

3. ENVIRONMENT

The **environment** comprises everything that creates natural conditions for the existence of organisms, including human beings, and is a prerequisite for their further evolution. Its components are especially the air, water, rocks, soil, organisms, ecosystems, and energy.

Environmental protection expenditures include expenditures on the acquisition of environmental fixed assets and environmental non-investment expenditures. The data are collected by means of an annual statistical questionnaire of the CZSO. The data on fixed assets are the sum of expenditures expended by reporting units on acquiring fixed assets (by purchase or own activities) and the total value of fixed assets acquired free or by transfer according to relevant legislation or by a change from private use to business. The non-investment expenditures include wages and salaries, payments for rent, energy and other material, and payments for services whose principal purpose is to protect the environment.

Waste management refers to activities focused on preventing waste generation, managing waste, and subsequent care for places where waste is deposited, as well as to checking these activities.

Water management refers to all activities aimed at the use, development and protection of water sources and protection against harmful effects of water.

Notes on tables

Table 3-1. Changes in land use (plantations)

The differences between decreases/increases in agricultural and non-agricultural land are due to the updating of areas after mapping.

The data shown in this table were provided by the Czech Office for Surveying, Mapping and Cadastre.

Tables 3-2 to 3-5. Protected areas

Act No. 114/1992 Sb., of the Czech National Council, on Nature and Landscape Conservation, distinguishes between 6 categories of **specialty protected areas**:

- national parks and protected landscape areas - referred to as **large protected areas**, and
- national nature reserves, nature reserves, national nature monuments, and nature monuments referred to as **small protected areas**.

The data in the tables were provided by the Agency for Nature Conservation and Landscape Protection, Prague.

Tables 3-6 to 3-10. Environmental fixed assets acquired, environmental non-investment expenditures expended and economic benefit from environmental protection activities

Environmental protection is divided into 9 components:

Air pollution control and climate protection includes innovations of technological processes designed to prevent pollution (protection of air, climate and ozone layer); removal of waste gas and vented air; removal of solid and gaseous emissions; air quality monitoring systems, etc.

Wastewater management includes innovations of technological processes designed to prevent pollution; construction of wastewater treatment plants; construction of sewerage systems connected to wastewater treatment plants; cooling water management; water quality monitoring systems, etc.

Waste management includes innovations of technological processes designed to prevent waste generation; facilities and equipment for waste collection, transport, separation and treatment;

construction of incineration plants, recycling plants, controlled landfills, and composting plants; redevelopment (sanitation) of old landfills; waste monitoring systems, etc.

Landscape and biodiversity protection includes protection and rehabilitation of habitats and species; protection of natural and semi-natural types of landscape; protection and renewal of environmental stability elements; revitalization of hydrological network; costs of solutions to duties resulting from Articles 35 and 32 of Act No. 44/1988 Sb., on the Protection and Use of Mineral Resources (the Mining Act), etc.

Soil, groundwater and surface water protection and remediation includes prevention of pollutants from deposition in soil and then from infiltration into water; prevention of soil contamination and degradation by chemical effects, followed by soil remediation; protection of soil against erosion, slope movements and other degradation caused by physical phenomena, including costs of solutions to landslide issues; costs of geological survey tasks aimed at protection of soil, groundwater and surface water, etc.

Vibration and noise abatement (excl. workplace protection) includes prevention of noise and vibration through technological innovations; construction and application of noise and vibration control systems in transport by road, rail and air and in industry; measuring equipment, etc.

Radiological protection includes anti-radon measures; geological work connected with the issue of locating deep nuclear waste depositories; measuring equipment; transport and handling of highly radioactive waste, etc.

Research and development include R&D activities dealing with air pollution control and protection of climate and ozone layer; water pollution control; waste management; soil and groundwater protection; noise and vibration abatement; biodiversity and landscape conservation; radiological protection; other environmental research and development, etc.

Other environmental activities include acquisition of tangible fixed assets to prevent floods, environmental protection education and training, etc.

The source of the data given in the tables is annual questionnaires of the CZSO.

Tables 3-11 to 3-16. Emissions from air polluters and specific emissions of main pollutants

Basic pollutants of primary concern, which are generated by combusting solid and liquid fuels and discharged into the air, comprise solids (fly-ash and solid particulate matter), sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), and hydrocarbons (C_xH_y).

Since 2002, volatile organic compounds (VOC) have been reported instead of emissions of hydrocarbons (C_xH_y). Available data for the emission balance of VOC, which also covers emissions from the use of solvents, paints and varnishes e.g. for outdoor maintenance and in households, do not permit making a breakdown by individual polluter at present. Hence, only the total of VOC emissions is given for the time being.

Amounts of pollutants discharged into the air are listed in the Register of Emissions and Air Polluters (Registr emisí a zdrojů znečišťování ovzduší - REZZO). The register keeps records of the following types of polluters broken down by their thermal outputs:

- **REZZO 1:** includes stationary fuel-burning systems more than 5 MW in thermal output, plus systems operated in especially important technological processes. The systems classified to this group are referred to as 'big polluters';

- **REZZO 2:** includes technological systems incorporating stationary fuel-burning equipment whose thermal output ranges from 0.2 to 5 MW, equipment of important technological processes, and coal mines and similar areas, where burning, evaporating or escaping of pollutants is possible. This group is referred to as 'medium-sized polluters';

- **REZZO 3:** includes local technological systems with stationary fuel-burning equipment whose thermal output is lower than 0.2 MW, production process equipment not falling into the category of big and medium-sized polluters, areas where work done can pollute the air, storage sites of fuel, raw materials, products, waste and captured emitted pollutants, and other facilities and activities polluting the air to a large extent. This group is referred to as 'small polluters';

- **REZZO 4:** mobile systems equipped with air-polluting combustion or other engines. This group includes especially road and rail motor vehicles, vessels and aircraft. It is referred to as 'mobile polluters'. Since 1995, the balance has been including emissions of solid and sulphur dioxide pollutants from transport.

Specific emissions are emissions of pollutants per unit of time per unit of area.

Tables 3-17 and 3-18. **Pollution at selected locations and background stations**

Pollution limit is the maximum permissible concentration (by weight) of a pollutant contained in the air.

Permissible 24-hour concentrations are set for sulphur dioxide and PM_{10} as $50 \mu\text{g}/\text{m}^3$ and $40 \mu\text{g}/\text{m}^3$, respectively.

Methods of measurement:

- sulphur dioxide (SO_2): colorimetry, coulometry and UV fluorescence
- PM_{10} (respirable fraction of suspended particulate matter with an aerodynamic average of 50% of particulates below $10 \mu\text{m}$): radiometry
- nitrogen oxides (NO_x): colorimetry and chemical luminescence
- precipitation acidity: pH-metry.

Precipitation acidity is read on the scale of 14 to 1, where pH values = 14, 7 and 1 indicate extremely alkaline, neutral and extremely acidic environments, respectively.

Table 3-19. **Ground ozone layer**

The maximum level of ground ozone layer is the maximum 8-hour average level measured between 09.00 and 17.00 hours.

The ground ozone concentrations are measured by the method of UV absorbance.

The data in Tables 3-11 to 3-19 were provided by the Czech Hydrometeorological Institute.

Table 3-20. **Total amounts of ozone in the atmosphere**

Ozone is measured with Dobson spectrophotometer on the principle of determining the extent of selective absorption of solar radiation, passing through the atmosphere, by ozone at certain wavelengths. The extent of selective absorption is proportional to the amount of ozone. All the values are given in Dobson units (D.U.) B.P. Scale and supplied by the Solar and Ozone Observatory, Hradec Králové managed by the Czech Hydrometeorological Institute.

Table 3-21 to 3-24. **Generation of waste**

On 1 January 2002 a new **Act No. 185/2001 Sb., on Waste and Amendments to Some Other Acts**, as amended, entered into force. The Act fully complies with waste management laws and regulations of the EU.

Waste is any movable thing a person disposes of or intends/is under duty to dispose of, which is classified to a group of wastes listed in Annex No. 1 to Act No. 185/2001 Sb.

Hazardous waste is waste included in the list of hazardous wastes given in the implementing regulation as well as any waste exhibiting one or more hazardous characteristics listed in Annex No. 2 to Act No. 185/2001 Sb.

Waste management refers to gathering, concentration, collection, purchase, sorting, transport, storage, recovery and disposal of waste.

Ways of waste management:

The ways of waste management are divided into two groups, in compliance with the division according to the EU. They are:

- **waste recovery** (R codes) - activities shown in Annex No. 3 to Act No. 185/2001 Sb.; and
- **waste disposal** (D codes) - activities shown in Annex No. 4 to Act No. 185/2001 Sb.

Municipal waste refers to all wastes generated within the municipality by the activity of actual persons, coming under Group 20 of the Waste List, except for wastes produced by legal or natural persons holding a business licence.

In this publication the municipal waste refers to all wastes generated within the municipality by the activity of actual persons, which is not regulated by special rules or restrictions, and similar wastes generated by trades, offices, etc., including components of these wastes collected separately.

Trade waste refers to wastes, whose composition is similar to the municipal wastes classified under Group 20 of the Waste List, generated by the non-productive activity of legal or natural persons holding a business licence (e.g. small entrepreneurs, offices, etc.).

Standard waste collection refers to collection of mixed wastes from dustbins, containers or bags.

Bulky waste collection refers to collection of wastes overly large to be placed in dustbins, containers or bags.

Data for the tables were collected and processed by the CZSO from information provided on CZSO statistical questionnaires. The reporting units for Tables 3-21, 3-22 and 3-24 are enterprises with 20+ employees whose principal activity classified them to CZ-NACE divisions/groups coded 01-36, 40-41, 45, 502, 505, 52, 55, 601-602, 61, 62, 642, 747, 7481, 851-852, 9211 and 93. Furthermore, units with 5+ employees classified to CZ-NACE 37 (Recycling), 5155 (Wholesale of chemical products) and 5157 (Wholesale of waste and scrap), as well as all units classified to CZ-NACE 90 (Sewage and refuse disposal, sanitation and similar activities) irrespective of the number of employees, were also included in the survey. The reporting units for Table 3-23 were chosen municipalities (through the local authorities) classified under CZ-NACE group 751.

Tables 3-25 and 3-26. Environmental expenditure from central resources; incomes and expenditures of the State Environmental Fund (SEF)

SEF's incomes consist of various payments and charges and resources from the National Programme of Air Pollution Control (NPAPC), while SEF's expenditures include grants and loans.

The data were provided by the State Environmental Fund, the National Property Fund and the Ministry of Finance of the CR.

Table 3-27. Contamination of food with selected foreign substances

The choice of commodities, chemical elements and organic contaminants, made in cooperation with the Czech Agricultural and Food Inspection, was primarily directed to those substances whose acceptable daily intakes (ADI) established by the World Health Organization are comparatively high. The table gives the numbers of samples taken and their share (in % of total samples taken) which is off the hygienic limit.

The data in the table were provided by the State Veterinary Administration of the CR and the Czech Agricultural and Food Inspection.

Tables 3-28 and 3-29. Quality of surface and ground water

On 1 May 2004, the national standard ČSN 75 7111 was superseded by Decree No. 252/2004 Sb. of the Ministry of Health of the CR. To maintain the comparability in the time series, the data in Table 3-28 are retrospectively adjusted according to the limits and indicators laid down in the decree. Zinc, oil products and alpha activity given in previous years are not included in the decree.

The **limit value** of the indicator 'drinking water quality' is a value whose exceeding does not usually represent an acute health risk. Unless otherwise stated, the indicator gives the upper limit of permissible values.

The **maximum limit value** is a value of the indicator 'drinking water quality' whose exceeding excludes the water from being used as drinking water, unless otherwise decided by the public health protection authority.

The quality of groundwater is evaluated according to Decree No. 252/2004 Sb. of the Ministry of Health of the CR - Drinking water, as follows:

Chemical oxygen demand (COD_{Cr}): oxygen consumption determined by the dichromate method;

Chemical oxygen demand (COD_{Mn}): oxygen consumption determined by the manganese method.

The data were provided by the Czech Hydrometeorological Institute.

The indicators of the quality of surface water are expressed by an arithmetic mean and evaluated according to the national standard ČSN 75 7221.

Table 3-30. Pollutants discharged into watercourses and accidents on water sources

The quantities of pollutants discharged into watercourses are given in metric tonnes per year, separately for individual pollutants defined as follows:

- **undissolved substances:** substances determined by filtering water and drying up the residue to constant weight at 105° C;
- **dissolved inorganic salts:** substances which remain after the filtration of the water sample. They are determined by evaporating a filtered water sample and by drying up and annealing (at 600° C) the residue after evaporation. The residue is annealed to constant weight;
- **biological oxygen demand (BOD₅):** the amount of oxygen consumed by the aerobic biochemical decomposition of organic matter contained in water, over 5 days under standard conditions;
- **chemical oxygen demand (COD):** the amount of consumed oxygen (O₂) determined by the dichromate method.

Table 3-31. Watercourses and surface water abstraction under watercourse management organizations

Act No. 254/2001 Sb., the Water Act, put the decisive part of watercourses under the care of water management organizations – state-owned enterprises Povodí.

Length of watercourses (km) includes regulated, partially regulated and non-regulated watercourses and excludes drainage, irrigation and feeding channels.

Table 3-32. Water management works

Data on water management works are measured at five-year intervals only and include data from state-owned enterprises Povodí (River Basins), Lesy ČR (Forests of the CR), Magistrát hl. m. Prahy (Prague City Hall) – Environmental Protection Department (previously the data were reported by the enterprise Lesy ČR hl. m. Prahy (forests of the CR Capital City of Prague) and from Zemědělská vodohospodářská správa (Agricultural Water Management Administration).

Tables 3-33 to 3-38. Public water-supply and sewerage systems, public wastewater treatment plants (WWTPs), sludge production in WWTPs

The area of water-supply and sewerage systems embraces activities linked to the administration and operation of these systems, i.e. providing sufficient supply of good quality drinking water and removing sewage water, including its treatment.

Public water-supply and sewerage systems: water-supply and sewerage systems established and run in the interest of the general good.

Production of water: includes both invoiced and non-invoiced water. The sum of these two items may differ from figures for the total production by amount of water received from or supplied to other organizations.

Wastewater treatment plants are buildings and equipment used for treating wastewater in a mechanical, biological and/or another treatment stage. Equipment used for coarse pre-treatment of wastewater (rakes, sand traps, oil traps, etc.), cesspools and simple devices with mechanical function, which are not monitored and operated regularly, are not considered to be wastewater treatment plants.

The **capacity of WWTPs** given here refers to design capacities (in m³/day) or higher if implemented intensification measures that raised the design capacity have been approved by the water authority.

The data listed in Tables 3-30 to 3-38 have been obtained from the processing of CZSO questionnaires completed by watercourse management organizations and operators of water-supply and sewerage systems. Information on water-supply and sewerage systems has been collected from major operators. At present, a sample survey is also conducted to collect data from small operators and the data obtained are grossed up to regions and the country.

The data released in this chapter are comparable with those given in the statistical yearbooks of previous years. After five years is again included information on water management works (weirs, locks, water reservoirs).

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Other and more detailed information on the environment can be found in the following regular CZSO publications brought out according to the CZSO Catalogue of Publications 2006 (thematic group 2 – ENVIRONMENT, AGRICULTURE, subgroup 20 – Environment):

- “Waste Generation, Recovery and Disposal in the Czech Republic in 2005” (Czech-English) – September 2006
- “Information on the Environment in the Czech Republic in 2000-2005” (Czech-English) – November 2006
- “Water Supply, Sewerage and Watercourses in 2005” (Czech-English) – April 2006
- “Environmental Protection Expenditure in the Czech Republic in 2005” (Czech-English) – October 2006,

and in the “Statistical Environmental Yearbook of the Czech Republic” (Czech-English – a publication produced jointly by the Ministry of the Environment of the CR and the Czech Statistical Office.

Further data are published on the following web pages of the Czech Statistical Office:

http://www.czso.cz/eng/redakce.nsf/i/environment_zem

or of other institutions:

<http://www.cenia.cz/www/webapp-en.nsf/startpage>

<http://www.chmi.cz/indexe.html>

<http://www.env.cz/AIS/web-en.nsf/>

<http://www.ochranaprirody.cz/index.php?lang=en>

http://www.nature.cz/index.php?id_subjekty=en