26. ENVIRONMENT

Methodological notes

In total number of **protected areas** are included all categories of protected areas of a nature and of a landscape: protected landscape areas, national parks, natural reserves, national natural reserves, natural monuments, national natural monuments and protected areas.

Some protected areas from categories natural reserve, national natural reserve, natural monument, national natural monument and protected area are also located in the area of protected landscape areas or national parks, therefore their area is included into the area of these categories, too.

Penalties for air pollution as well as in the sector of water management, waste management and nature protection are imposed on legal and natural persons for breaking their duties provided by the relevant laws and administrative orders.

Environmental protection expenditures are financial resources spent in surveyed period on the building, purchase or acquisition of intangible and tangible fixed assets, used on protection of environment (i.e. protection of the air, waters, land and other factors of environment) as well as on the expenditures connected with this assets operation.

Intensity of **immission burden** in interaction with ecological factors is expressed by zones of endangered forests – categories A, B, C:

Zone A comprises areas with a strong long-term burden in the localities exposed to intensive air streams from immission sources (local and from long-distance pollutant transport).

Zone B includes areas under the same immission conditions as Zone A but under better ecological conditions in the localities partially protected against direct air streams from immission sources.

Zone C comprises areas under more favourable ecological conditions with a lower immission burden.

Endangered zones are those parts of forest ecosystems where intensity of burden together with ecological conditions and climatic factors causes their dynamic damages. Attributes of these zones are the level of immission burden and longevity of stands of a specific species composition derived from the model for mature spruce stands.

Degrees of damage to stands are derived from the state of stands and are based on the evaluation of defoliation and depigmentation of trees. A qualification scale of the international health monitoring is applied:

0 – Healthy trees, damage (0 – 10%)
1 – Slightly damaged trees (10.1 – 25.0%)
2 – Medium damaged trees (25.1 – 60.0%)
3 – Heavily damaged trees (60.1 – 90.0%)
4 – Dying and dead trees (90.1 – 100%)

Abiotic injurious factors (drought, wind, snow) are important from the point of view of volume of salvage felling. Together with immission produce conditions for further activation of biotic factors.

The most important biotic injurious factors are insect, vertebrate animals (mainly game) and fungal diseases.

Categorization of game to utility and damage causing game is from practical point of view relative and is important mainly from economic standpoint. For this reason a notion of "damage-causing game" started to be used under which belong individual game species (predators) that

cause damage to utility game (it is a component of the food chain). Breakdown of game into furred and feathered one is a species breakdown and is of biological importance.

Data on **waste** originating in the territory of the Slovak Republic are collected in accordance to the Act No 216/2021 Coll., amending the Act No 79/2015 Coll. on Waste, to the Decree No 194/2022 Coll. amending the Decree No 371/2015 Coll. implementing certain provisions of the Act on Waste, to the Decree No 320/2017 Coll. amending the Decree No 365/2015 Coll., establishing the Catalogue of Waste and to the Decree No 317/2020 amending and supplementing the Degree No 366/2015 on Record-keeping and Reporting Obligations.

The separate table shows the amount of municipal waste and similar waste not treated by municipality and which was produced in activities of legal or natural persons entitled to enterprising in particular branches of the economy of the SR.

Data on **emissions** balance the pollutants and the greenhouse gas from anthropogenic activities which are discharged into the air during the year. Balanced pollutants are nitrogen oxides (NOx), sulphur oxides (SOx) expressed as SO_2, ammonia (NH_3), non-methane volatile organic compounds (NMVOC), carbon monoxide (CO), particulate matter (PM_{10}) and fine particulate matter ($PM_{2,5}$). Greenhouse gases include carbon dioxide from fossil fuels (CO_2), carbon dioxide from biomass (CO_2 BIOMASS), nitrous oxide (N_2O), methane (CH_4), fluorocarbons (i.e. F-gases: HFCs, PFCs, SF_6). Emission inventory includes stationary and mobile sources in the energy, industrial activities, agriculture, transport, waste management and residential-municipal spheres. The emissions are balanced in accordance with international methodologies. The database of NEIS (National Emission Information System) is used by pollutants. Database enables comprehensive data collection and processing at various district offices, verifying the accuracy of the calculation of emissions from input data entered by the operator and the import into the central database NEIS CU at the Slovak Hydrometeorological Institute. Data collection is performed by a set of forms, or electronically using the module NEIS PZ. Provided overview of emissions is consistent with the methodology and classification used for air emissions accounts, by economic activity (NACE Rev. 2). This statistical categorization is uniform across Europe.

Air quality depends on the amount of emissions of air pollutants (concentration) of the various sources of air pollution and air quality is monitored by the National Air Pollution Monitoring Network (NMSKO).

The values of emissions and specific emissions in selected districts with the largest specific emissions in the energy and industry sectors were divided on the basis of available data from the National Emission Information System (NEIS), which contains data on large and medium-sized sources of air pollution (point sources). Emissions from transport were spatially distributed on the basis of data on the length of the road network and traffic intensity in individual regions of the Slovak Republic. The spatial distribution of emissions from household combustion was calculated on the basis of data on dwellings and fuel consumption in individual districts. Data on emissions from agriculture were divided according to detailed information on livestock breeding and fertilizer use, broken down into districts of the Slovak Republic. Emissions from landfilling of waste were divided according to the region in which the waste was generated and individual categories of waste according to the waste catalogue. The RISO information system was used to obtain data divided into districts. The share of waste in individual districts of the region was used from IS RISO. Emissions from composting were divided into districts based on population density. Emissions from waste incineration, biogas plants and wastewater treatment were divided into districts based on their location data from the NEIS database. Specific emissions are converted according to the area of the district per km^2.

Levels of **immissions in selected localities** are assessed on the basis of a continual measurement done at individual monitoring stations within the NMSKO network.

Data on regional air pollution are presented for the four monitoring stations (Chopok, Topoľníky, Stará Lesná, Starina), which are the part of the European monitoring network EMEP.

Levels of **surface ozone** in selected monitoring stations are assessed on the basis of the eight-hour concentration (time of measurement is from 9 a. m. to 5 p. m.). The target value for the protection of human health is 120 $\mu g/m^3$.

Regional pollution of precipitation informs on acidity and chemical composition of precipitation obtained from regional monitoring stations and from city station in Bratislava.

Water-supply and sewage systems include waterworks activities related to the administration and operation of water-supply and sewage systems, i.e. production and supplies of drinking water and drainage of sewage water and its purification.

Length of dikes protecting against flooding is measured in the axis of a dike and on each bank separately.

Values of individual pollutants drained off into the water courses are presented for the water companies as well as for the river-basin companies.

Values of the **water pollution** are shown for producers monitored by the water and sewage companies as well as river-basin companies.

Definition

Protected territory is geographically defined area determined or controlled and administrated for the purpose to achieve the specific objectives of protection.

Current expenditures are the sum of internal and external environmental expenditures.

Hunting ground is continual hunting land up to 500 ha at least.

Waste means a movable object or substance that the holder discards, intends, or is required to discard under the Act on Waste No 79/2015 Coll. or specific regulations.

Municipal waste is

(a) mixed waste and separately collected from household, including paper and cardboard, glass, metals, plastics, bio-waste, wood, textiles, packaging, waste electrical and electronic equipment, waste batteries and accumulators and bulky waste, including mattresses and furniture;

(b) mixed waste and separately collected waste from other sources, where such waste is similar in nature and composition to waste from households.

Municipal waste does not include waste from production, agriculture, forestry and fishing, septic tanks and sewage network and treatment, including sewage sludge, end-of-life vehicles or construction and demolition waste.

Waste treatment means a collection, transport, recovery (including waste sorting) and a disposal of the waste including a supervision on these activities and subsequent care for the place of disposal. Trader or intermediary activities are included. Waste recovery includes material recovery (recycling), energy recovery, composting and backfilling. The most common methods of waste disposal are landfilling and incineration (without energy recovery).

Mobile sources of air pollution are the road, railway, water and air transport means with explosion engine or other driving engines.

Stationary sources of air pollution are all the other sources emitting pollutants.

PM10 are dust particles with aerodynamic diameter of beads less than or equal 10 μm.

Regional air pollution is a pollution of the atmosphere boundary layer in the countryside sufficiently far from the local industrial and urban sources. Harmful substances in this layer of the atmosphere are getting involved into the global circulation.

Weir is an inflating construction damming up the riverbed or, exceptionally, valley that serves for formation of a reservoir to get a permanent or temporary inflation of the water for various

waterworks purposes.

Water reservoir is reservoir from which water offtake for public water supply is realized.

Controllable volume of water reservoirs is a total controllable capacity of reservoirs where it is possible, regardless of tributaries to the reservoir, to accumulate and to drain the water as necessary.

Retentive volume of water reservoirs is a controllable protective capacity of the reservoir.

Reserve volume of water reservoirs is a part of the total reservoir capacity that serves for improving flow and for securing water taking in drought areas.

Area endangered by floods includes the area that is endangered by the high water. High water is 10 years old water (Q 10) and 100 years old water (Q 100). We give approximate figures.

Area protected against floods includes the area that would be flooded because of higher flows of the water in water-courses in case that the retentive volume of reservoirs, adjustments to water courses or protecting dikes were not built.

Production of drinking water includes total amount of drinking water produced in own water management facilities under the administration of water companies and municipalities after adding an amount of drinking water taken from other water management organizations or from other water suppliers (legal persons) and after subtracting an amount of drinking water delivered free of charge to water management organizations.

Invoiced water includes the amount of drinking water sold to direct customers.

Non-invoiced water includes losses of the water in the pipe network, own water consumption or possible free water supplies, e.g. for fire protection purposes.

Waste water treatment plants are facilities purifying sewage water, applying mechanical and biological way of purification or the so-called third stage of purification applying mechanical and biological additional purification. Waste water treatment plants do not include facilities for rough pre-purification of waste water (sand-traps, oil-traps, etc.), septic tanks, cesspools and simple facilities that are not observed and served regularly.

Suspended solid pollutants are substances determined by water filtration and dehydration of the rest (on filter) at 105 °C to constant weight.

Biochemical oxygen demand (BOD) is the volume of oxygen consumed in aerobe biochemical decomposition process of organic compounds present in the water for the period of 5 days at standard conditions.

Chemical oxygen demand (COD) is a consumption of oxygen (O_2) by dichromate method.

Source

Data on protected areas and national parks are provided by the Ministry of Environment of the SR. Data on hunting ground, hunting and spring stock of game are taken from materials of the Ministry of Agriculture and Rural Development of the SR.

Data on municipal waste and environmental expenditures are the results of the statistical survey of the SO SR. Data on waste in the economy of the SR and data on municipal waste from other sources are taken from administrative sources of the Ministry of Environment of the SR. More detailed information can be obtained in the publication Waste in the Slovak Republic and Environment in the Slovak Republic.

All data on air quality are taken from the Slovak Hydrometeorological Institute.

Data on water management are obtained from Slovak Water Management Enterprise and Water Research Institute. Data on water quality are taken from the Slovak Hydrometeorological Institute and from the Public Health Authority of the SR.

Data on penalties imposed for breaking obligations concerning environmental protection are

obtained from the Environmental Fund.

More detailed information can be obtained in the organizations mentioned above as well as on the SO SR website in the section Statistics – Environment and in the public database of the SO SR DATAcube.