objective is to reduce NO_x 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.

In 1990 – 2002, the volume of **ammonia emissions (NH_3)** dropped by 54%. 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. Slovak Republic, 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.

More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

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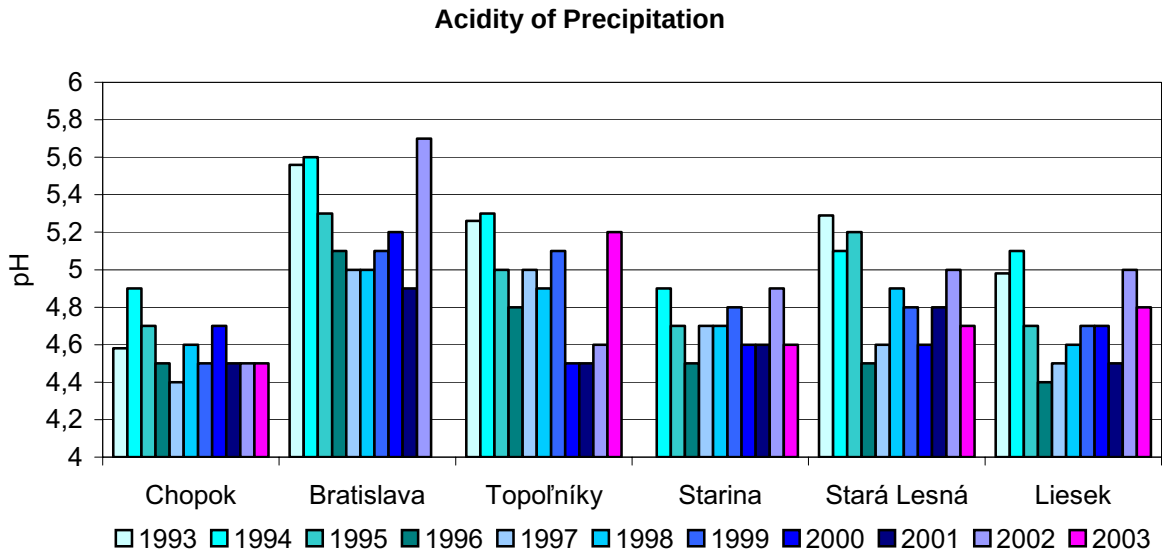


Source: Slovak Hydrometeorological Institute

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.

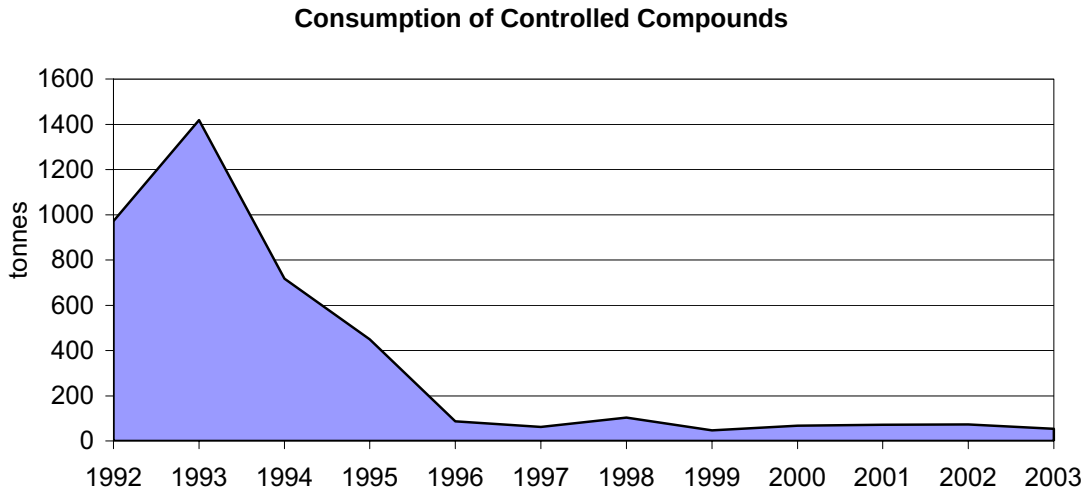
Total pH interval in the period of 1993 – 2003 in the SR varied in the interval of 4.4 - 5.7 pH. **Chemical analyses of atmospheric precipitations** in 2003 document a slight increment in acidity at the majority of monitoring stations. Interval of pH values in monthly precipitations in 2003 varied at regional stations in the interval of 4.5 – 5.2. We may conclude that acidity of atmospheric precipitations since 1993 to 2003 has had a fluctuating characteristic with a slight trend toward acidity reduction. **Concentrations of dominant sulphates** in precipitation water in 2003 were within 0.78 – 1.12 mg $S.l^{-1}$. Total reduction in sulphate concentrations over a long period corresponds to the reduction in SO_2 emissions since 1980. Values of wet deposition of sulphur in 2003 varied from 0.29 to 0.94 g $S.m^{-2}.r^{-1}$. Critical load values for wet deposition are not yet specified. In USA and Canada, wet deposition value of 0.7 g $S.m^{-2}$ per year for sulphates is considered the critical load for forests. **Nitrates** that contribute to the acidity of precipitation less than sulphates, showed in 2003 concentration interval of 0,46 - 0,74 mg $N.l^{-1}$. Only Topoľníky showed slight reduction in nitrates concentration, other stations showed values that were slightly higher.

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.** The Slovak Republic also accessed to a number of Protocols have been developed in the framework of the Convention.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/08_air%20and%20ozone.pdf
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_1999.pdf
- Environment of the Slovak Republic in 1993 – 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/9/3_Kum_prob.pdf

THE OZONE LAYER DEPLETION



Source: Minisitry of Environmnet of the Slovak Republic

By **controlled compounds** (AI – freons, A II – halones, BI – freons, B II – CCl4, BIII – 1,1,1 3-chlorethane, C I, C II – HBFC22B1, E - CH_3Br) 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 – CCl4, 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. Today we ca 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 Deplate 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 Deplate 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.

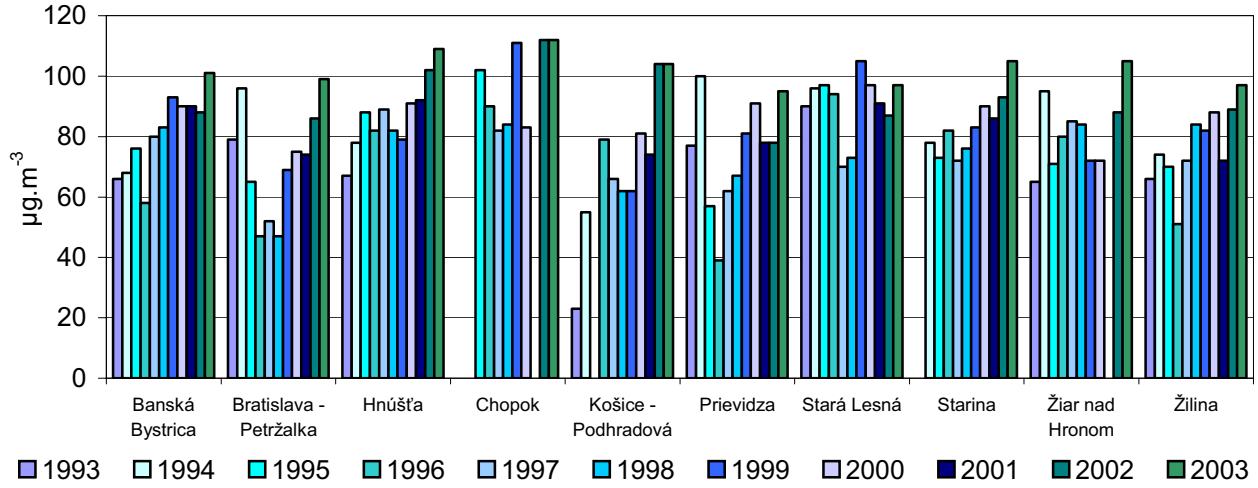
More info:

- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report) http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/08_air%20and%20ozone.pdf
- Air Pollution in the Slovak Republic, 2001 http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_2001.pdf
- Environment of the Slovak Republic in 1993 - 2003 http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/9/5_Kum_prob.pdf

TROPOSPHERIC OZONE

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 labelled 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 – 2003, this target value has been exceeded, with the exception of several urban stations, at most monitoring sites in Slovakia. Greatest number of detected cases of exceeding values was at monitoring station Chopok (98 days).

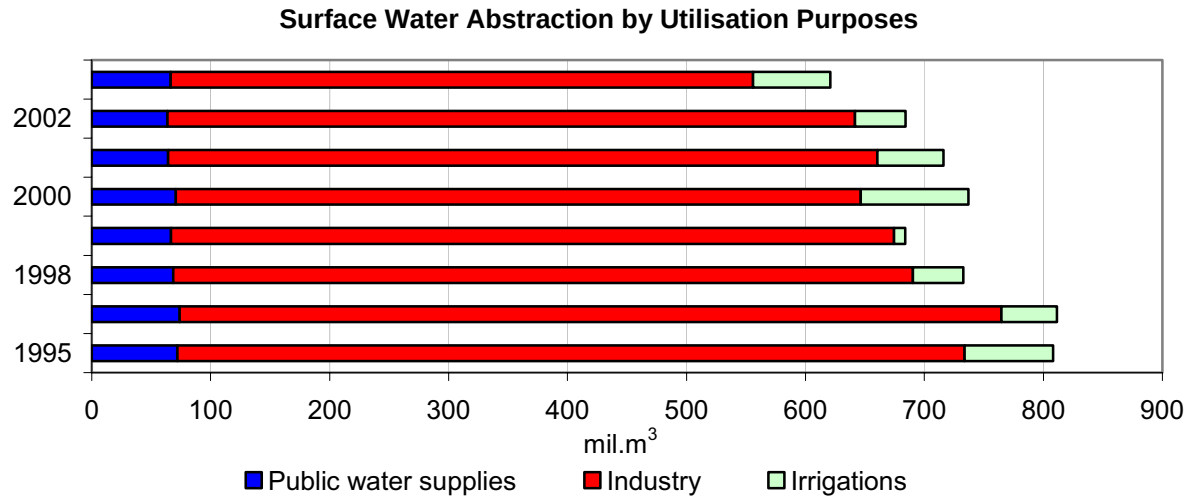
In 1999, the **Slovak Republic** accessed to the **Protocol to Abate Acidification, Eutrophication and Ground-level Ozone**, and also its **legislation** in the area of air quality assessment and control since 2003 has been fully approximated to the EU legal regulations.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Air Pollution in the Slovak Republic
  http://oko.shmu.sk/rocenky/SHMU_Air_pollution_in_the_SR_2001.pdf

WATER

WATER ABSTRACTION



Source: Slovak Hydrometeorological Institute

Of all abstractions in 2003, surface water abstractions represented 60%. **Total abstracted volume** of surface water in 2003 was 620.97 mil.m^3, which, compared to 1995, is a reduction by 187 mil.m^3 (by 23%). **Water use rate** reached 14.8%.

Greatest share on total abstractions of surface water in 2003 and other years have shown abstractions for **industrial purposes,** that represented as much as 78.8% (reduction compared to the year 1995 represented 26%). Water abstraction for **water supplies** during the monitored period has not changed significantly, and they represented approximately 10% of all abstractions. Due to the shortage of rainfalls during the summer season, abstractions for **irrigation** have had fluctuating characteristics with 10.5% share in 2003.

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

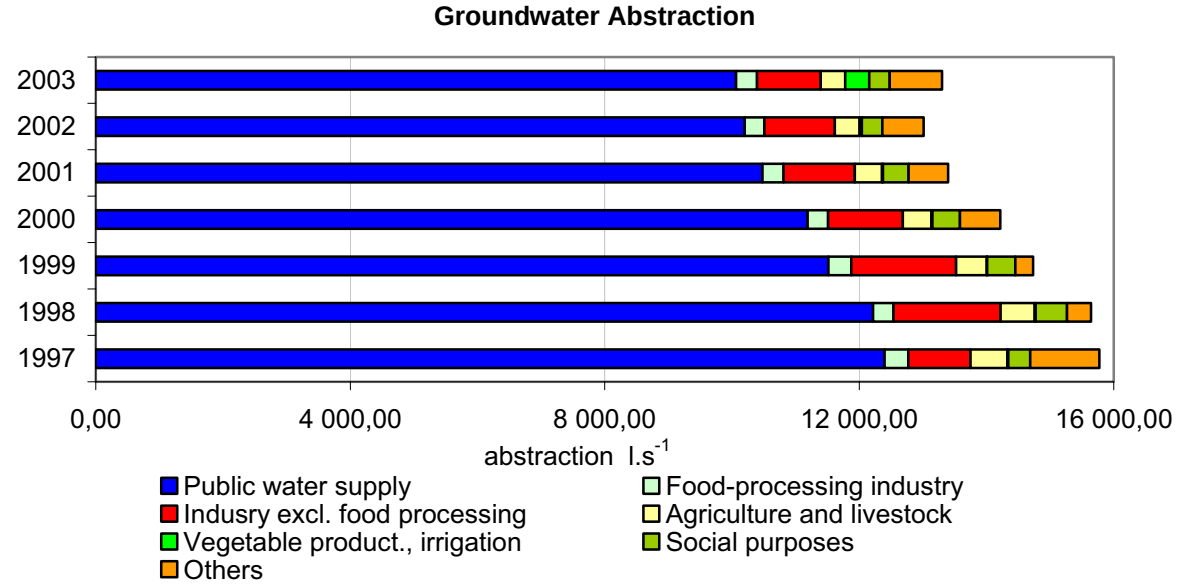
	Austria	Czech Republic	Hungary	Poland	Slovakia	EU15
1980	2,207	2,820	3,551	11,899	1,575	222,700
1985	2,195	2,873	4,880	13,076	1,390	194,500
1990	2,561	2,787	5,266	11,928	1,388	193,600
1995	2,258	2,024	5,079	10,078	808	188,000
2002	2,496	1,368	4,720	9,067	684	175,400

Source: OECD

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- OECD Environmental Data, Compendium 2004, Inland Water
  http://www.oecd.org/home/

WATER ABSTRACTION



Source: Slovak Hydrometeorological Institute

In 2003, based on the hydrogeological assessment and surveys in Slovakia, there were **available 76,198 l.s^{-1}** groundwater sources and deposits. In total, consumers **used 13,303.36 l.s^{-1}** of groundwater, which **represented 17.46%** of documented available volumes. Total groundwater abstractions do not even reach 50% of documented volumes of available groundwater sources. 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.

Major part (app. 75%) represented abstraction of groundwater through **public water supplies.** Other sectors of the national economy, compared to previous periods, have shown a slight reduction in volumes by 2 to 6%. Greatest reduction in abstractions after the year 1997 was recorded in case of abstractions for public water supplies – by 2,335 l.s^{-1} or by 19%. **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, despite the fact that **countries belonging to 15 EU countries showed a slight increase in total abstractions.** Groundwater abstraction in the EU in 1980 was 43,200 mil.m^3 , and 47,100 mil.m^3 in 2002 (which represents **a 9% increment**).

International comparison of groundwater abstractions in mil.m^3

	Austria	Czech Republic	Hungary	Poland	Slovakia	EU15
1980	1,135	802	1,254	3,231	657	43,200
1985	1,168	806	1,386	3,333	671	44,800
1990	1,174	836	1,026	3,237	728	46,400
1995	1,083	719	897	2,846	578	45,000
2002	1,065	540	871	2,662	410	47,100

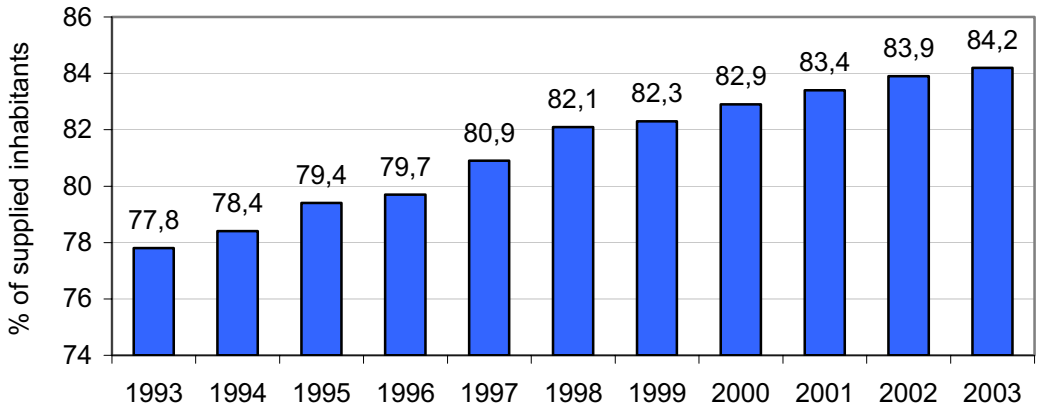
Source: OECD

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- OECD Enviromental Data, compendium 2004, Inland Water
  http://www.oecd.org/home/

PUBLIC WATER SUPPLY AND SEWERAGE SYSTEMS

Connecting the Public to Public Water Supply



Source: Statistical Office of the SR

Number of inhabitants supplied with drinking water from the public water supplies in 2003 reached the number of 4,531 thousand, which represents **84.2%** of supplied inhabitants. Compared to 1993, the number of inhabitants increased by 393 thousand. (e.g. 9%) In 2003, there were in the SR **2,149 individual municipalities** that were supplied with public supply water, and their portion on total SR municipalities was **74.5%.** Greatest number of supplied municipalities was in the following regions: Žilina (97%), Bratislava (94.4%), and Trenčín (91.3%).

Volume of produced drinking water in 2003 reached the value of 379 mil.m^3, which, compared to 1993, represents reduction by 183 mil.m^3 (or by 33%). 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 2003 reached the value of 109,2 $l.inh^{-1}.day^{-1}$, which represented a drop by 37%.

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 (1997)	**Czech Republic*** (2002)	**Hungary*** (2000)	**Poland*** (1999)	**Slovakia*** (2002)
% of supplied inhabitants	87	90	98	85	84

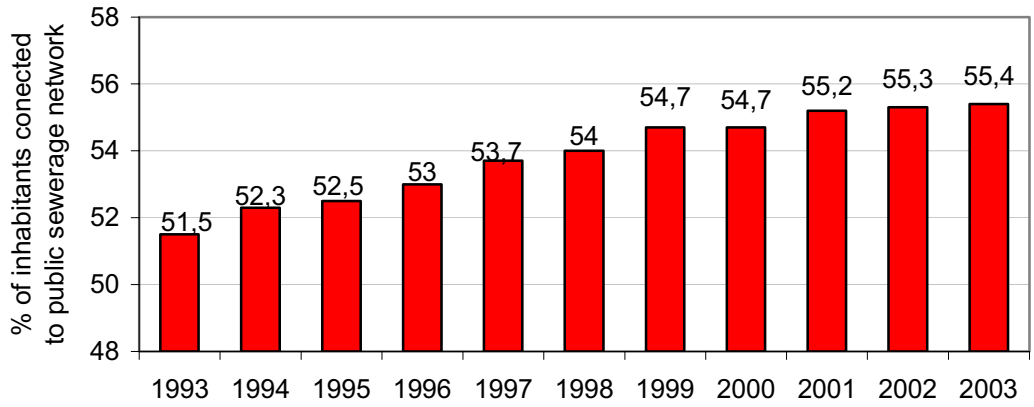
Source: OECD
Note: * V4 countries

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- OECD Enviromental Data, Compendium 2004, Inland Water
  http://www.oecd.org/home/

PUBLIC WATER SUPPLY AND SEWERAGE SYSTEMS

Connecting the Public to the Public Sewerage System



Source: Statistical Office of the SR

Number of inhabitants living in houses **connected to the public sewerage system** in 2003 reached the number of 2, 978 thousand, which represents 55.4% of total inhabitant count. Despite the growing number of inhabitants connected to the sewerage system, such increment was only 4%. **Of the overall number** of 2,883 individual **municipalities,** those with completed sewerage system in place (under the administration of Water Plants and Sewerage Works (VaK) and under municipal administration) were only 557, which represented 19.3% of all municipalities. Greatest share of municipalities with public sewerage system was in the following regions: Bratislava (41.7%), Žilina (27.6%), and Banská Bystrica (22.5%).

Number of wastewater treatment plants (WWTP) in VaK administration in 2003 reached 384, with the greatest share of mechanical-chemical treatment plants – 86.72%. **Total capacity** of WWTP grew by 485 thous.m^3.day^{-1}, compared to 1993, and in 2003 reached the level of 2,111.7 thous.m^3.day^{-1}. Of total volume of discharged wastewater (445 mil.m^3), 425 mil.m^3 were purified, which represented 95.5% 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 WWTP are still under construction, level of connectedness to wastewater sewerage system is still lagging behind development of public water supply.

Greatest level of sewerage system connectedness **on international scale** has the Czech Republic (77.5%), followed by Poland (61.2%), and the SR (55.4%). Lowest level exists in Hungary (51.2%), where almost half of the population is not connected to public sewerage systems.

	Austria	Czech Republic	Hungary	Poland	Slovakia
% of inhabitants conected to public sewrage system	81.5 (1998)	74.6 (1999)	48.0 (1998)	58.0 (1999)	53.9 (1998)
	86.0 (2001)	77.5 (2002)	51.2 (2000)	61.2 (2001)	55.2 (2002)

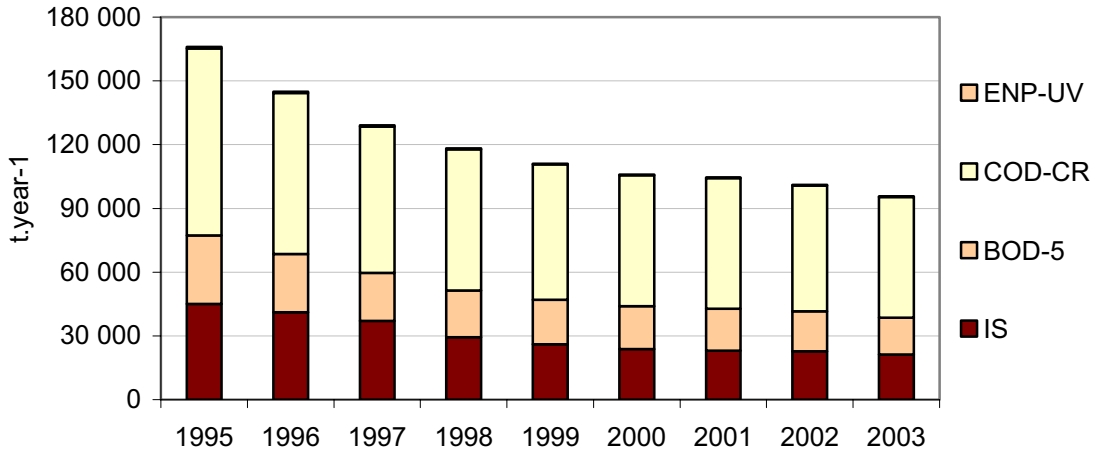
Source: OECD

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- OECD Enviromental Data, compendium 2004, Inland Water
  http://www.oecd.org/home/

PUBLIC WATER SUPPLY AND SEWERAGE SYSTEMS

Discharge of Wastewater into Watercourses



Source: Slovak Hydrometeorological Institute

Volume of discharged wastewater in 1995 – 2003 **dropped by 19%.** In 2003, **950,686 thous.m^3** of wastewater was discharged, which represented a decrease by 217,238 mil.m^3, compared to 1995. This decrease was shown in all selected indicators of contamination (BOD_5, COD_{Cr}, IS, and ENP_{UV}). Waste Water Treatment Plants (WWTPs) built in 1995 together with their technologies do not reach treatment effect sufficient enough for their wastewater to comply with the limits of Ordinance of the SR Government No. 491/2002 Coll. of Laws for the following indicators: BOD_5, COD_{Cr}, and insoluble substances. 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, **653,627 thous.m^3 treated** wastewater was discharged into watercourses, which represents a decrease by 20% compared to 1995, while volume of untreated wastewater was **297,059 thous.m^3**, e.g. reduction by 15%.

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

Source: European Environmental Agency
Notes: Concentrations are median of the annual average concentrationns per year. Total number of stations in brackets.

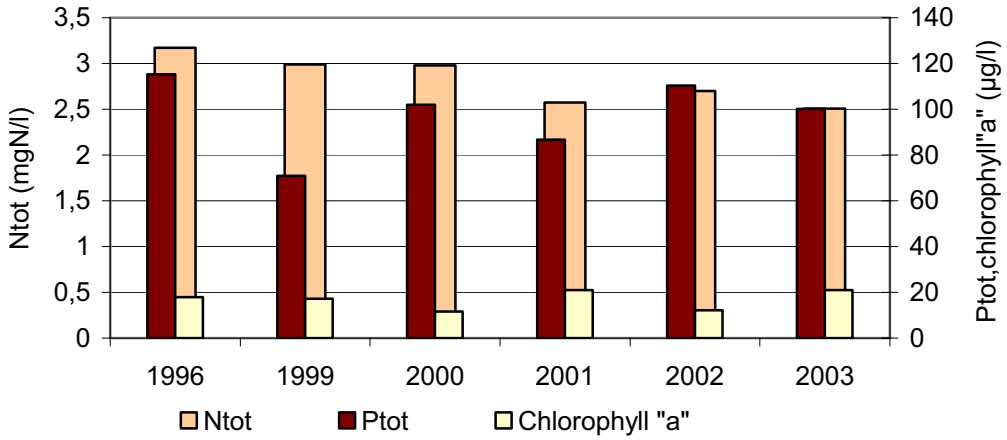
More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- EEA – Indicator Fact Sheet (Nutrients in Rivers)
  http://www.themes.eea.eu.int/Specific_media/water/indicators

EUTROPHICATION

Trend in Average Annual Concentrations of $N_{tot.}$, $P_{tot.}$ and Chlorophyll „a“

Station: Danube-Komárno centre



Source: Slovak Hydrometeorological Institute

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.** Assessing this group and comparing it with previous time period, there have not been major changes. Share of abstraction sites (in the years 2002-2003) that comply with the criteria of I., II., and III. quality category (e.g. criteria comparable with adequate surface water quality), was around 70%. Despite the fact that the **total phosphorus** concentration in 1996 – 2002 showed **decreasing tendency**, the average $P_{tot.}$ value increased at more abstraction sites. Content of **total nitrogen** in surface water at selected sites showed **decreasing tendency.**

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.

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 **2003**, the maximum value for chlorophyll „a“ exceeded this concentration for 6 out of the 29 monitored water dams and tanks.

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.**

Quality of European watercourses has significantly improved as a consequence of reduction in organic-related load, and in phosphorus generated especially from wastewater treatment and industry. Unlike phosphorus, nitrates concentrations in rivers remained relatively stable and are higher in those west European countries with most intensive agricultural activity. According to data from European Environmental Agency, over the last twenty years there has been an increase in total phosphorus concentration in monitored water reservoirs and lakes, which points to increasing tendency in eutrophication in European lakes.

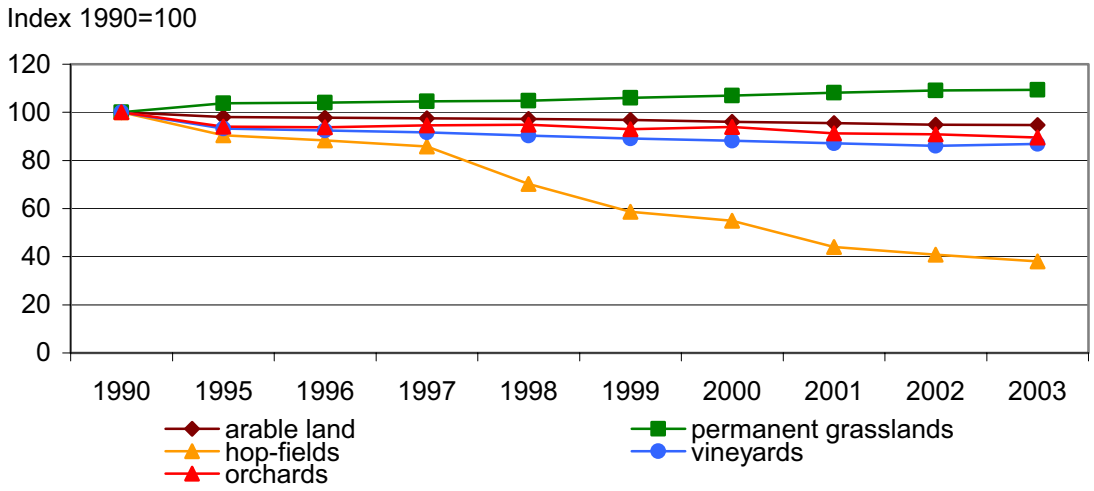
More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

SOIL

LAND STRUCTURE

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 2003.

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 2003** with slight reduction in areas of hop-fields and vineyards, and meanwhile increasing of permanent grassland areas. Percentage of **arability** again dropped, which over the last 10 years has been reduced by app. 2%. With regard to existing soil-ecological conditions, it is necessary to decrease the level of soil arability (presently around 60%) with subsequently higher representation of permanent grasslands and special cultures.

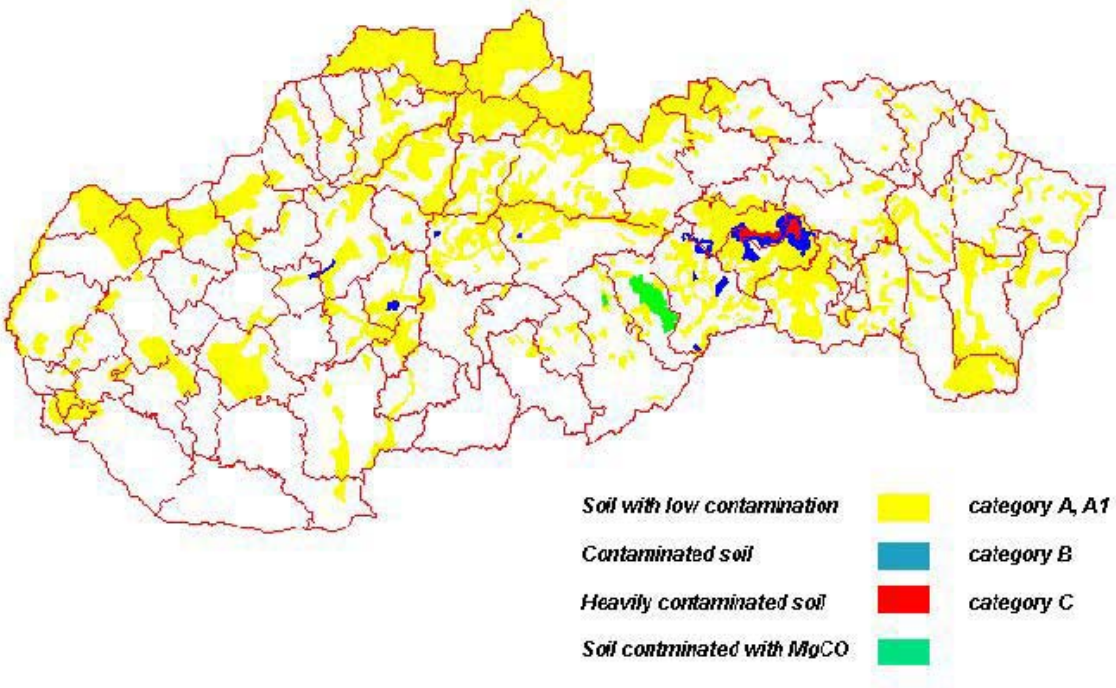
We have also noted a slight **increase of built-up areas** (since 1996 by 14.5%) that has been impacted by demographic trends and transformation of economy, as well as by construction of industrial parks and commercial chain facilities, while these, with small exceptions, do not introduce new, better quality of environment.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10, 2002)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/11_soil%20forrestry%20agriculture.pdf
- Environment of the Slovak Republic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/4/4e.html

SOIL DEGRADATION

Soil Contamination



Source: Soil Science and Conservation Research Institute, 2000

Of all SR area of 4,903 389 ha, **agricultural land** represents 2,436,879 ha (**49.7%**). Partial Monitoring System – Soil, provides information on the state and development of contamination of agricultural land.

First monitoring cycle has shown that **69.5%** of agricultural land of the SR belonged into the category of **non-contaminated soils** found primarily in areas with most productive agricultural land. **27.7%** of agricultural land belonged into the category of **risk soils** with exceeding values beyond the A, A1 limit in at least one risk element (slightly contaminated soil). These are soils with increased content of contaminants (Cd, Pb, Cr, Ni, As, Zn, Cu) over values of natural background of soil cap in the SR. They are present mostly in mountainous areas with high percentage of natural geo-chemical anomalies, as well as in areas with impact of global and regional emission transfer. Only **1.4%** of agricultural land belonged into the category of **contaminated with exceeded B limit** (contaminated soil) and **0.4%** into the category of contaminated soils **with exceeded C limit** (significantly contaminated soil). **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 a kol., 1997).
The second monitoring cycle has shown that **sanitary condition** of agricultural land **slightly improved.** Number of soils exceeding the A limit dropped (Kobza a kol., 2002).

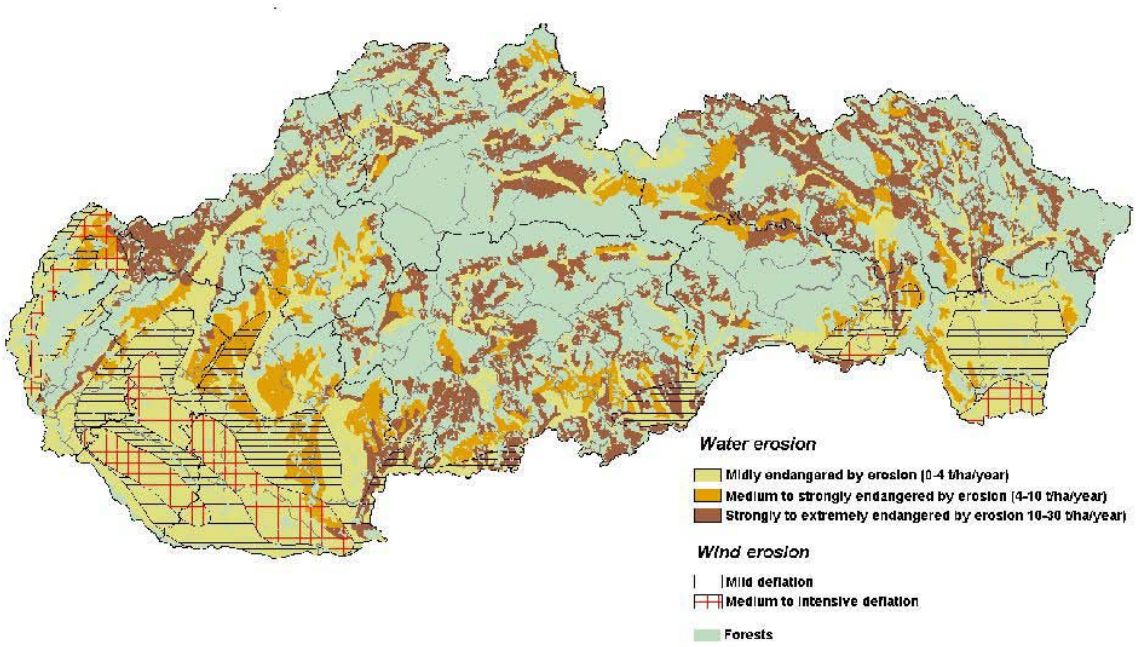
In terms of land protection also against contamination, adoption of **Act No. 220/2004 Coll. of Laws on protection and use of agricultural land** appears important. This law stipulates protection of properties and functions of agricultural land, as well as ensures its sustainable management. Limit values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

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/11_soil%20forrestry%20agriculture.pdf
- Partial Monitoring System
  http://www.vupu.sk/vupu_english/indexe.htm

SOIL DEGRADATION

Soil Erosion



Source: Soil Science and Conservation Research Institute, 2000

Dominant in Slovakia are symptoms of **water erosion** that threaten **55% 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 is not a major issue in the SR, and threatens **6.5% of agricultural land.**

Agricultural land in the SR threatened by erosion

Intensity of land erosion	Water erosion		Wind erosion	
	ha	% of agricultural land	ha	% of agricultural land
Without or mildly endangered by erosion	1,065,420	45.0	2,213,700	93.5
Medium endangered by erosion	473,520	20.0	113,650	4.8
Strongly endangered by erosion	426,170	18.0	9,470	0.4
Extremely strong endangered by erosion	402,490	17.0	30,780	1.3

Source: Ministry of Agriculture of the 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
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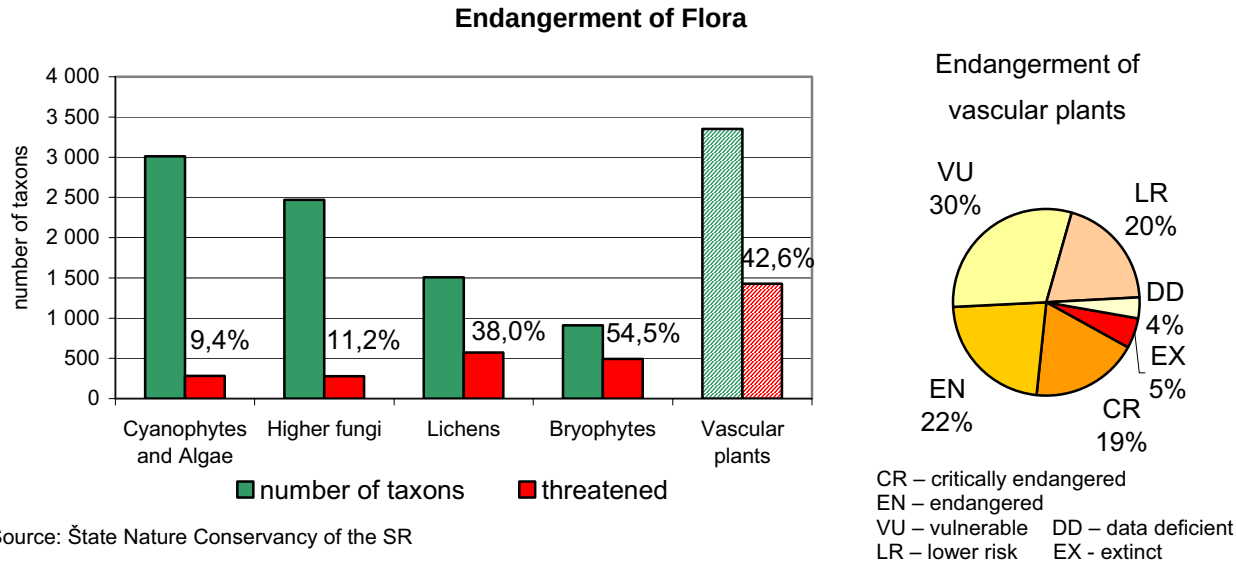
NATURE AND LANDSCAPE PROTECTION

BIODIVERSITY



Source: Štate Nature Conservancy of the 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**.

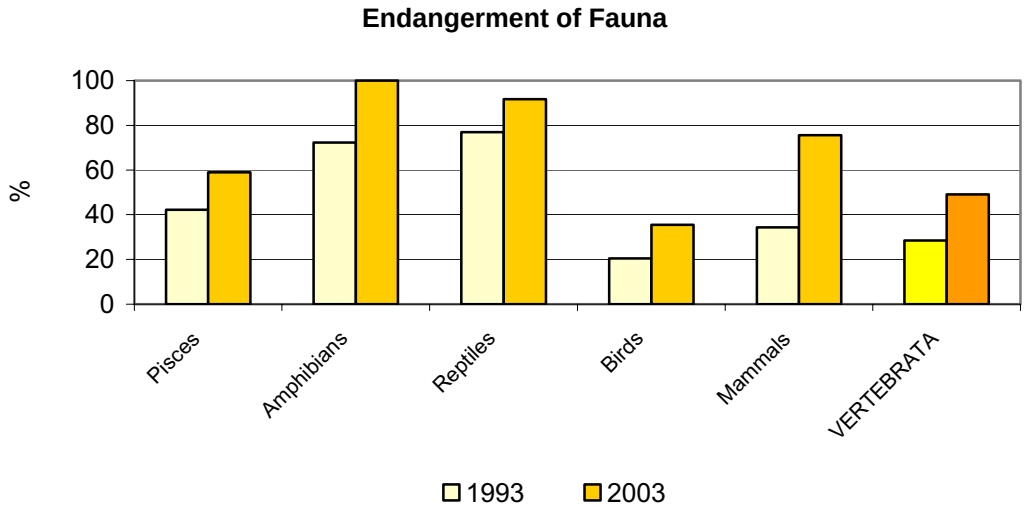
Red list of bryophytes and seed-bearing plants of Slovakia contained 1,009 endangered and rare taxons **as of 1993**, which represents **40.36%** of 2,500 species of vascular plants of Slovakia, including 199 critically endangered ones (7.96%). Other 92 taxons are endemic (3.68%) and 32 taxons disappeared (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.

Over the last decade, there has been an intensive research and classification of individual floristic species, with introduction of further changes to categorisation of species endangerment introduced in 1990s (under IUCN). Any comparison in plant endangerment is therefore impossible. Nevertheless, 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.

Objectives in the area of protection of flora pursuant to *Action plan for the implementation of National strategy for biodiversity protection of the SR for the years 1998-2010* are focused on mapping the state of lichens as indicator species, update to red lists of endangered plant species in 10-year time periods, extended studying of populations and biology of endangered species and little known taxons to ensure their protection, mapping the presence of invasive plant species and developing methodology for their disposal, continuous development and subsequent carrying on of action plans of protection of individual critically endangered species prioritised on the basis of acuteness of endangerment of their populations.

More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

BIODIVERSITY



Source: State Nature Conservancy of the SR

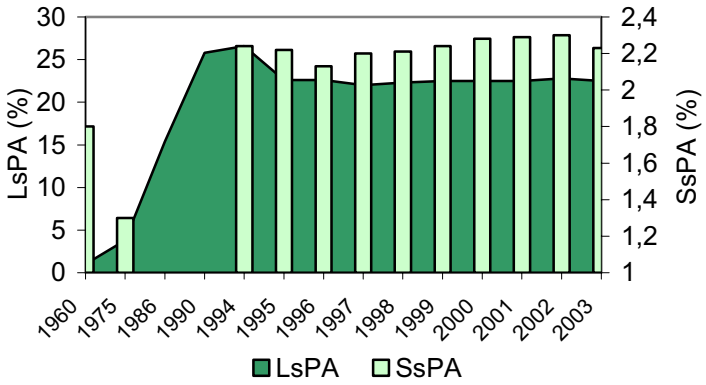
Fauna composition of the SR has varying characteristic and is based on geographical conditions. In terms of **zoo-geographical** aspect, we divide Slovakia into two extensive areas – *Carpathian mountainous complex* (including mainly West Carpathians and part of East Carpathians), and *Inner-Carpathian 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 267 species entered in the red list of **vertebrates** by individual endangerment categories pursuant to IUCN, which represents almost half of the known vertebrates in Slovakia (**49.1%**). It includes 49 fishes, 18 amphibians, 11 reptiles, 121 birds, and 68 mammals. Of more than 21,000 taxons of **invertebrates** in Slovakia, around **17%** of them are endangered pursuant to the IUCN categorisation.

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. *Action plan for the implementation of the National strategy of biodiversity protection of the SR for the years 1998-2010,* together with *National environmental action programme II* of 1999, for the area of biodiversity protection formulate the **objective** to create conditions for natural migration of animals, implement biotope monitoring and protection, update red lists of endangered animal species in 10-year time periods, continually develop action plans for protection of individual critically endangered species, ensure adequate protection of significant bird territories and improve nesting opportunities for endangered bird species, implement transfers, restitutions, re-introductions of selected species of animals, complete the construction of breeding stations, emergency rescue facilities, and limit hunting of big predators up to the limit of ecological necessity.

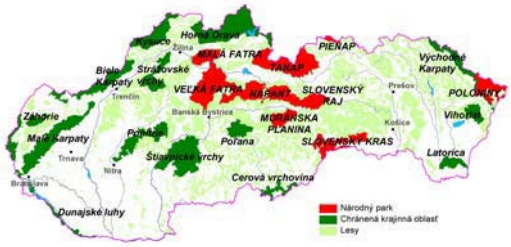
More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

NATURAL AND CULTURAL HERITAGE

Trend in Size of Protected Areas in Slovakia



Large-sized protected areas in SR



Source: State Nature Conservancy of the SR

At present, the whole territory of the Slovak Republic is under 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 2003, 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 10.5% of the SR territory (**22.49% of large-sized PA** of the SR territory)
- Size of **small-sized PA** represented **2.25%** of the Slovak territory.
- **Total size** of spetial protected nature elements in the SR represents **1,128,263.2 ha**, which represents **23.1%** of the Slovak territory. Apart from this, cave protective zones represented 15.8545 ha.

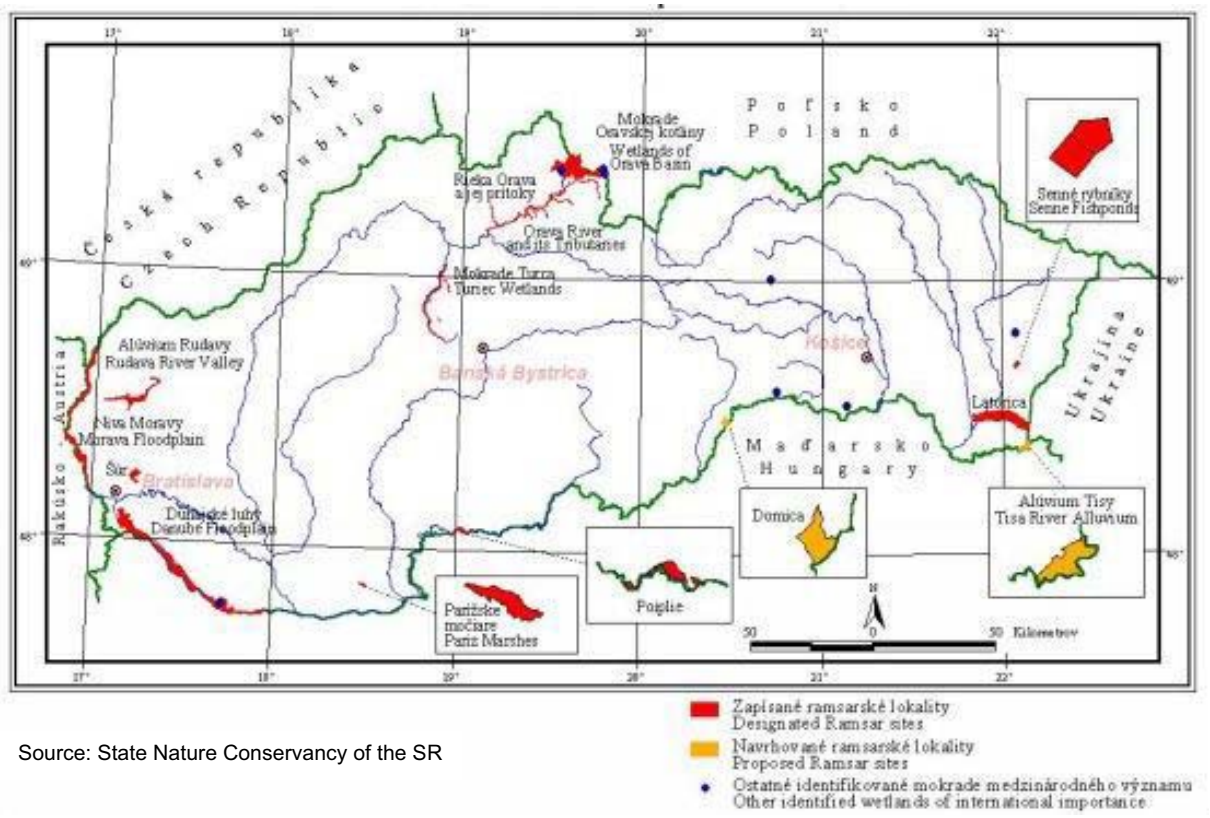
Share of large-sized PA on total Slovak territory increased especially in the course of 1980s. Since 1995, this share has not changed significantly and remains approximately 23%. Size of the **small-sized PA** has slightly increased over the last years. Their number increased from 901 (102,465 ha – 2.09%) to 1,097 (112,788.3819 ha – 2.3%). Significant improvement is shown in the **condition of PA** in the 4th and 5th degree of protection, with 72.8% of total SsPA territory being in optimal conditions (in 1992 this was 48%), 27.0% of the area is endangered (unlike former 49%), and 0.2% is degraded (unlike former 3%).

Pursuant to *National environmental action programme II., and Action plan for the implementation of national strategy for the biodiversity protection in Slovakia for the years 1998-2010,* there is a need to build **in the near future** systems of PA based on Generel of the Supraregional Territorial System of Ecological Stability and evaluate them against the EU criteria, revitalize damaged and endangered PA, build areas of the European significance that would be proposed for the NATURA 2000 network, propose new locations for nomination into the world natural heritage, complete networks of bilateral and trilateral PA, and complete the construction of educational paths/localities. At present, 13 protected landscape areas and 1 national park (Chočské vrchy, 12,357 ha) are **proposed.**

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10, 2002)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/12_biodiversity.pdf

Wetlands of International Importance



Source: State Nature Conservancy of the SR

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. Slovak Republic 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.** Although nature protection in Slovakia in the past focused more on protection of forest and mountainous ecosystems, protection of various types of wetlands has had certain tradition in Slovakia.

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***. Elaboration and consequent implementation of proposals for wetlands protection would be unthinkable without knowledge of their territory, distribution, and natural values – professional monitoring and inventory. Selection of wetlands for the World List is taking place on the basis of professional monitoring and inventory of wetlands. Such wetlands pursuant to the Ramsar Convention **(Ramsar sites)** include the following Slovak territories:
NNR Parížske swamps, NNR Šúr, NNR Senné – ponds, Dunajské luhy (PLA, including Čičovské dead branch), Flat of the Morava river (in Záhorie PLA), Latorica (PLA Latorica), Alluvium of Rudava, wetlands of Turiec, Poiplie, wetlands of Oravská basin, Orava river and its tributaries, and Domica. Proposal also includes *the alluvium of Tisa (together with Hungary, Ukraine and Romania) and the territory in the catchments of Morava and Dyje rivers (together with the Czech Republic and Austria).* Other territories of international importance are *Hrhovské ponds, Chymské ponds, Zemplínska šírava PS, and Sivá Brada.*

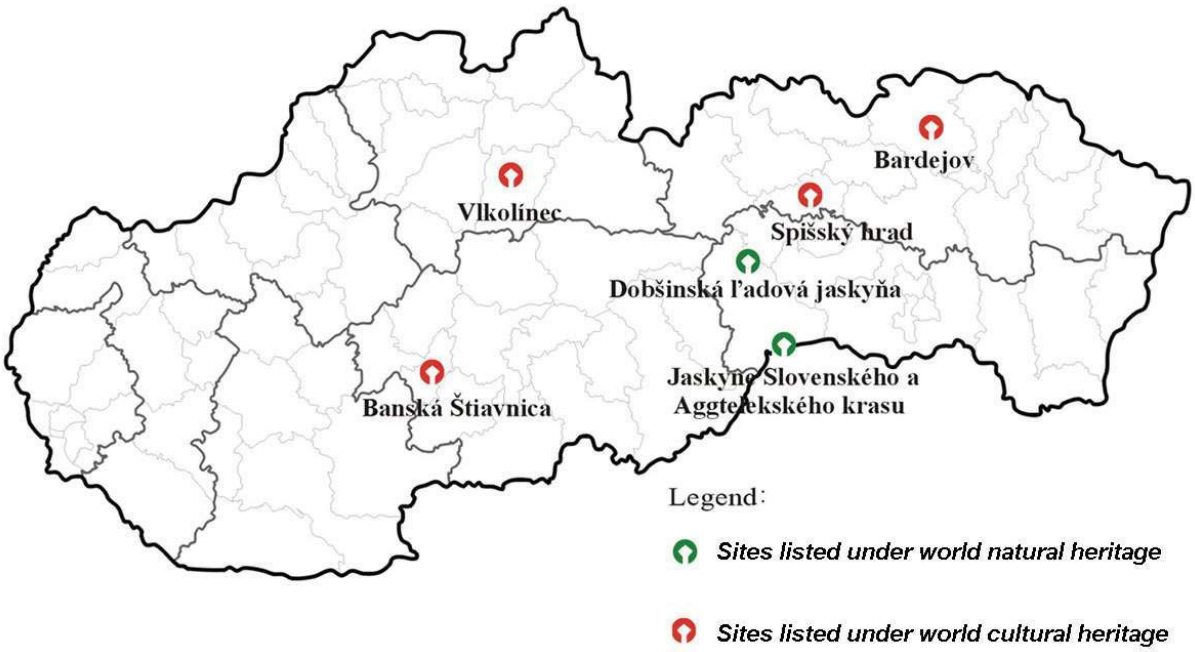
State of wetlands of international importance in Slovakia (2002)

Wetlands	Locality number	Area (ha)	% from SR territory
International importance	22	42,227.73	0.86
including Ramsar sites	12	38,206.42	0.78

Source: Ministry of Environment of the SR

NATURAL AND CULTURAL HERITAGE

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 2003, the **World Heritage List** contained **755** sites (including 582 cultural, 150 natural, and 23 mixed from **134** 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 Cultural Heritage sites with neighbouring countries as of 2003

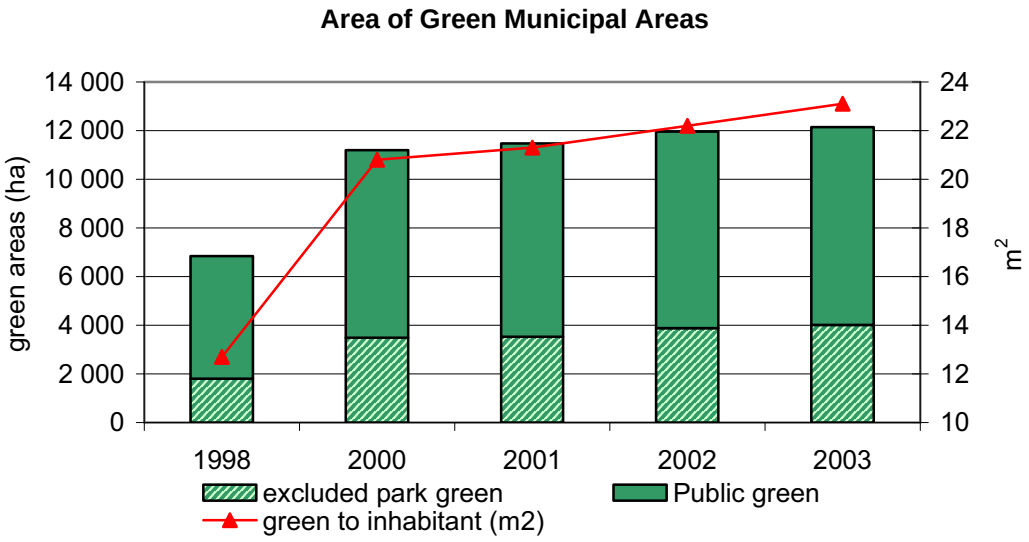
Country	Number of WCH sites
Slovak republic	4
Czech republic	12
Poland	11
Hungary	8
Austria	8

Source: UNESCO

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

URBAN ENVIRONMENT



Source: Statistical Office of the 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. 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 **2003,** areas of municipal green in the SR reached **12,144 ha,** including 4,017 ha of park green areas. Its share per one inhabitant was **23.1 m^2**. Trend in size of municipal green areas has shown positive characteristics over the last years, while since 1998 it grew by 5,301 ha (77.5%) or by 2.3 m^2 (81.9%) per inhabitant, respectively. Greatest size of municipal green areas exists in Nitra region, however, when calculated per one inhabitant, most green is found in Trenčín region.

Slovak cities are building oases of health right in the middle of large-scale constructions; these have the form of green pedestrian zones and municipal parks, with preserved historical green areas and graveyards. In the framework of complex introduction of functional green areas, residential units also provide for their maintenance and treatment. Since 1994, Slovakia pays more attention to significant increase in damages to *Aesculus hippocastanum* by *Cameraria ohridella* that causes colour patching, withering, and defoliation during the summer season. 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.

More info:

- State of the Environment Report of the Slovak Republic
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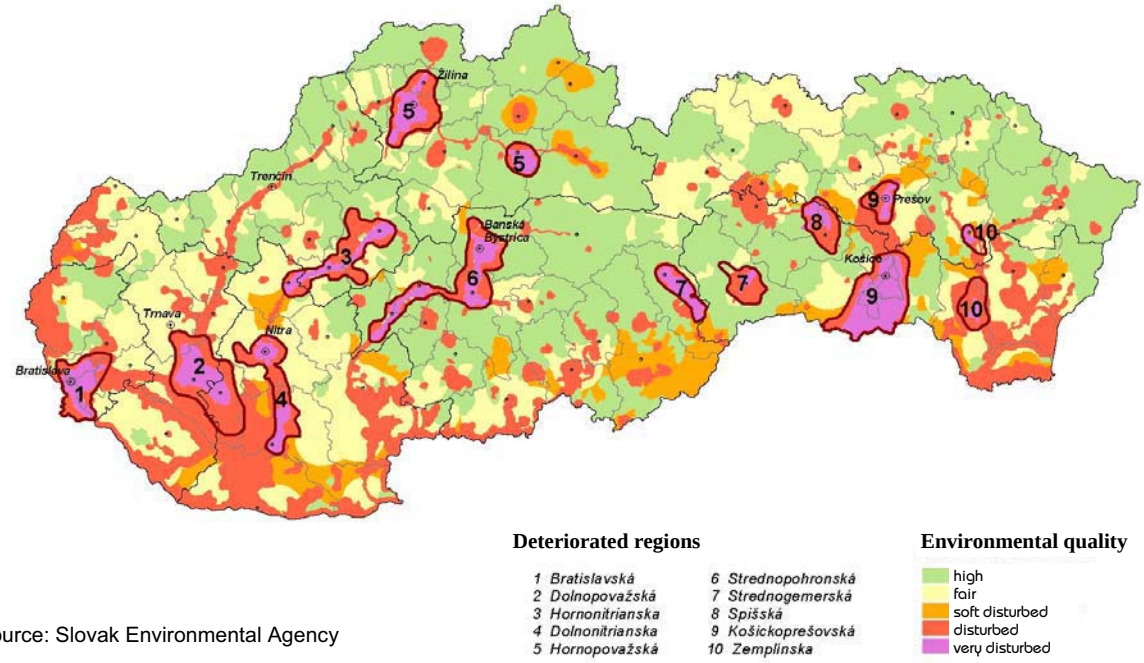
ENVIRONMENTAL REGIONAL CLASSIFICATION OF THE SR

ENVIRONMENTAL REGIONAL CLASSIFICATION

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 **10 deteriorated regions** with the size of 4,567 km^2 and 1,810,519 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.

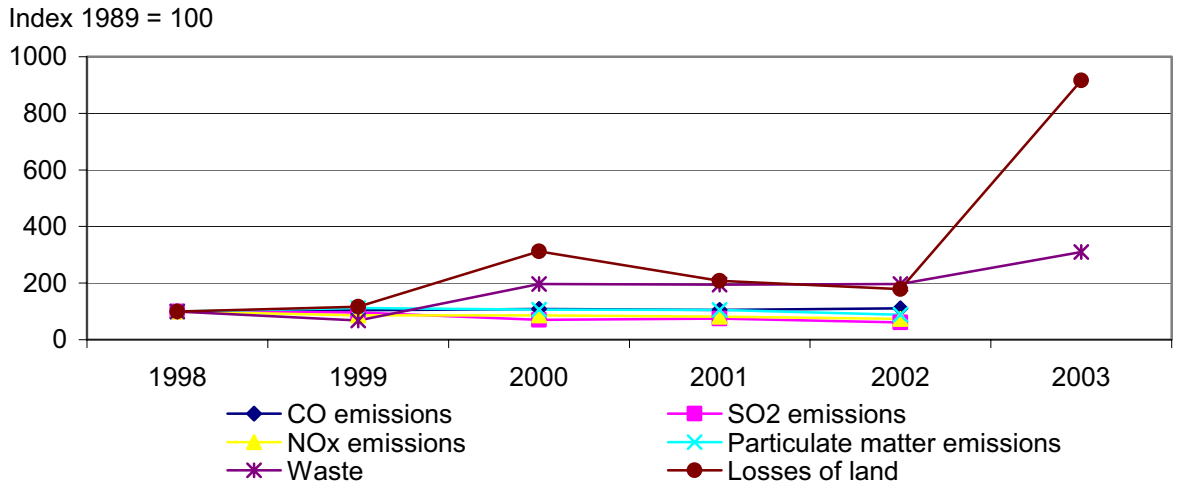
Deteriorated regions	Area of km^2	Number of inhabitants	Position in frame of regions - rate in %
Bratislava region	345	417,721	Bratislava 100 %
Lower-Považie region	673	124,305	Nitra 43 %, Trnava 57 %
Upper-Nitra region	483	164,600	Nitra 14 %, Trenčin 86 %
Lower-Nitra region	411	179,421	Nitra 100 %
Upper-Považie region	509	206,289	Žilina 100 %
Middle-Pohronie region	599	194,092	Banská Bystrica 100 %
Middle_Gemer region	342	54,072	Košice 51 %, Banská Bystrica 49 %
Spiš region	203	24,302	Košice 93 %, Prešov 7 %
Košice-Prešov region	773	389,438	Košice 82 %, Prešov 18 %
Zemplín region	229	56,279	Košice 75 %, Prešov 25 %
Total	**4,567**	**1,810,519**	

Source: Slovak Environmental Agency

ECONOMIC SECTORS AND THEIR IMPACT ON ENVIRONMENT

INDUSTRY

Selected Indicators in Industry



Source: Slovak Hydrometeorological Institute, Institute of Geodesy, Cartography and the Cadastre of the 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 2002, there has been a **slight increase** (11.1%) compared to 1998, while increase in emissions was shown mainly for manufacturing (10.4%). Manufacturing in 2002 constituted 92.8% of all industrial CO emissions.

In case of industrial **SO_2 emissions** there was an opposite trend – as of 2002, emissions **dropped** by 38.5%, 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 50.1% in 2002, compared to 1998.

In case of **industrial NO_x emissions** there was also a **reduction,** since these were reduced by 26.2% as of 2002, compared 1998. Greatest source of industrial NO_x emissions in 2002 was manufacturing (53%).

In case of **particulate matter emissions** from industry in 1998 – 2002, there were also **reduced** by 11.6%.

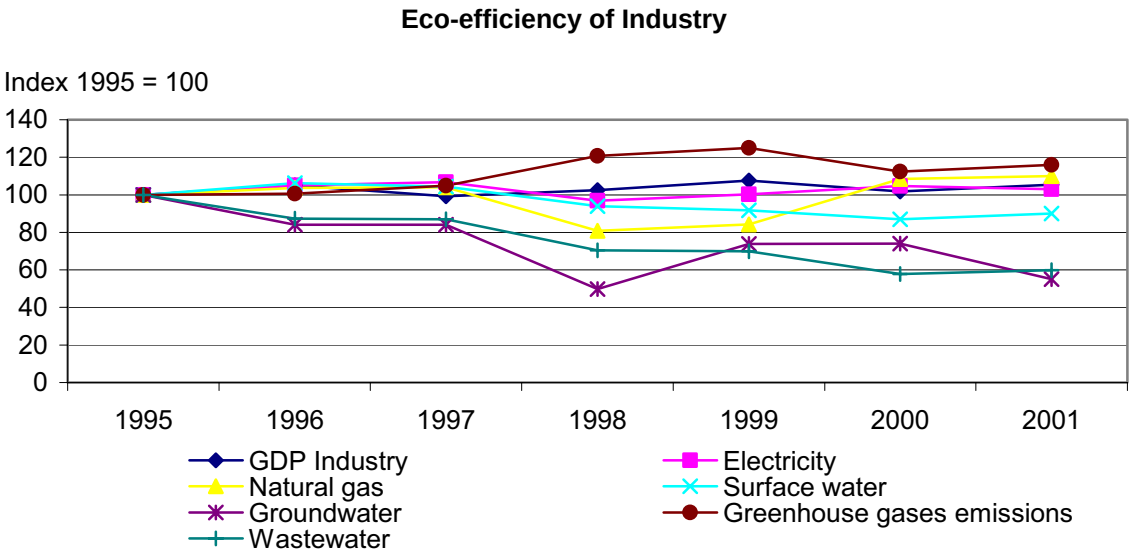
In 2003, industry generated 10,556,378 tones of **waste**, including 980,260 tones of hazardous waste, and 9 576,118 tones of other waste. Waste generation as of 2003 **grew** by 209%, compared to 1998.

Losses of land for the purposes of industrial construction were increased by 816% as of 2003, compared to 1998.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

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 apparently no more significant break-through tendencies that would signal more radical introduction of environmental measures. Eco-efficiency of industry is, in relation to its slow restructuring, together with insufficient introduction of new progressive technologies, as well as still present difficulties in the areas of raw material and energy, **still low**.

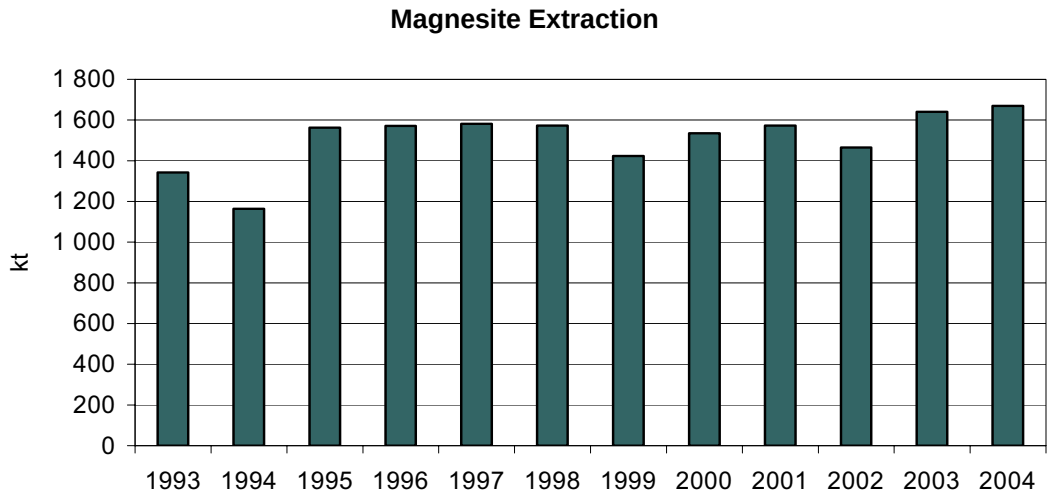
Improvement in the impact of industry on environment may be achieved through introducing **environmental technologies** that will improve the quality of environment and limit or eliminate its contamination, including waste generation. Especially things such as tax incentives, public procurement, raise 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.

Reduction in consumption of solid and liquid fuels in industry has been positively shown in reduction of **emissions of selected pollutants.** Consumption of **electricity** in the industry in 1998, 1999 and in 2001 as compared to 1995, was lower than the grow of GDP from industry – this was positively reflected on environmental effectiveness of industry in the given years. Consumption of **natural gas** in industry in 1998 and 1999 dropped, however, it grew again during the following years. In case of **groundwater and surface water abstraction** in industry, we can see a positive trend – volume of consumed water has been decreasing when compared to the GDP generated by industry. Similar situation may be observed also in case of discharged volumes of **wastewater** from industrial activities. Environmental effectiveness of industry in terms of **greenhouse gases emissions** from industrial activities has a negative trend – greenhouse gases emissions grow faster than the GDP from industry. Volume of generated **waste** in industry has still been growing, and in 2002, waste generation from industry increased even by 96% as compared to 1998, all this being the cause of reduction of environmental effectiveness of industry.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

EXTRACTION OF MINERALS



Source: Main Mining Office of the SR

Deposits and extraction of nonmetallics 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 nonmetallics 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.

Nonmetallics raw material represent approximately 90% of **all SR mineral deposits**, while extraction of this type of raw material in the SR represents 43% of total extracted minerals at exclusively designated sites in the SR, and 42% in case of construction raw material.

Extraction of nonmetallics 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 1993 to 2004 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 stabilisation 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 nonmetallics and construction raw material in 1993 – 2004

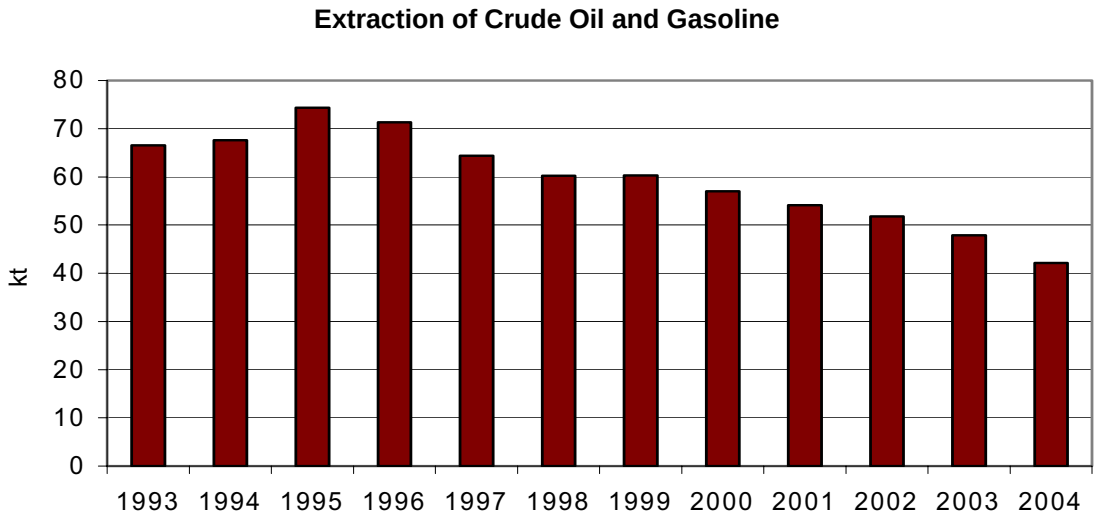
Extracted mineral	Measure unit	1993	1994	1996	1998	1999	2000	2001	2002	2003	2004
Magnesite	kt	1,341.8	1,164.4	1,571.6	1,572.8	1,423.8	1,535.2	1,573.00	1,464.5	1,640.9	1,668.9
salt	kt	98.4	99.6	125.0	102.1	100.18	101.80	104.00	102.7	104.8	104.3
Building stone	thous. m^3	5,511	5,824.9	4,848.8	4,700.2	3,473.9	3,540.4	3,881.60	4,478.3	4,503.3	4,527.5
Gravel sands and sands	thous. m^3	2,680	2,866.2	3,038.0	5,427.9	2,874.4	2,443.3	2,666.40	2,933.1	3,872.7	3,951.7
Bick clay	thous. m^3	572.2	308.1	388.2	561.1	480.29	529.50	442.10	433.4	507.4	591.7
Limestone and cement raw materials	thous. m^3	869.3	680.1	301.9	515.4	294.1	320.2	282.20	332.7	384.9	569.5
	kt	1,411.9	1,423.1	1,445.0	1,435.6	1,398.1	1,419.5	1,614.60	1,547.4	1,649.4	3,479.8
Limestone for special purposes	kt	3,849.9	3,829.9	3,559.0	4,187.3	4,603.4	4,176.5	4,211.10	4,356.8	4,093.0	1,057.5

Source: Main Mining Office of the SR

More info:

- State of the Environment Report of the Slovak Republic
http://www.sazp.sk/slovak/periodika/sprava/index.html

EXTRACTION OF MINERALS



Source: Main Mining Office of the SR

Extraction of energy raw material decreased in the beginning of the 1990s to the level from 55% (extraction of **natural gas**), through app. 60% (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 1993 - 2004

Extracted minaral	Measure unit	1993	1994	1996	1998	1999	2000	2001	2002	2003	2004
Brouwn coal and lignite	kt	4,029.2	4,078.2	4,245.6	4,288.9	4,041.9	3,947.6	3,761.9	3.661.3	3,508.8	3,410
Crude oil including gasoline	kt	66.5	67.6	71.3	60.2	60.3	56.9	54.1	51.8	47.9	42.1
Natural gas	mil. m^3	256.5	290.5	317.1	262.0	218.6	227.0	211.7	223.0	200.8	178.1

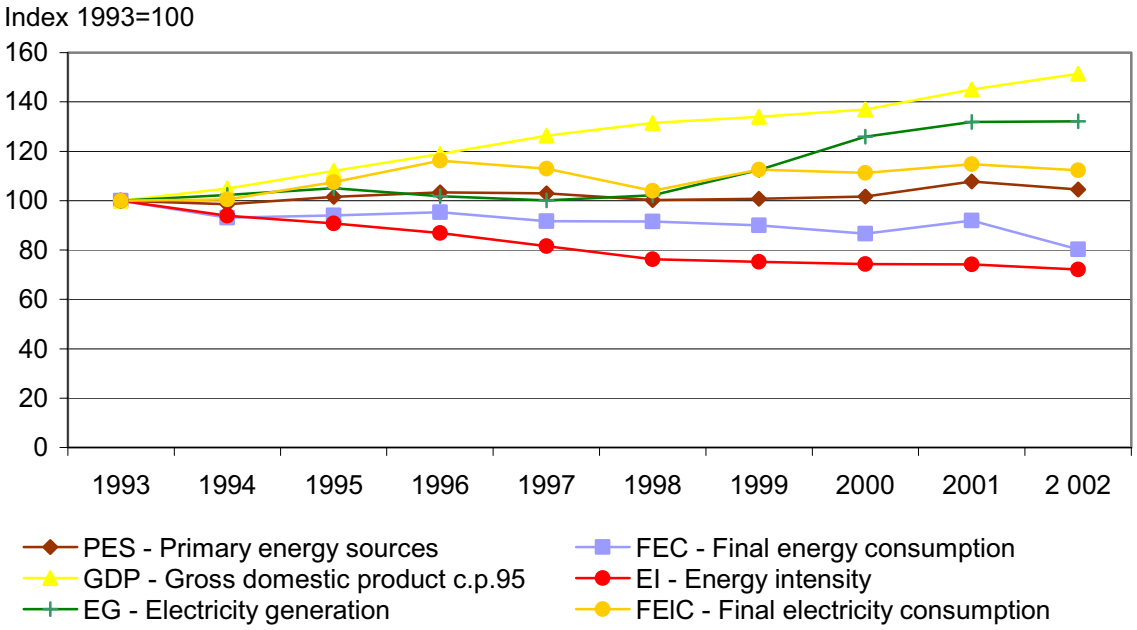
Source: Main Mining Office of the SR

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

ENERGY

Selected Indicators in Energy Sector



Source: Štatistical Office of the 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.

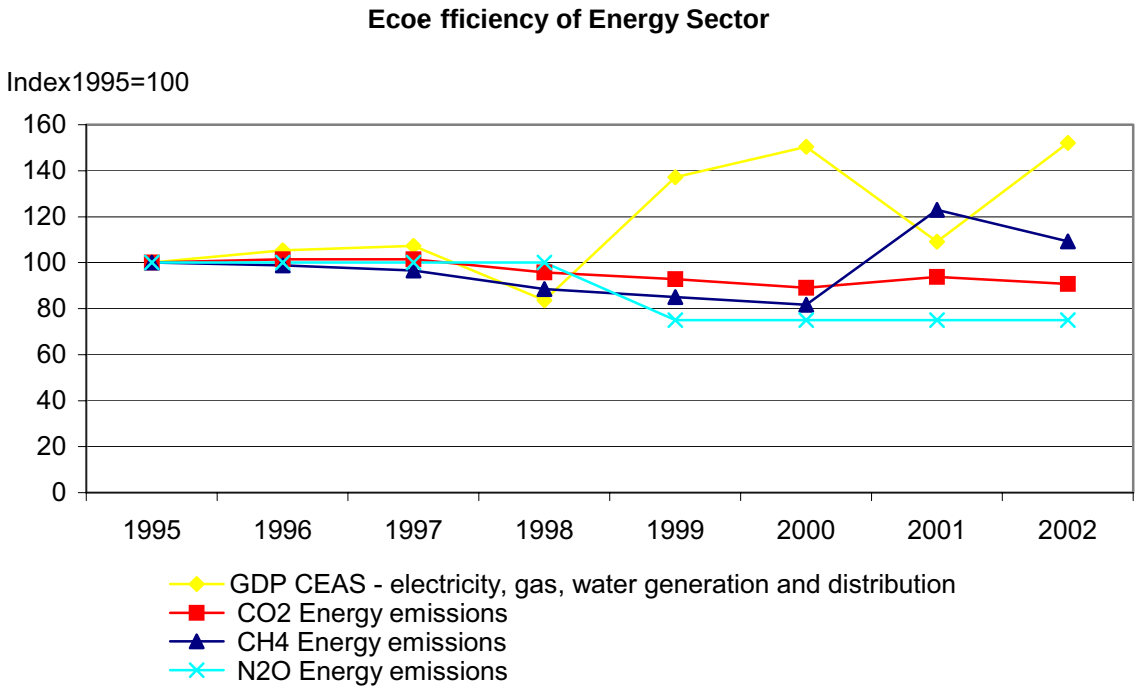
Final energy consumption (FEC) showed reduction by app. 20% as a result of the mentioned drop in economic activities. Permanently greatest EEC is by industry, while when making comparison with the EU countries, consumption by the public is still low. Structural changes have apparently impacted positive trend in reduction in energy intensity (EI=PES/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 2002 per capita in the SR was 4,207 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/10/2_vyvoj_ekonom.pdf



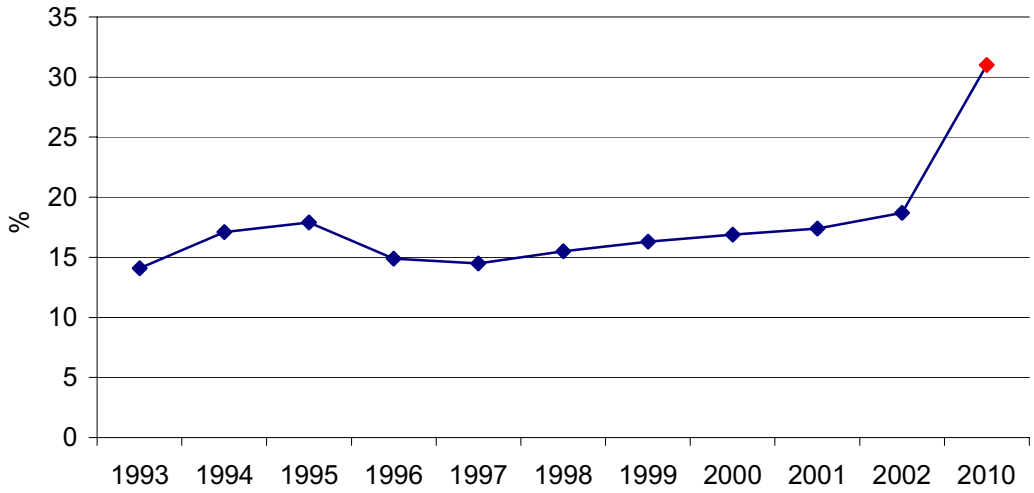
Note: CEAS – Classification of economic activities by sectors
Source: Štatistical Office of the SR, Slovak Hydrometeorological Institute

Ecoefficiency of the energy sector may be attained through growth of its share on total gross domestic product (GDP) with minimizing its negative impacts on environment.

Since 2000, extensive reconstruction has been carried out in all significant businesses involved in different energy sectors, thus increasing economic efficiency of the energy sector as such (GDP), which, given the balanced primary energy sources consumption and decreasing final energy consumption, represents a **positive trend**.

Total **greenhouse gases emissions** from energy sector since 1995 have been reduced by app. **5%**, which is caused by gradual implementation of measures focused on introduction of ecology into production, mainly in thermal power plant, reduction in energy consumption, and change within the fuel basis to more purified fuels. Most significant impact of the energy sector was in the area of CO_2 emissions production, while its contribution total CO_2 emissions over the monitored time period dropped by app. 17%. Currently, the share is almost 90% on total CO_2 emissions in the SR.

Electricity Volumes Produced from Renewable Energy Sources



Source: EUROSTAT

In the period between 1993 and 2002, **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.

Situation in use of RES for electricity production in 2002

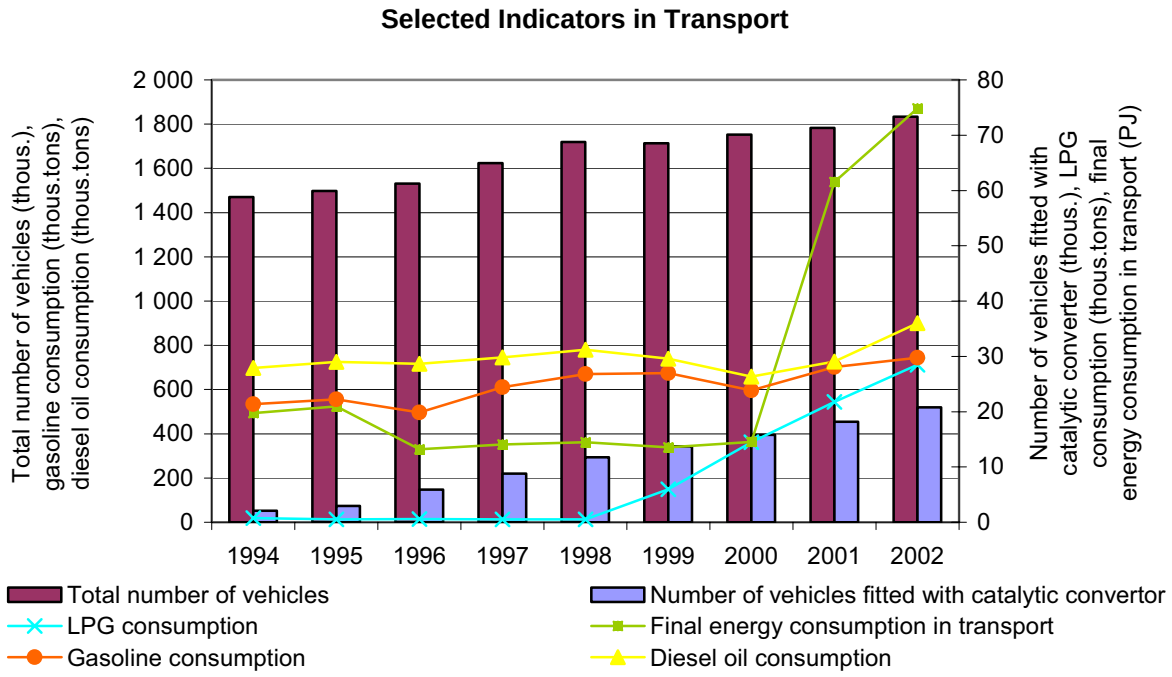
Source	Installed capacity (MW)	Generation (GWh)	Useful potential (GWh)	Potential utilization (%)
Large scale hydro plant	2,446	4,924	5,600	87.9
Small scale hydro plant	70	245	1,000	24.5
Geothermal energy	0.04	0.32	60	0.5
Wind energy	0	0	600	0
Solar energy	0.06	0.001	1,540	0
Biomass power	21.4	153	1,300	11.8
Biogas	3	6	500	1.2
Total	**2,540.5**	**5,328.321**	**10,600**	**50.2**

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

More info:

- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report) http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/13_economic%20indicators.pdf

TRANSPORT



Source: Statistical Office of the 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.

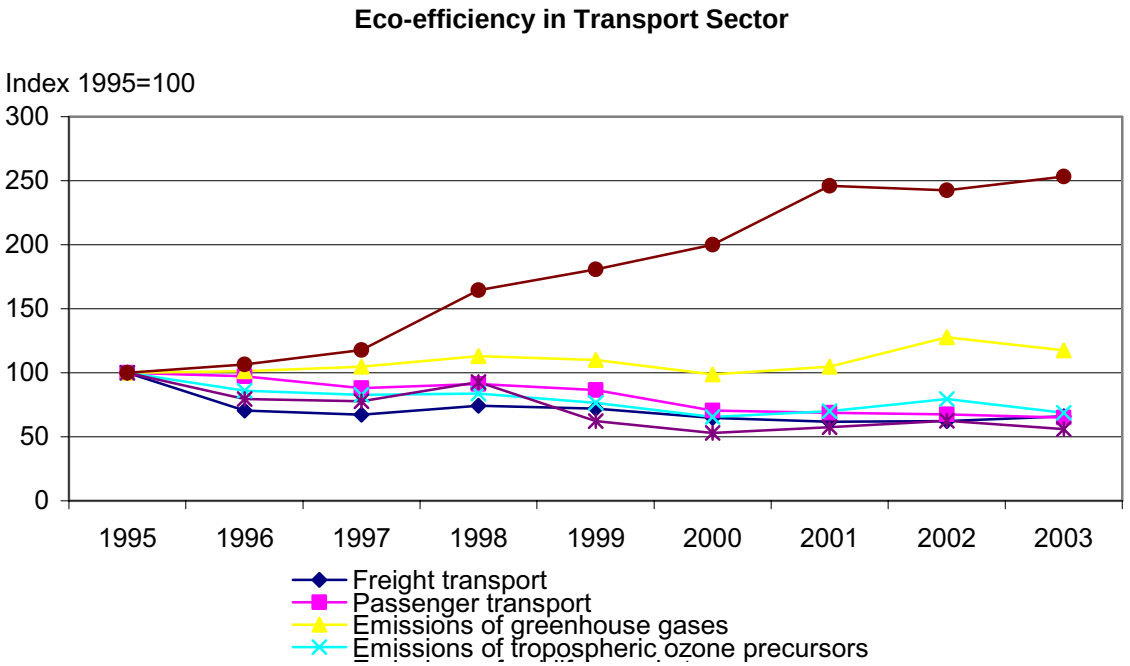
Rising trend in **fuel consumption** per thousand transported persons in road transport is influenced by increasing contribution of individual automobile transport and decreasing contribution of road public transport. Over the monitored period of the years 1994 – 2002, consumption of diesel grew by 29%, and even by 39% in case of petrol. Most dramatic increase was detected in consumption of LPG, with consumption of 580 t in 1994 rising to 28.501 t in 2002.

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 1994 – 2002 grew by 25%. 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.
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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Environment of the Slovak Rebublic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/10/3_vyvoj_ekonom.pdf
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/13_economic%20indicators.pdf

TRANSPORT



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

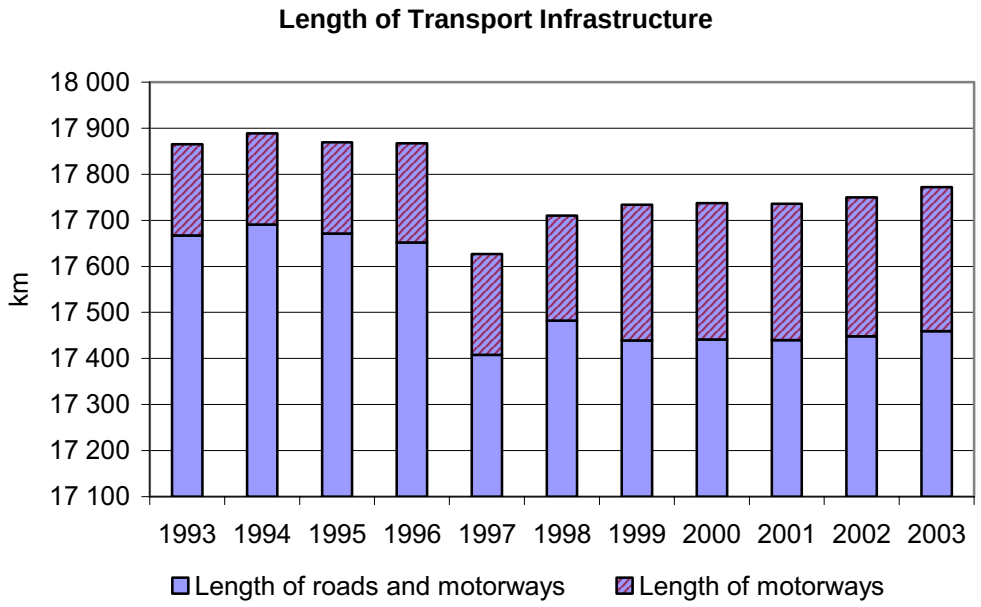
Eco-efficiency of transport is determined through correlation between economic transport indicator expressed by the GDP indicators – gross domestic product, and emissions of pollutants from transport and outputs in passenger and freight transport.

The chart clearly shows divergent trend of some monitored parameters during the whole monitored period in regard to gross domestic product indicators. These are especially modal split indicators in passenger and freight transport that have been impacted by transformation process in the Slovak economy, together with breakdown of many economic and business connections, existence of competitive environment as related to creating conditions for continuous transition to free movement of people, goods, services of transport providers in transport market, and by completion of de-monopolisation and privatisation process not only in Slovak economy, but also in the transport sector.

Freight transport demand in the years 1995 – 2003 showed a 34% reduction. Greatest reduction in freight transport demand was monitored in 2001 (38%). Greatest reduction in passenger transport demand was in 2003 (35%) compared to 1995. Consequently, more flexible adaptability of road transport to ever-changing economic conditions promises further growth in transportation and growing tendency in transport demand. Current situation in the SR shows increase in road transport, especially freight and individual automobile transport, while railways, long distance bus transport, and city transport shows a reduction tendency. This negative trend in transport contributes to the increasing load on environment, including residential zones with hazardous emissions and noise from traffic.

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 – 2003) by 17%. Greatest growth of greenhouse gases emissions compared to 1995 was in 2002 (28%). Emissions of basic polluting substances showed greatest reduction in 2003 from the whole monitored period (30%). In terms of "ecology introduction" in transport, it is necessary to implement and develop use of alternative, renewable transport energy sources, and focus on supporting and developing non-motorised and ecological transport types. Decreasing negative impacts on environment should also be ensured by optimum balance in using the potential of individual transport types, through shift in modal splits to more environmentally friendly types (railways, water, inter-modal, public transport, etc.).

TRANSPORT



Source: Statistical Office of the 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 2003, the SR transport network included 17,772 km of roads and motorways. Motorways represented 313 km of the network. Over the period of 10 years, the **length of motorways** in the SE has increased **by 58%**.

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 trans-border 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.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Environment of the Slovak Rebublic in 1993-2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/10/3_vyvoj_ekonom.pdf
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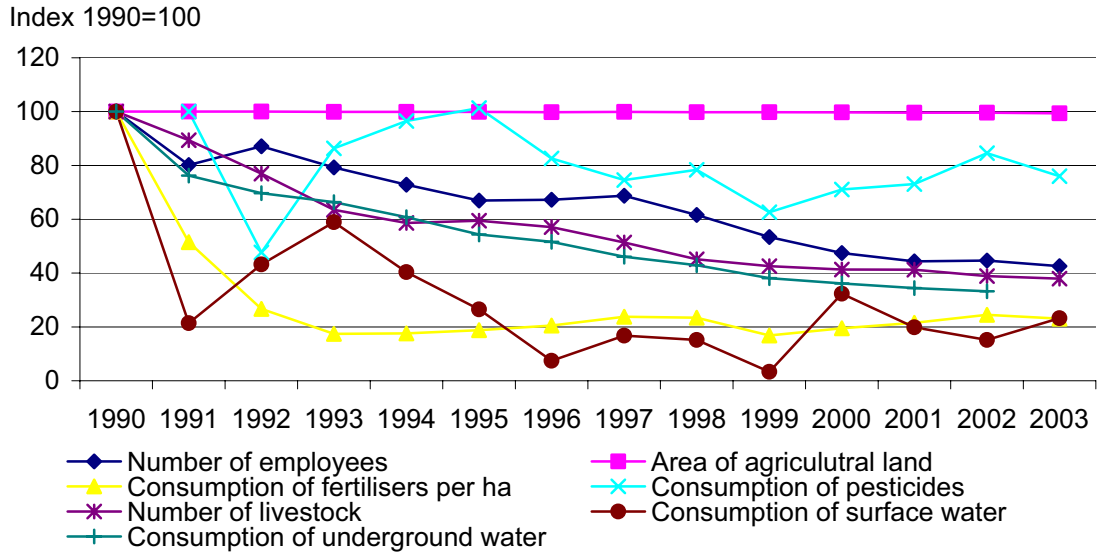
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/13_economic%20indicators.pdf

AGRICULTURE

Selected Indicators in Agriculture



Source: Slovak Hydrometeorological Institute, Statistical Office of the 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.

In the period of 1990 – 2003, there was a **loss of agricultural land by 0.6%** (16,000 ha), which is a positive effect compared to the 1970s and 1980s when the loss of agricultural land was more than 180,000 ha. Greatest part of agricultural land were changed into the area of forest land.

The last decade has been characteristic for **radical reduction in application of agrochemicals** into the production process. In the period of 1990 to 2003 there was **reduction in the consumption of industrial fertilisers by 75%** (reduction by 184 kg of pure nutrients (p.n.) of industrial fertilisers per ha). Of this volume, **nitrogen fertilisers dropped by more than 60%** (reduction by 53 kg of p.n. per ha), **phosphorus and potassium fertilisers dropped approximately by 90%** (reduction by 60 kg of p.n. per ha in case of phosphorus fertilisers, and by 70 kg of p.n. per ha in case of potassium fertilisers).

In the years of 1991 – 2003, **pesticide consumption dropped by 24%** (by 1,132 t).

In the years 1990 to 2003, **there was a reduction in the number of livestock** of all categories. Numbers of **cattle dropped by 60%** (reduction by 970,000 pcs.), **pork and sheep by 40%** (in case of pork by 1 078,000 pcs., in case of sheep by 286,000 pcs.), **horses by 30%** (reduction by 4,500 pcs.), and **poultry by 15%** (reduction by 2 262,000 pcs.).

Volume of surface and groundwater used in agriculture **was decreased.** In 1993 to 2003, there was a 76% reduction (reduction by 215 mil. m^3) by surface water abstraction in agriculture, and in 1990 to 2002, use of groundwater in agriculture dropped by 66% (reduction by 858 $l.s^{-1}$).

More info:

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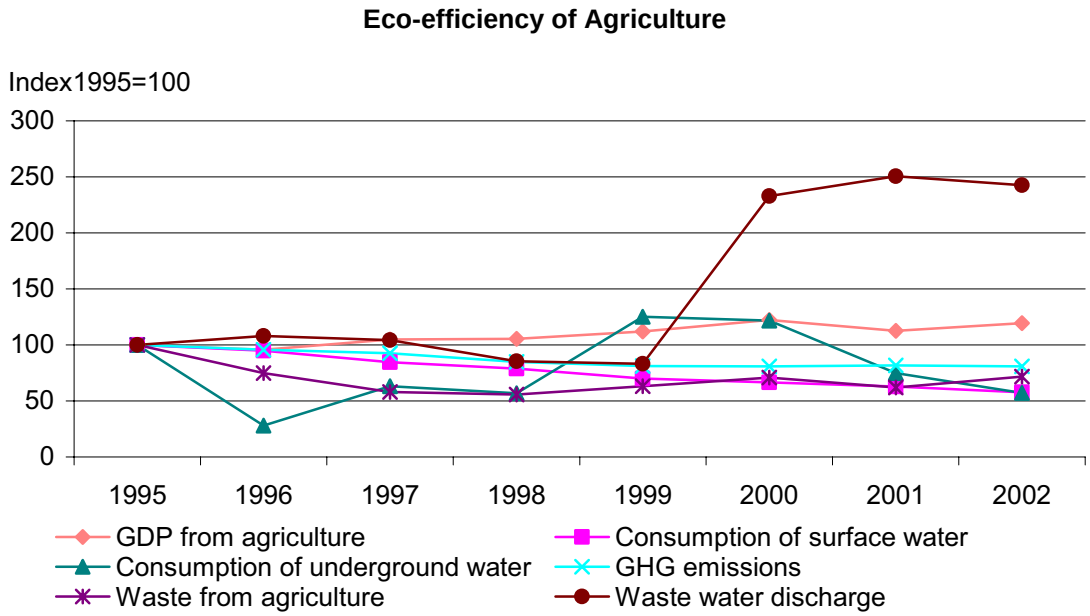
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/11_soil%20forrestry%20agriculture.pdf

AGRICULTURE



Source: Statistical Office of the SR, Institute of Geodesy, Cartography and the Cadastre of the SR, Central Control and Testing Institute of Agriculture

Eco-efficiency of agriculture in the SR **grows at slow pace,** which is a consequence of the absence of significant changes that would support such effectiveness.

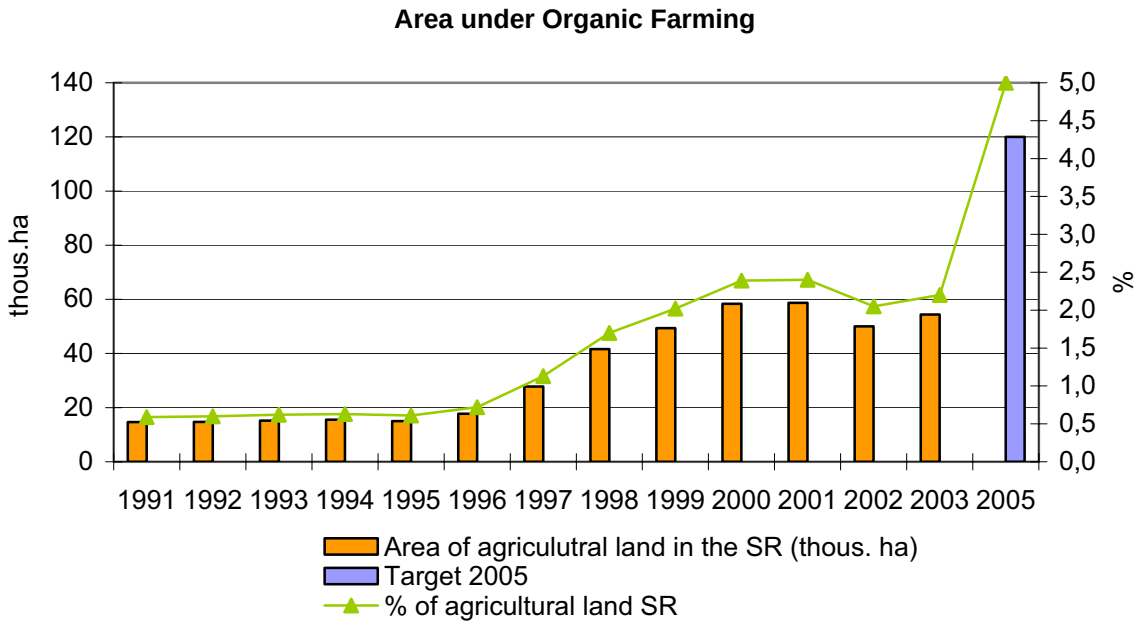
In the period since 1995, we may see **favourable trend** in eco-efficiency of agriculture **with regard to groundwater abstraction.** Surface water abstraction shows fluctuating characteristics, and, consequently, eco-efficiency of agriculture in case of surface water abstraction varies, with positive or negative trends in certain time periods.

Positive trend may be seen in eco-efficiency in the area of greenhouse gases emissions, here we see the scissors open up effect – grow of gross domestic product (GDP) and reduction in 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.

Fluctuating trend of eco-efficiency **related to total volume of discharged wastewater from agriculture** is well documented by the trend of 1995 – 1999. In 2000, there was a sharp increase in the volume of discharged wastewater from agriculture, and, consequently, **significantly negative trend** in eco-efficiency of this sector.

Stagnation of eco-efficiency of agriculture has been reflected in the volume of **generated waste** as documented by close correlation between the growth of GDP and growth in the volume of waste generated by 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.



Source: Ministry of Agriculture of the SR

In 1995**,** the **Concept of Organic farming in Slovakia was developed and subsequently approved by the Slovak Government**. 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 on organic farming.**

As of the end of 2003, there were **88 subjects** enlisted in the system of organic farming in the SR, on the area of **54,478 ha of agricultural land.** The subject list includes 13 organically-active natural persons on the area of 1,331 ha of agricultural land, and 75 organically active legal entities on the area of 53,147 ha of agricultural land.

Compared to 1991, the number of subjects in organic farming has increased from 38 to 88 in 2003, while in the same year, **share on the area** of agricultural land by organic farming increased **from 0.59% to 2.2%.** Products of these farms are mostly being exported to the EU countries.

One of the **objectives** of the agrarian policy outlined in the Rural Development Plan of 2004 – 2006, is to carry out organic farming on **5% of agricultural land (120,000 ha),** which calls for almost 50% increase, compared to the present situation. This objective was shifted into **Action Plan of Organic Farming in the SR till 2010.**

Compared to the **EU 15 countries**, in 2000, Slovakia had lower share of organic farming on total agricultural land than the EU 15 average.

More info:

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- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
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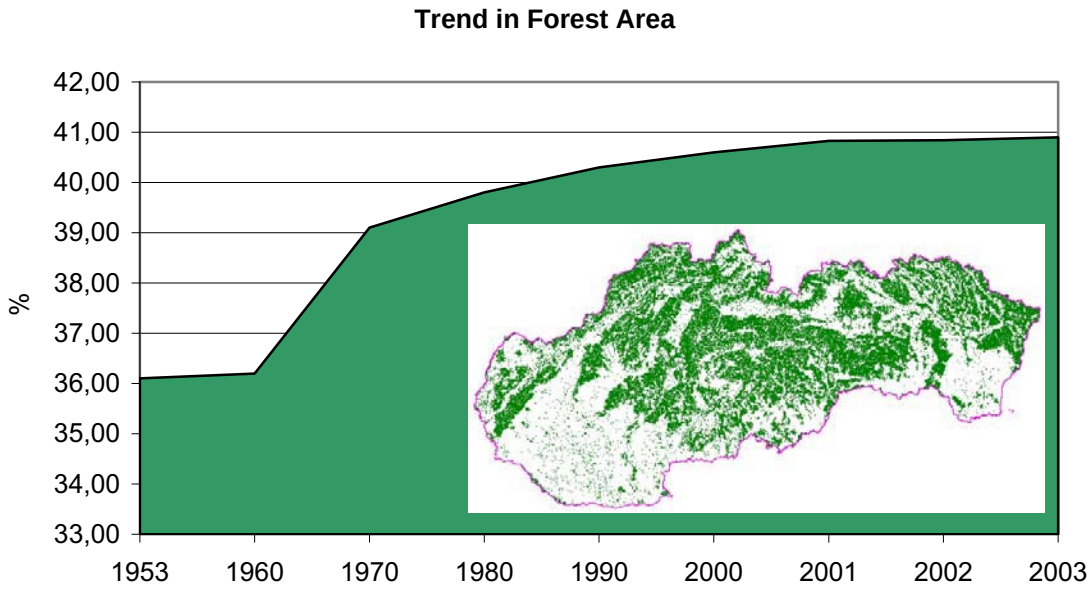
FORESTRY



Source: Forest Research Institute Zvolen

Slovak Republic belongs to the European countries with the highest rate of forestation. **Forest land in 2003** were **40.9%** (2,004,226 ha) of total territory of the state. **Stand area** in 2003 represented app. 96% (1,929,309 ha) of total size of forest lands. Calculated to the number of inhabitants, this represents **3.72 km^2 per 1,000 inhabitants.**

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 1970, it has grown by 4.7%, and in 2003 it represented 40.9% of the SR territory.

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 Republic	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

More info:

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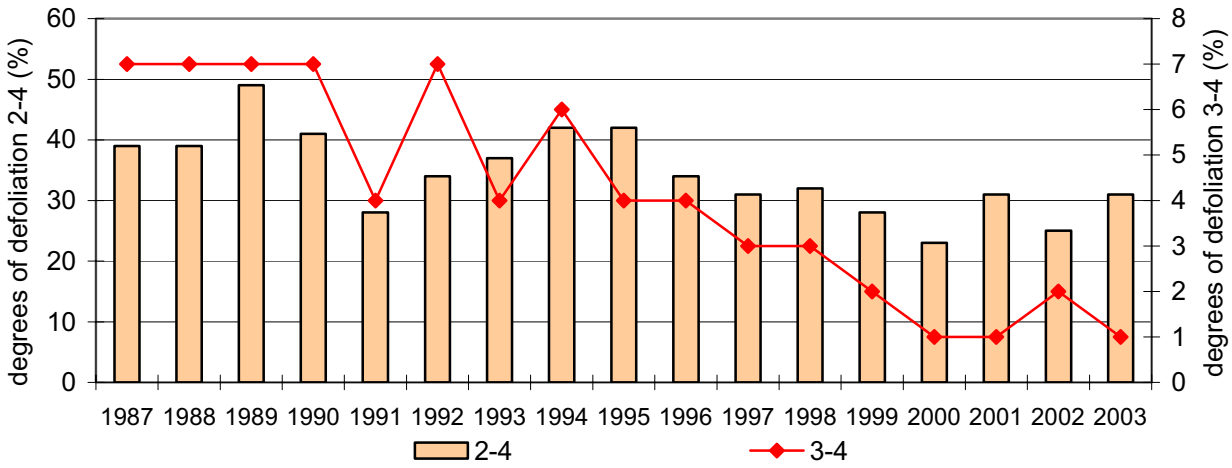
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/rio10/en_pdf/11_soil%20forrestry%20agriculture.pdf

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)

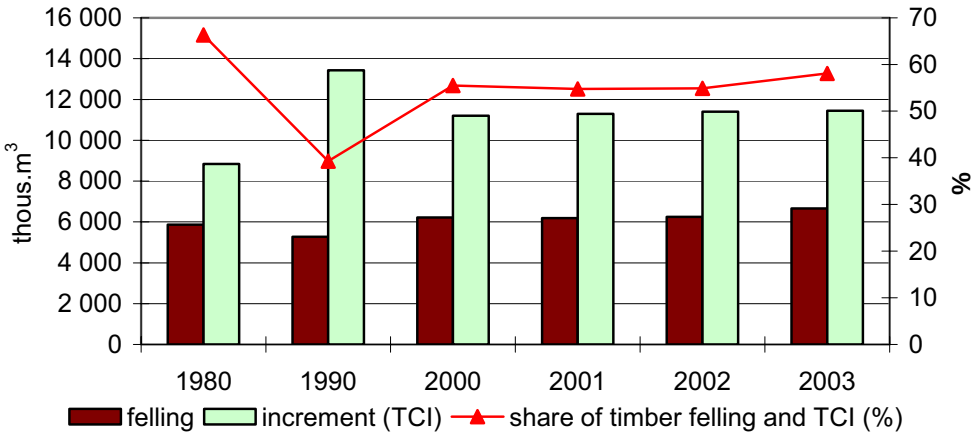
According to WWF, after Sweden and Switzerland, Slovakia has the most well-preserved forests in Europe. Nonetheless, the state of Slovak forests is damaged, mainly due to ambient air pollution or other damaging factors, as well as the past character of forest management. Persisting malfunctions of forest 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 2003, the SR carried out already the 17th 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,** there were 31 % of trees damaged (defoliation 2-4). Worst situation exists in case of **coniferous** trees with 40% of damage, and 25% of damaged **broad-leave** trees. Condition of coniferous trees has been **stabilised** since 1996 (average defoliation is between 26.3 – 28.3%), in case of broad-leave trees, the situation shows more fluctuations between individual years. The least defoliated tree types are hornbeam and beech. **In long term, tree types with the greatest level of defoliation are acacia (Robinia pseudoacacia) and spruce (Pinea alba).**

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.

More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand
  http://www.unece.org/trade/timber/fra/pdf/contents.htm

Utilisation of Forest Resources



Source: Forest Research Institute Zvolen

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 – 2003 **varied** considerably. Its volume dropped from over 5.8 mil.m^3 in 1980 to below 4.3 mil.m^3 in 1991 – 1993. In the following years, timber felling was showing increasing tendency. In **2003,** the level reached over **6.6 mil.m^3**. Compared to 1980, volume of timber felling **increased** by 13.4%, and by **26%** 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 2003,** the increment was 11,391 thous.m^3 in total, or 5.8 m^3 per ha, which represents **reduction by 14.7%** 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.

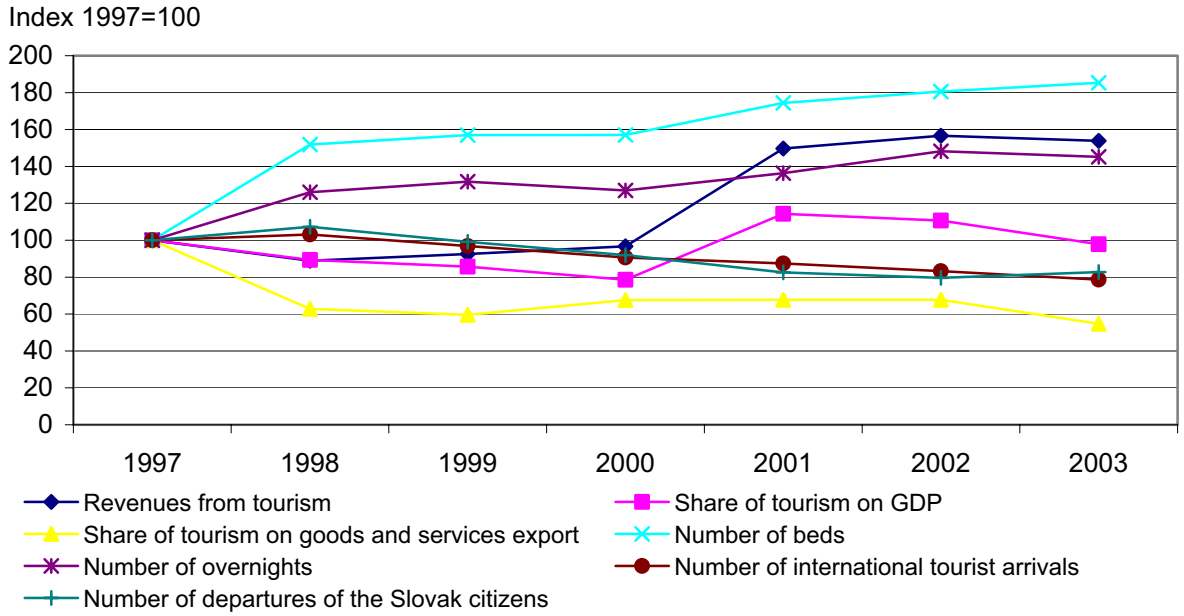
Share of timber felling and TCI ultimately **grew from 39.9%** (**1990**) to **58.1%** (**2003**). **Forest utilisation in Slovakia** may be considered sustainable, since timber felling is lower than the annual increment. Actual annual volumes of timber reach 40 to 60% of net annual increment, which points to new possibilities for increase in future timber felling.

More info:

- Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand http://www.unece.org/trade/timber/fra/pdf/contents.htm

TOURISM

Selected Indicators in Tourism



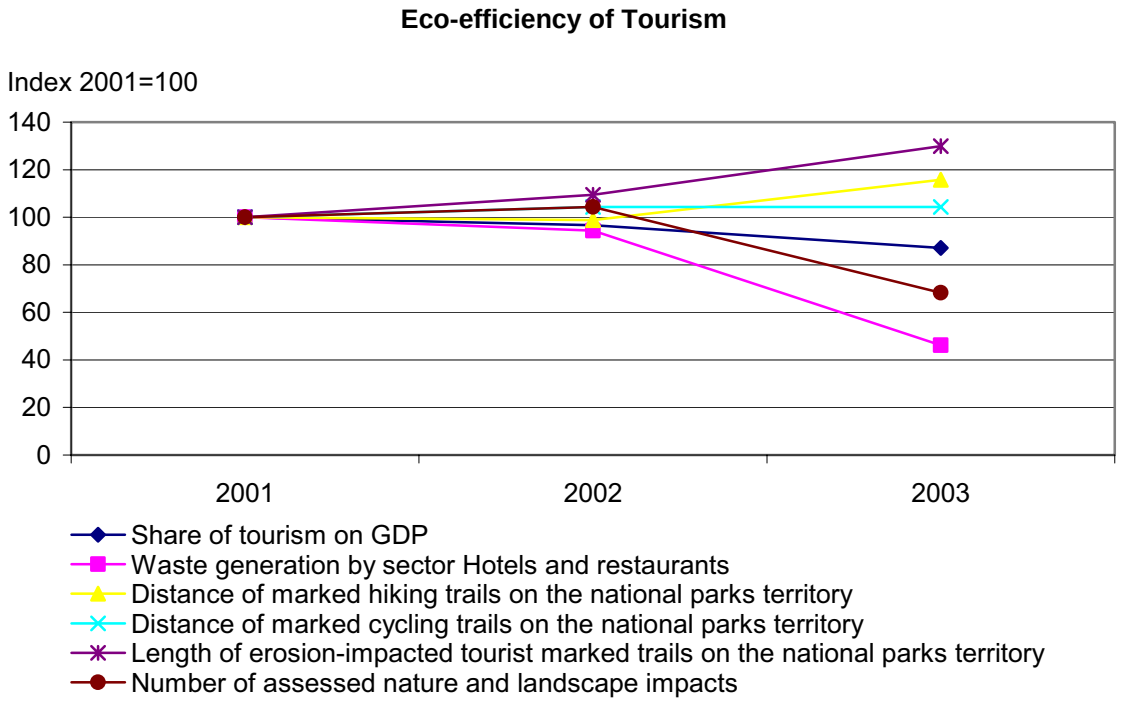
Source: Ministry of Economy of the SR, Statistical Office of the SR

Despite fluctuations in statistical data, revenues from tourism in 1997 – 2003 were rising, while level of revenues in foreign exchange in 2001 is partially affected by transition to EUR toward the end of the year and the SR citizens placing foreign exchange on their foreign exchange accounts
When assessing **share of tourism on gross domestic product** (GDP) it is apparent that the SR, despite the fact that in comparison with the neighbouring countries it has excellent natural and cultural-historical conditions for development of tourism and inflow of foreign tourists, **cannot fully use its own potential** due to lower standard of offered services, national promotion of tourism, and marketing, and is significantly behind Austria, especially, which is also oriented toward similar types of tourism (summer and winter mountain tourism, recreation)
Increase in lodging capacity of accommodation facilities can be assessed positively as this increase has been caused especially by increase in the number of more affordable small accommodation facilities – pensions, tourist hostels, cabin settlements, camps, and other accommodation facilities. On the other hand; however, Slovak Republic is **lagging behind the European Union standard and that of the neighbouring countries, in the number of beds per km^2**.

In terms of output in accommodation facilities in the SR in 1997 – 2003, despite the minimum reduction in the year 2000, the fact that during the period of 1997 – 2002 **the number of overnights spent in tourism accommodations increased,** unlike significant reduction in overnight stays of domestic tourists and continuous growth in the number of overnight stays of foreign tourists, is positive. In comparison with the neighbouring countries, the Slovak Republic 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.
Total **number of international tourist arrivals** together with **the number of departures of the Slovak citizens** during the monitored time period **was essentially decreasing** despite significant fluctuation of statistical data. In terms of spatial distribution and main destinations, **greatest numbers of tourists** in both directions were shown **at the common part of the national border of the Slovak and Czech Republics**, while the **lowest numbers,** due to reciprocal visa duty, were recorded **at the border with Ukraine.** National border with the greatest load is the border with Austria, due to its length.

More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

TOURISM



Source: Statistical Office of the SR, Slovak Environmental Agency, State Nature Conservancy of the SR

Eco-efficiency of tourism is determined by a correlation between economic indicator of tourism and environmental indicators that are not available in Slovakia for longer time periods.

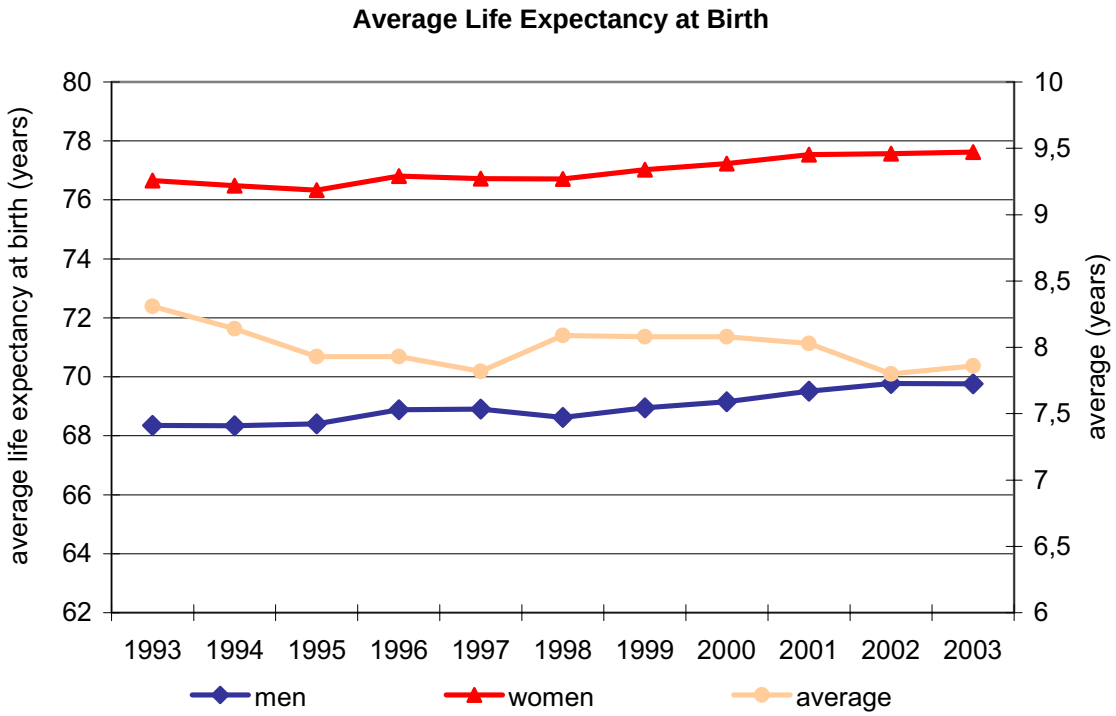
Positive trend in efficiency of tourism has been shown in the area of waste generation by hotels and restaurants, while in the period of 2001 – 2003 there has been **reduction in waste generation by as much as 53.8%**.

Especially by inclusion of territories of new national parks (NP) of Slovak Karst and Veľká Fatra since 2002, there has been **increase in distance of marked cycling trails and marked hiking trails** on the territory on national parks. In terms of density of such marked tourist trails, the most fragmented territories, considering their size, are areas of the Pieniny national park, NP Muránska plane, NP Low Tatras, NP Slovenský raj, and NP Veľká Fatra.

Increase in length of erosion-impacted tourist marked trails presents a significant environmental issue. These trails are in the zone above the upper forest border and in precipices 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 trails in the territory of the national parks of the Low Tatras and Malá Fatra, **substantial erosion** exists also in the territory of the national park of Slovenský raj.

Significant reduction in nature and landscape impacts assessed by nature and landscape conservation authorities is also caused by different classification of the assessed activities under Act on nature and landscape conservation that came into force since 2003. Although all categories of protected areas together cover only about 18% of the SR size, to them relate 60 – 80% of assessed impacts to nature and landscape that require permission of pertinent nature conservation authority (especially areas of TANAP, NP Low Tatras, NP Slovenský raj, and NP Malá Fatra).

PUBLIC HEALTH



Source: Statistical Office of the 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 2003, average life expectancy at birth reached 69.76 years in men and actually remained at the level of the previous year, for women it slightly grew to 77.62 years. Compared to 1993, this is an increase by 2% in men, and 1.2% 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 1999 – 2000) that in this indicator the SR men are lagging behind the Islanders by 7 years, compared to the French women, Slovak women are short of almost 6 years.

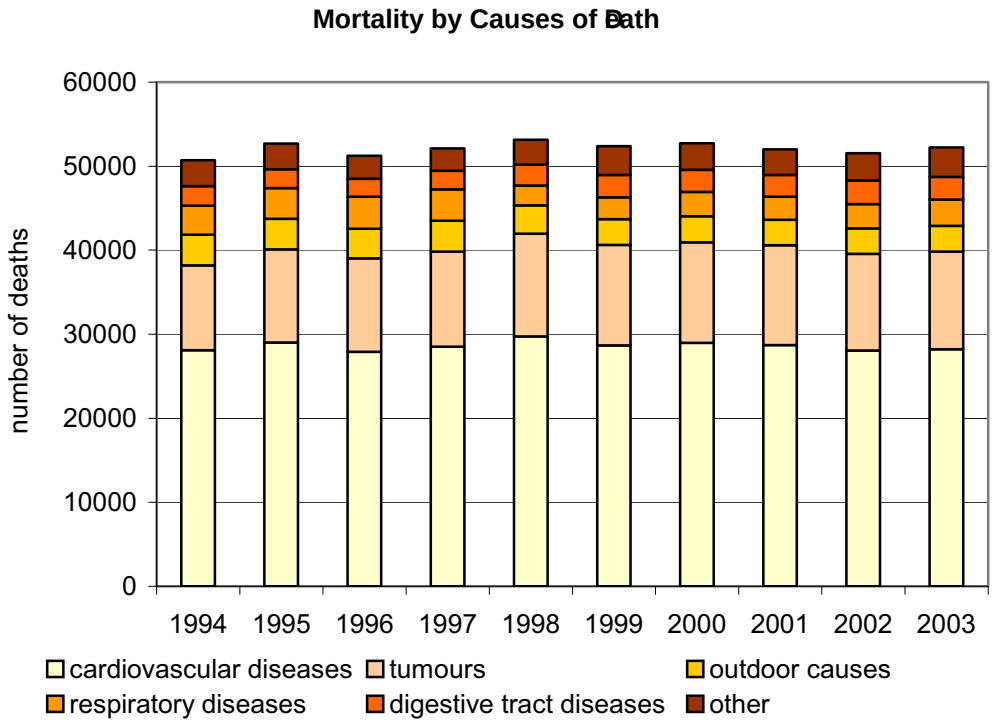
Average life expectancy at birth

	Austria	Poland	Hungary	Czech Rep.	EU	SR
Men	75.8	70.4	68.4	72.1	75.7	69.9
Women	81.7	78.7	76.7	78.7	81.6	77.8

Source: EUROSTAT

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/11/11e.html



Source: Statistical Office of the 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 2003, 27.7 thousand men and 24.5 thousand women died in Slovakia, which represents an increase by 287 in men, and 411 in women, compared to 2002.

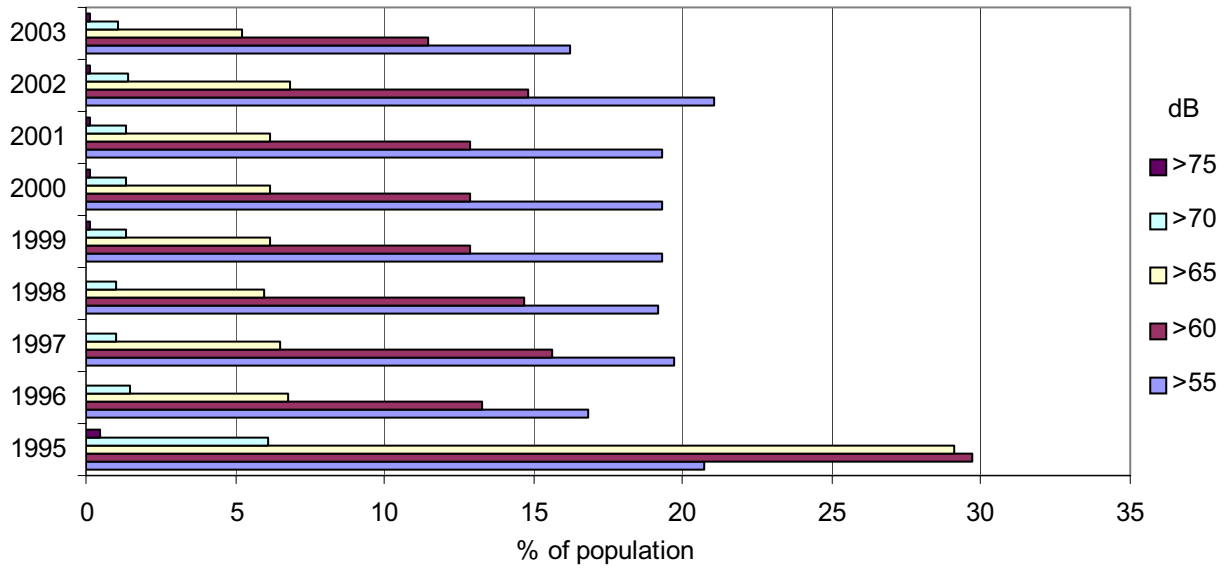
Substantial part of public mortality falls into the 5 major categories of **causes of death,** including circulatory system diseases, neoplasms, diseases of the respiratory and digestive systems, and external causes of death. In 2003, these 5 death categories constituted 93.4% of all deaths in men, and 93.2% 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 11,616 persons died in 2003. 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 (8.9%) with the rate almost 4 times the rate in women. In women, third cause of death are diseases of the respiratory system (5.6%). **Overall mortality trend by the mentioned causes of death has been stabilised since 1993**

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The National Report of the Slovak Republic on Sustainable Development (RIO+10 Report)
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/11/2_zdrav_stav.pdf

ENVIRONMENTAL RISK FACTORS

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



Source: State Health Institute of the SR

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 Slovak Republic 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.

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 **82,791.** 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.

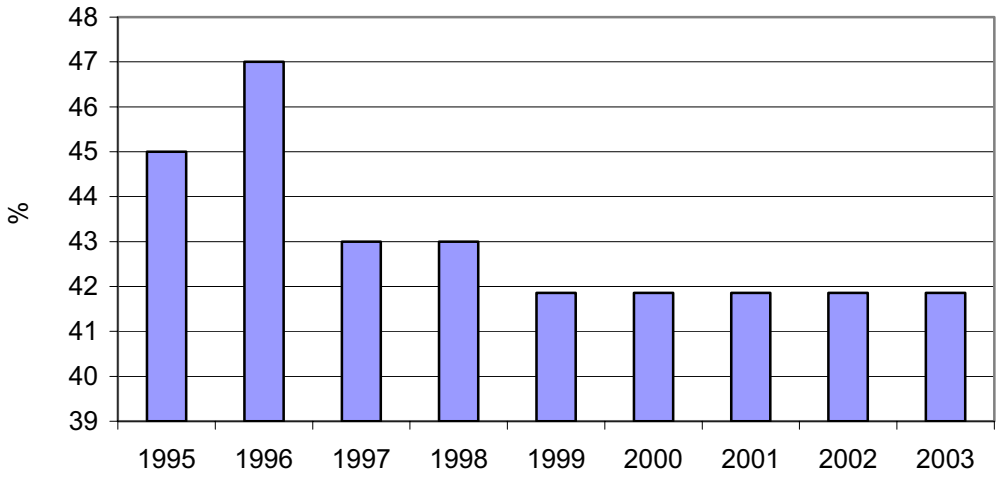
Competent authorities in the EU countries are required to elaborate strategic noise maps for main roads, railways, airports and agglomerations, as well as develop action plans for noise reduction in those areas where necessary and for keeping the level of environmental noise wherever it is good.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

PHYSICAL RISK FACTORS

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.

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}.

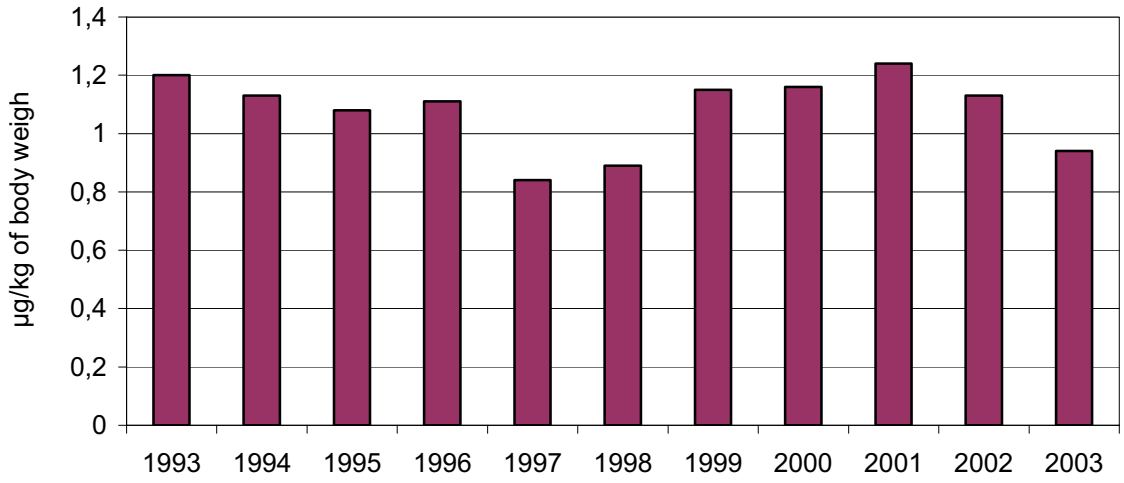
In relation to volume Radon activity in soil air and soil permeability, Slovak territory may be divided into three groups, based on the value of Radon risk – with he following proportions: **low** 53%, **medium** 46.7%, while only 0.3% are with **high** radon risk. Districts with **highest EVRA values**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

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- Report of the Geological Institute of Slovak Republic, 2002
  http://www.gssr.sk/profil/vs2002/priloha2.doc

CHEMICAL 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 i**s 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 6.5μg to 14μg. Values of weekly intake into organism during the first four years of monitoring reach approximately the same value – 1.0μg 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.

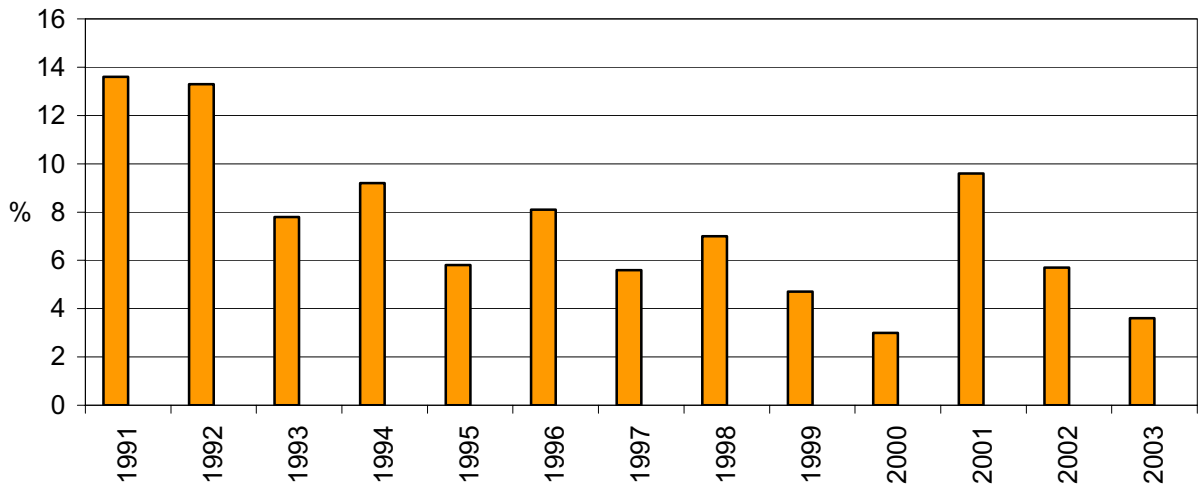
In terms of Slovak geographic areas, **highest** percentage values exist in territories of the **East-Slovakian region,** while **lowest values** were measured in territories of the **Middle-Slovakia region.**

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

CHEMICAL RISK FACTORS

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 catastre territory. In total, there were **2,151 samples** collected **(17,452 analyses)** that were analysed for content of chemical elements (lead, cadmium, mercury, arsenic, chromium, nickel), polychrome biphenyls, nitrates and nitrites. Of total number of 2,151 samples, **5.1%** (110 samples) did not comply with set limit values. Greatest proportion of **unsatisfactory samples** was recorded with arsenic (1.6%), mercury (1.5%), cadmium (1.2%), less with lead (0.5%), and least with nickel (0.6%) and chromium (0.2%).

In terms of overall assessment by contamination of all monitored xenobiotic substances at the same time in all commodities, it is clear that percentage of limit-exceeding samples in 2003 dropped by 9.7%, compared to 1992, and by 2.2%, compared to 2002.
Cadmium belongs to **most critical contaminants** of all monitored chemical elements. This represents 27.8% of total number of limit-exceeding analyses in 1992, 1997, 2002, and 2003. Limit-exceeding samples on the cadmium content **in 2003** were detected only in 16 samples of oilseeds. In all other commodities there was a significant **reduction** in average findings, compared to 1997 and 2002.

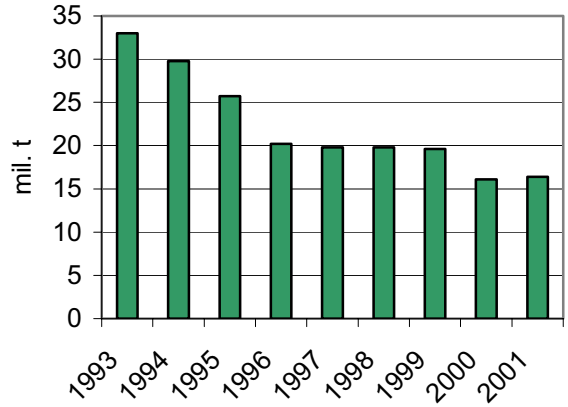
Compared with available international data, the SR may be considered among countries with **lowest values** of weekly intake of arsenic, cadmium, mercury, chrome, nickel, lead, and nitrates by the human organism.

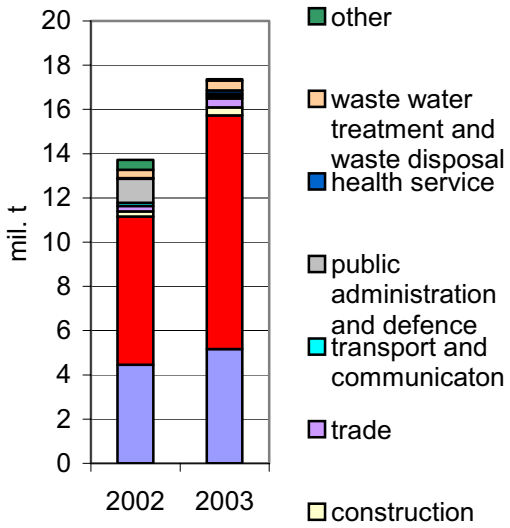
More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

WASTE

Waste Generation





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 – 2001**, the volume of generated waste showed **decreasing trend.** Unlike 1993, with 33 mil. tones of generated waste, in 2001, there was **approximately 50%** reduction (16.4 mil. tones).

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 **2003,** of total volumes of generated waste (17.4 mil. tones), **most waste** has been generated **by industry** (app. 60%) and **agriculture** (app. 30%). Overall increase in monitored volumes of waste compared to 2002 (by 22%) was caused by more exact approaches to classification of some types of generated waste among the state administration authorities and generators of waste.

Of total volumes of generated waste, 62.3% of waste was assessed in 2003, which, compared to 2002, is an increase by 9.6%.

Waste generation, its handling and quantitative objectives under the Waste Management Programme of the SR – strategic and conceptual document in the area of WM in the SR, developed for the years 2000 – 2005

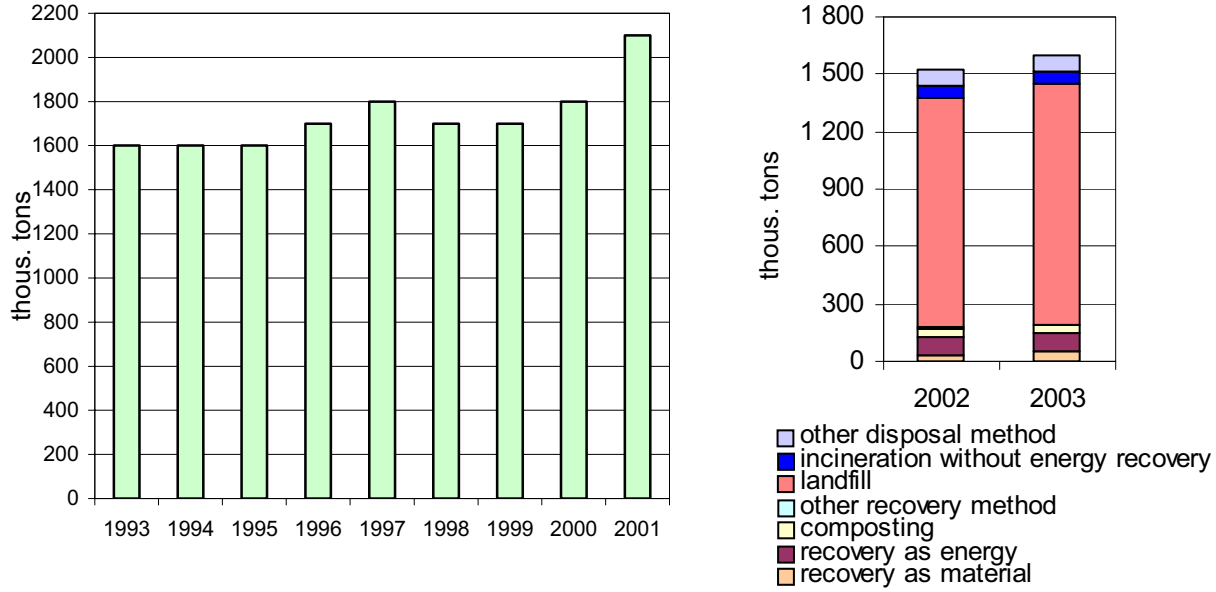
Year	Amounts of waste (thous. tons)	Recovery (%)		Disposal (%)		Other (%)
		as material	energetically	incineration	landfill	
2000	16,119	59	3	2	27	[1)] 17
2005	[3)] 17,000	70	5	1	24	[2)]

Source: Waste Management Programme, 2000-2005
Notes:
Calculated under new waste categorisation and including waste handling approaches after mechanical-chemical, and biological treatment.
[1)] Other waste handling – biological treatment, mechanical-chemical treatment, storage, non-specified, and other treatments.
[2)] Other handling methods – storage, export, other methods of disposal (chemical destruction)
[3)] Volume of waste in 2005 according to prognosis (SR Twinning project 98/IB/EN 02, MoE SR 2001)

More info:
- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

WASTE

Municipal Waste, its Generation and Handling



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

Municipal waste generation (MW) in 1993 – 2001 was in the interval from 1.6 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. Proportion of landfilled waste in 2001 dropped (app. 52% of total generated MW) compared to 1993 (app. 87%) by 35%.

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 2003,** there was 297 kg/year of MW per capita, which shows slight reduction by app. 1%, compared to 2002 (283 kg/year/capita). Of total generated MW in 2003, only 12% was recovered, most of it through energy reclaiming approaches (app. 6%), and the rest was disposed of, with the ratio of landfilled waste being 89%, and incinerated waste approximately 5.3%, which does not represent significant changes, compared to 2002.

Programme of waste management of the SR being the strategic and conceptual document in the area of WM in the SR for the years 2000—2005, defines **the following objectives** in handling biologically degradable waste: to reach a 35% share on composting of biologically degradable MW, and decrease the volumes of biologically degradable components of landfilled MW by 30%, compared to 2000.

MW handling in 2000, and quantitative objectives for 2005

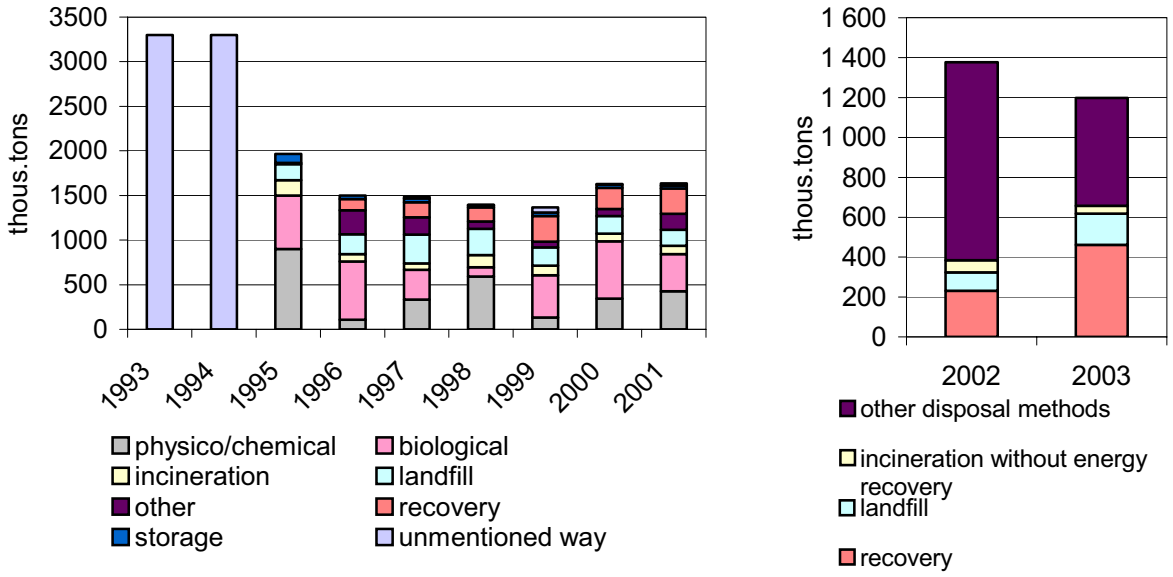
Year	Recovery (%)		Disposal (%)	
	as material*	as energy	incineration	landfill*
2000	21	6	6	66
2005	35	15	0	50

Source: Waste Management Programme, 2000-2005
* as calculated in relation to waste handling through septic tanks and cesspools.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

Hazardous Waste Handling



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 2001 (1.6 mil. tones), points **to its decreased generation** by app. 50%.
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. Comparing waste generation of this time period, the volume of HW decreased by app. 8% in 2003, compared to 2002. **Most significant HW** in Slovakia in 2003 included the industry, which contributed to the overall generation of this type of waste by 59%, and agriculture with 32%. Of total volume of HW generated on the territory of the SR, 33.5% was recovered (461,570 tones), which means an increase by 19%, compared to 2002. The remaining 65% of total volume of generated HW (736,598 tones) was disposed of, which means reduction by 16% (1 147,764 tones), compared to 2002. It points to the fact that strategic objectives in HW management in the SR are carried out. HW management accentuates prevention of waste generation as the number one option, followed by its recovery before disposal.
SR, since its birth, has been a member state to the **Basil convention** on management of HW cross-border transfer and its disposal.

HW generation, its handling and quantitative objectives under the Waste Management Programme of the SR – strategic and conceptual document in the area of WM in the SR, developed for the years 2000 – 2005

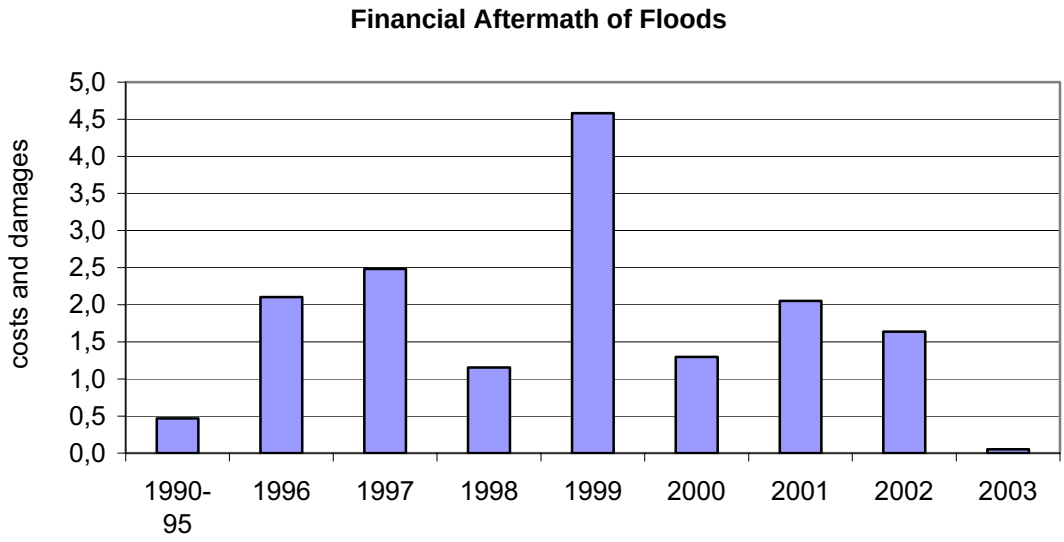
Year	Amounts of waste		Recovery		Disposal		Other
			as material	as energy	incineration	landfill	
	thous. tons	%	%	%	%	%	%
2000	1,792	11	16	2	3	30	[1)] 49
2005	[3)] 1,600		30	2	5	63	[2)]

Source: Waste Management Programme, 2000-2005
*Notes: * Calculated as based on new waste categorisation with the inclusion of waste handling following mechanical-chemical and biological treatment, [1)] Other waste handling – biological treatment, mechanical-chemical treatment, storage, non-specified, and other treatments, [2)] Other handling methods – storage, export, other methods of disposal (chemical destruction), [3)] Volume of waste in 2005 according to prognosis (SR Twinning project 98/IB/EN 02, MoE SR 2001).*

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

ACCIDENTS AND NATURE DISASTERS



Source: Water Research Institue

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. Sk.

"Programme 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 measures implemented in the framework of Programme of flood protection, include the following tasks:

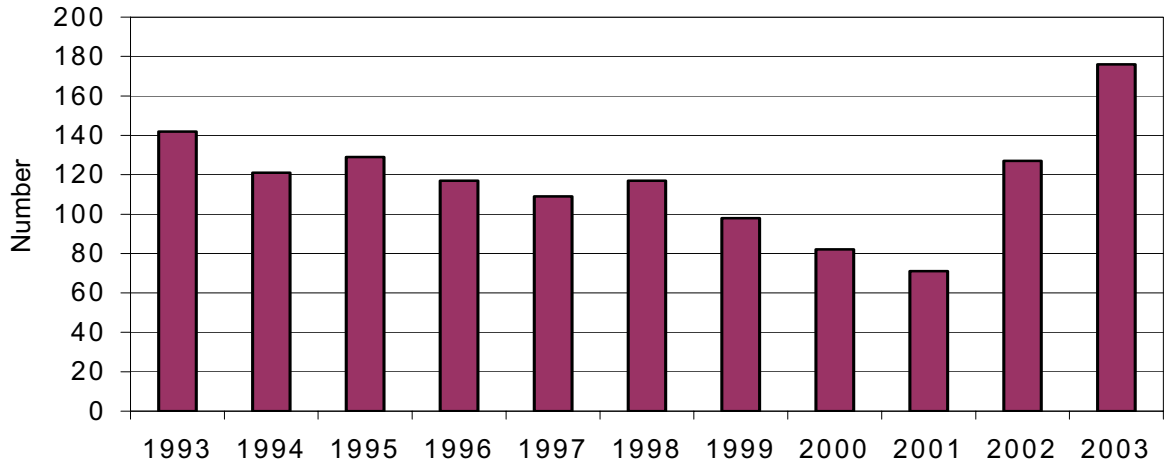
- **Issue maps** with marked high-risks areas, together with data on probability of occurrence of flood currents;
- Systematically **improve the performance of alert and prognosis service** through international cooperation;
- **Do not permit the rise in flood levels** on important water management watercourses (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. Sk per year.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html
- The Green Report of the Ministry of Agriculture of the Slovak Republic
  http://www.mpsr.sk/slovak/dok/zs2000/vh/zsvob3.htm

ACCIDENTS AND NATURE DISASTERS

Number of Listed Accidental Deteriorations in Water Quality



Source: Slovak Environmental Ispection

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.
Unknown originators and so-called foreign organisations are contributing to EDW by significant percentage (in the year 2003 it was 29.5% for unknown originators, and app. 4.5% for foreign organisations). Number of EDW generated outside the SR territory in 1993 – 2003 fluctuated significantly, and its share on EDW in 2003 was only 1.1%.

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.

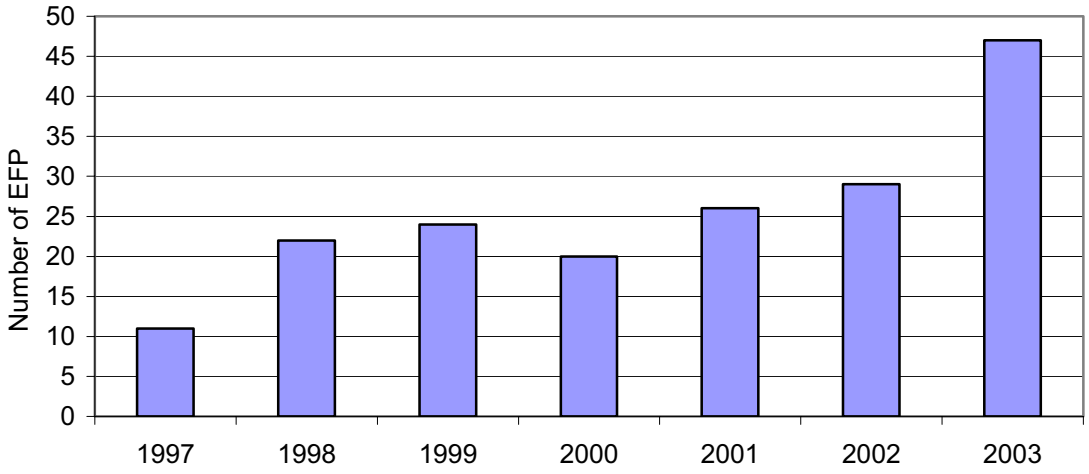
More info:

- Environment of the Slovak Republic in 1993 - 2003
  http://www.sazp.sk/slovak/periodika/sprava/skladacka/EN/12/4_Fyz_riz.pdf

ENVIRONMENTAL CARE

ENVIRONMENTAL ASSESSMENT AND ECO-LABELLING

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



Source: Ministry of Environment of the 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. Functionality of the Programme is based on creating a competitive environment on the market of products with comparable qualitative parameters through introducing another selective, competitive criterion including set environmental requirements. Environmental label is granted on achieving these requirements.
Slovak programme was adopted through the SR government resolution in 1996 and named National programme of environmental assessment and eco-labelling of products in the Slovak Republic, coming into force on April 15, 1997. Through implementation of the programme, the label **Environmentally Friendly Product** (EFP) has become one of important informative instruments of environmental and consumer strategy.

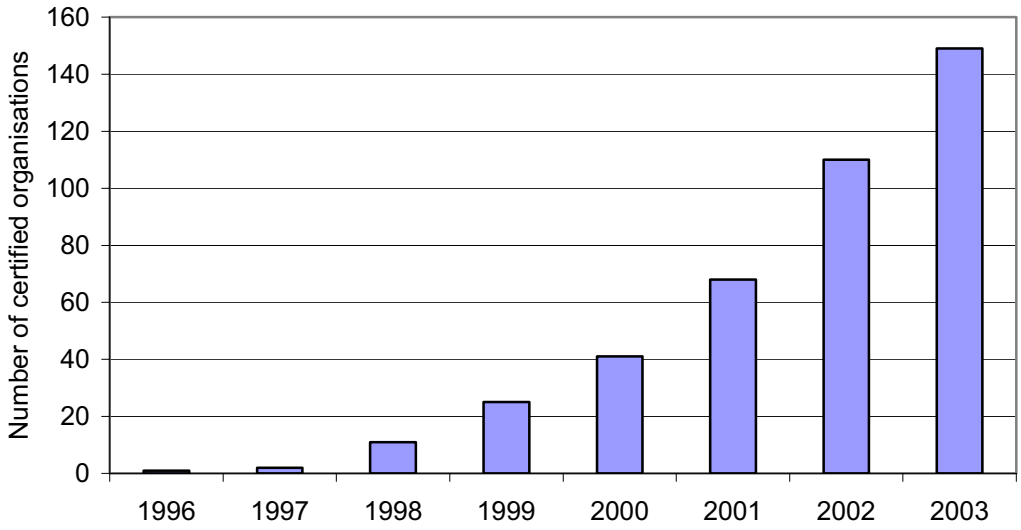
The year 2004 has been the eight year of implementation of voluntary **system of environmental product assessment and eco-labelling at the national level.** Other activities have been implemented as the opening phase for implementation of the European scheme of environmental labelling called **"European Flower"** pursuant to the European Parliament and Council Directive No. 1980/2000/EC on a revised Community eco-label award scheme.
Number of products with the right to use national environmental label of **EFP** has increased more than four times during the monitored period of 1997 – 2003. Greatest increase in the number of these products was recorded in 2003 (18 products). In 2003, **47 products** had the right to use the EFP label on the basis of licence agreements with the MoE SR.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

ECO-MANAGEMENT AND AUDIT SCHEME

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.

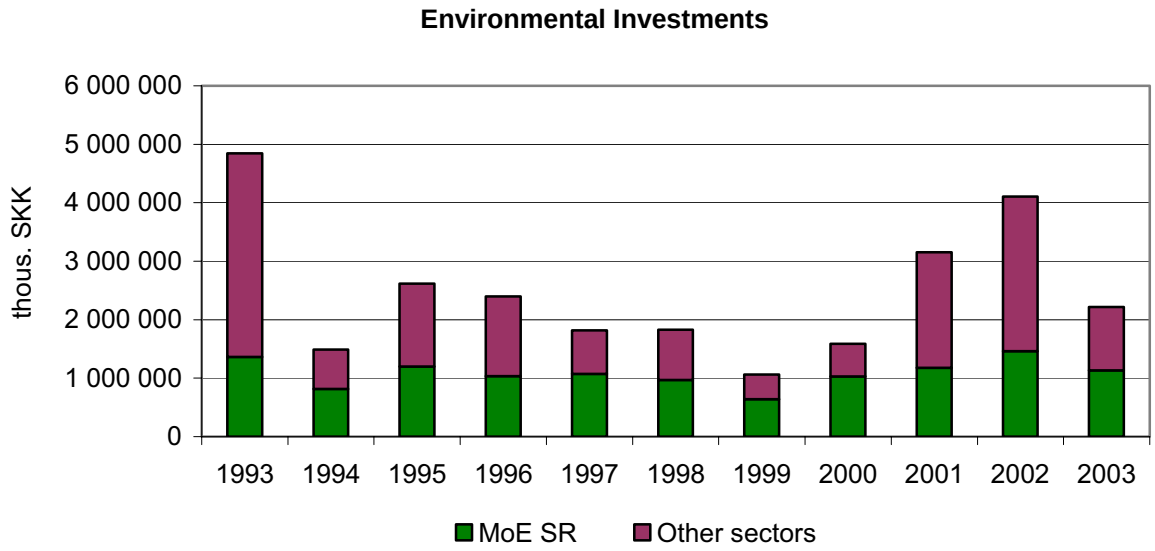
Community Scheme on **environmental management and audit** being a voluntary instrument for those organisations that want to assess and improve their environmental behaviour, was approved through the EEC Resolution No.1836/1993 – EMAS I in June 1993, and put into practice in April 1995. On April 27, 2001, new revised Resolution of the European Parliament and Council No. 761/2001 came into force.

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 2003, there were **149 organisations** in the SR under the ISO 14001 norm. Greatest increase in the number of certified organisations under ISO 14001 during 1996 – 2003 was recorded in 2002 (42 organisations).

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

ECONOMICS OF ENVIRONMENTAL CARE



Source: Ministry of Environment of the SR

During the period of 1993 – 2003 there was 24.55 bill. SKK from the national budget designated to **environmental investments.** Of this amount, **MoE SR** designated the sum of 10.7 bill. SKK. Other sectors with greatest investments include MoA SR (6.6 bill. SKK), MoH SR (1.739 bill. SKK), and MoD SR (1.737 bill. SKK).

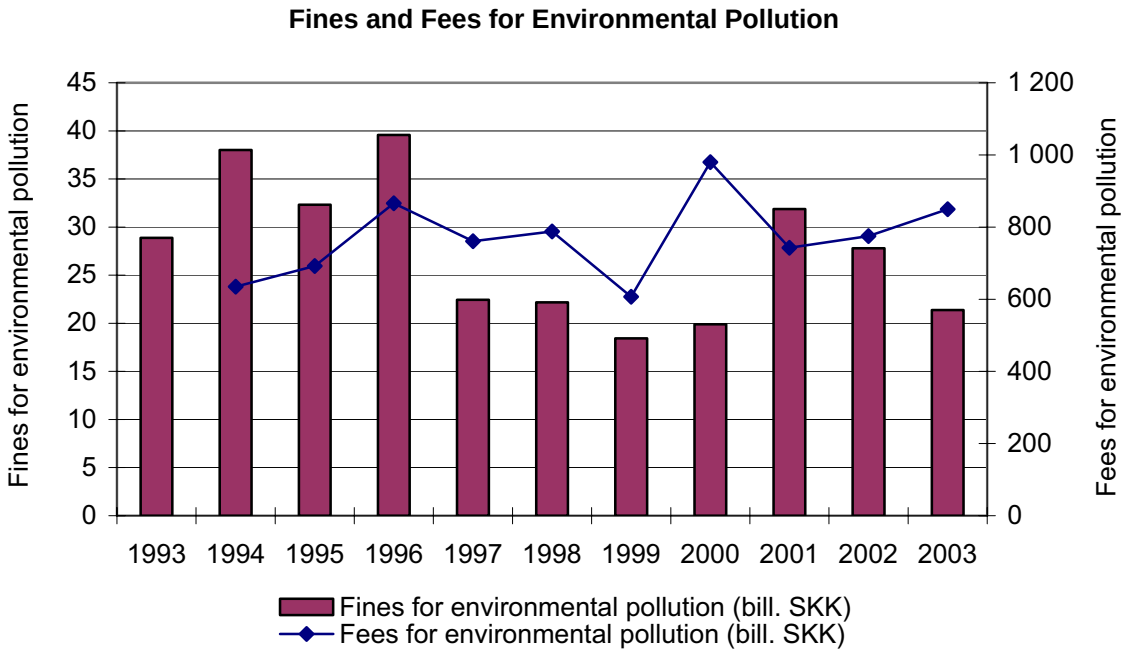
Biggest value of money to environmental investments was invested in 1993 at the amount of 4,843,901 thous.SKK. Lowest value to environmental investments was invested in 1999 at the amount of 1,060,361 thous. SKK.

In 2003, total sum of investment funds was 2,218,506 thousand SKK, with MoE SR contributing by 51.15%. The rest was divided among MoTPT SR (15.91%), MoD SR (8.31%), MoCRD SR (7.97%), and MoEc SR (7.16%).

Most **subsidies** in 2003 were given to funding environmental programmes relating to protection and rational use of water – 308 of subsidies in total, at the amount of 791.27 mil. SKK, including 64 subsidies to water supplies at the sum of 138.9 mil. SKK, and 244 subsidies at the amount of 652.37 mil. SKK into waste water treatment plants and sewerage. Other investments were directed into waste management, air protection, and other programmes.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html



Source: Ministry of Environment of the SR

Extent of **fines for environmental pollution** in 1993 – 2003 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. Sk, while lowest amount of fines was collected in 1999 – 18.43 mil. SKK. Total amount of imposed fines since 2001 has been decreasing. In 2003, there was reduction by 26% in total amount of imposed fines, compared to 1993. In 1993 – 2003 the highest sum of fines imposed by the state administration environment authorities was in the area of waste management (111.4 mil. SKK), followed by the area of water protection (96.1 mil. SKK) and in the area of air protection (45.3 mil. SKK).

In 2003 total volume of fines reached the sum of 21.38 mil.SKK. Greatest amount of fines in the given year was imposed in the area of water protection (8.03 mil. SKK), in the area of waste management (6.129 mil. SKK) and for infractions to the construction law – 3.716 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 849.5 mil.SKK in 2003.

In the framework of environmental pollution fees, **fees for ambient air pollution** reached 625.13 mil. SKK, **recompense for wastewater discharge** reached 214.33 mil. SKK, **fees for handling ozone-depleting substances and products** reached 5.78 mil. SKK, **fees for waste storing** reached 4.2 mil. SKK, and **fees for EIA** reached 52 thous. SKK.

More info:

- State of the Environment Report of the Slovak Republic
  http://www.sazp.sk/slovak/periodika/sprava/index.html

INTERNATIONAL CO-OPERATION

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)*

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.

ABBREVIATIONS

AOT 40	Accumulated Dose Over a Threshold of 40 ppb
BOD	Biochemical Oxygen Demand
COD_{Cr}	Chemical Oxygen Demand by Bichromade
EIA	Environmental Impact Assessment
ENP-UV	Non-polar Extractable Substances
GHGs	Greenhouse gases
Inc.	Incorporated
ISO	International Organization for Standardization
ISO	Insoluble Substances
IUCN	The International Union for the Conservation of Nature and Natural Resources
LPG	Liquid Petroleum Gas
Ltd.	Limited Corporation
MoA SR	Ministry of Agriculture of the Slovak Republic
MoCRD SR	Ministry of Construction and Regional Development of the Slovak Republic
MoD SR	Ministry of Defence of the Slovak Republic
MoE SR	Ministry of Environment of the Slovak Republic
MoEc SR	Ministry of Economy of the Slovak Republic
MoEd SR	Ministry of Education of the Slovak Republic
MoH SR	Ministry of Health of the Slovak Republic
MoTPT SR	Ministry of Transport, Posts and Telecommunications of the Slovak Republic
OECD	Organisation for Economic Co-operation and Development
SKK	Slovak Crowns
SR	Slovak Republic
STN	Slovak Technical Standard