



Danube Facts and Figures

ROMANIA

(April 2020)

General Overview

Romania, a country of 238,397 km² and 19,405,000 residential inhabitants (on 01.01.2019, according to the National Institute of Statistics – N.I.S.), is almost entirely situated within the Danube Basin (97.4%). Romania represents 29% of the surface area of the whole Danube Basin, with a length of 37.7% of the Danube River flowing through its territory. The Danube River has a multiannual average flow of 6500 m³/s before discharging its waters into the Black Sea. The Romanian seaside of the Black Sea is lying on 245 km, between Musura (at the border with Ukraine) and the border with Republic of Bulgaria.

Romania has ratified the Danube River Protection Convention through the Law no. 14/1995 and has been a Contracting Party since 1998.

Topography

Romania's relief consists of three major levels: the highest one in the Carpathians (the highest peak Moldoveanu 2544 m), the middle one which corresponds to the Sub-Carpathians, hills and plateaus and the lowest one consisting of plains, meadows and Danube Delta. The Danube Delta, the youngest relief unit under permanent formation, has the average height of 0.52 m. The main features of relief units are proportionality (31% mountains, 36% hills and plateaus, 33% plains and meadows) and concentric display of these 3 relief units.

Precipitation, climate and water flow

Romania's climate is temperate-continental of transition, with oceanic influences from the West, Mediterranean ones from South-West and continental excessive ones from the East. The multiannual average temperature is latitudinal different, 8°C in the North and over 11°C in the South, and altitudinal, with values of -2.5°C in the mountain area and 11.6°C in the plain regions. Yearly precipitations have an average of 637 mm which decrease in intensity from west to east, from over 600 mm to less 500 mm in the East Romanian Plain, to about 350 mm by seaside, but in the mountainous areas they reach 1000-1500 mm.

The main running waters are radially displayed, most of them having the springs in the Carpathians. Their main collector is the Danube River, which are the border with Republic of Serbia and Republic of Bulgaria in the south on 1075 km length and flows into the Black Sea. The lakes are represented by natural lakes (diverse genetic types) spread in all major units of relief, from glacial ones in the mountains to river banks and maritime shores. Also, by damming the rivers, many reservoirs have been built with different uses. The Romania's surface water resources are yearly calculated at about 125 bill. m³, while the groundwater resources are estimated at 9.6 bill. m³. The length of cadastre river network comprises 78,905 km, being characterized by a very high spatial variability (average specific discharge between <1 and 40 l/s.km²) and very high temporal variability (Qmin/Qmax 1/1000÷1/2000).

The larger tributaries (>4000 km²) in Romania are: Tisa, Somes, Crisul Alb, Crisul Negru, Crisul Repede, Barcau, Mures, Tarnava Mare, Bega, Timis, Jiu, Olt, Vedea, Arges, Ialomita, Siret, Moldova, Bistrita, Trotus, Barlad, Buzau, Prut, Jijia.

Land use and settlements

Romania has considerable land resources. According to the statistics, 58% (14.63 mill. ha) is agricultural land; 34.82% forest and other land with forest vegetation (6.73 mill. ha); 1.52% waters (0.82 mill. ha) and 7% other land uses (1.62 mill. ha). Of the agricultural land, arable fields account 64%; pastures 22%; hayfields 11%; vineyards 2% and orchards 1%.

From administrative point of view, Romania is divided into 41 counties and the Bucharest municipality. There are inventoried 320 cities (of which 103 have municipality status) and 2,861 communes (12,957 villages) in Romania. Major cities are Bucharest (with over 2.15 mill. inhabitants), Constanta, Iasi, Timisoara, Cluj-Napoca, Brasov, Craiova, Galati, Ploiesti and Braila, with Black Sea ports at Constanta and Mangalia. The Danube ports include Moldova Noua, Orsova, Drobeta Turnu Severin, Calafat, Corabia, Turnu Magurele, Zimnicea, Giurgiu, Oltenita, Calarasi, Cernavoda, Harsova, Macin, Braila, Galati, Tulcea and Sulina.

Natural highlights

Almost 23% of the Romanian territory is part of Natura 2000 network of sites under the Birds and the Habitats Directives.

The *Danube Delta*, covering 6,750 km² (82 % in Romania – 4,178 km² and 18 % in Ukraine) is the country's most important protected area, being part of UNESCO's Man and Biosphere Programme and Ramsar area, World Heritage site since 1990, National Park (IUCN) and Natura 2000 site (SCI and SPA). Located in the Tulcea County, the Danube Delta is a low alluvial plain, mostly covered by wetlands and water, being formed by 3 large deltaic units (Letea, Caraorman and Dranov) and 3 arms (Chilia, Sulina and Sfantul Gheorghe) to which are added the deltaic lakes as well as channels and streamlets. It provides a diversity of habitats for more 5,200 flora and fauna species. The Danube Delta Biosphere Reserve covers 580,000 ha in Romania and is sub-divided into: core areas of highest value and conservation priority (8.7%); buffer areas (38.5%) and economic areas (52.8%) where the majority of the 15,000 Delta residents live (according to).

The *Iron Gates Natural Park*, located on the Danube River in SW Romania at the border with Republic of Serbia, is also one of the most beautiful natural areas of Europe with a vast biological diversity covering 115,666 ha. It includes 18 natural protected areas of national interest (natural reserves and nature monuments), the largest one being the wet area Ostrov–Moldova Veche.

The *Retezat National Park*, located in the Southern Carpathians, is a spectacular landscape of natural forests, alpine meadows, mountain peaks, gorges, screes and about 80 glacial lakes. Covering 38,047 ha, the area shelters one of Europe's last remaining intact old-growth forest and the continental largest area of pristine mixed forest. It has a very rich flora and fauna, with over 1,190 plant species (one third of the total found in Romania including over 90 endemics/local varieties) and over 50 mammal species (including bear, wolf, lynx and chamois). The site is notable as the first park in Romania (set up in 1935). In 1979 the Man and Biosphere Program

of UNESCO included the park in the international network of biosphere reserve.

Human uses of water resources

The yearly Romania's water resources (about 135 bill. m³) comprise: the Danube River (52%), inland rivers (36%) and groundwater (12%). According to the water balance, in 2017, a water volume of 6.86 bill. m³ was abstracted and used for different purposes, such as: 16.9% for human use (drinking water), 59.5% for industry (excluding hydropower) and 23.6% for agriculture (including irrigations).

▪ Flood risk management

Key causes of flooding in Romania include: heavy rainfall (c.100-200 l/m²); increased urban land use; developments in floodplains; reduced rivers beds capacity due to embankments and deforestation of large areas.

Romania has developed the first national Flood Risk Management Plan in 2015 and contributed to the first Danube Flood Risk Management Plan.

A connection between Floods Directive and Water Framework Directive for an integrated water management at the river basin level was established. Both EU directives also meet through the program of measures which contain structural flood mitigation measures along with non-structural and green measures. Multiple benefits of these measures can lead to potential solutions (win-win measures, Natural Water Retention Measures) for the implementation of both Directives provisions. Detailed descriptions of all planned measures are found in the National Flood Risk Management Plan and in the sub-units plans on the river basin level.

▪ Use of hydroelectric power

In 2018, Romanian electric energy production was split between thermo-power (42%, of which coal 28%, hydrocarbons 14%), hydropower (28%), nuclear power (18%) and wind and photovoltaic solar energy (12%). In 2018 a surface water volume of over 366 bill. m³ was used for hydropower production. Generally, these hydropower plants are located on the Danube River (Iron Gates I and II) and other tributaries (Olt, Arges, Somes, Bistrita, Lotru etc.). Specific measures are planned or implemented in order to mitigate the impact of hydropower infrastructure works and for improving the longitudinal continuity of rivers and hydromorphological conditions (ex. ecological flow, fish migrations conditions).

▪ Navigation

The Danube River is the main navigable route in Romania, being an international waterway. The Danube is navigable by ocean ships from the Black Sea to Braila (the maritime navigation river sector) with a length of 175 km. Navigation is a pressure on the Danube River, affecting river bed morphology and water quality due to the navigation maintaining works and accidental pollution risk. Also, the Danube - Black Sea and the Poarta Alba - Midia - Navodari channels ensure the connection with the Black Sea, being an artificial water body.

The Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin, developed by the ICPDR is used for ensuring sustainable development of navigation on the Danube River. In relation to accidental pollution risks, the Accident Emergency Warning System (AEWS) of the Danube River Basin is activated whenever there is a risk of transboundary water pollution, or threshold danger levels of certain hazardous substances are exceeded.

▪ Rivers as receiving waters for effluents

Many Romanian inland rivers, particularly those from mountain areas, remain undisturbed by significant anthropogenic pressures. The urban, industrial and agricultural wastewaters are discharged into rivers which are receivers of these waters. They also collect diffuse pollution via different pathways (surface run-off, erosion, atmospheric deposition etc.). Since the last decades, water quality has been improving due to new regulations based e.g. on the “polluter - pays” principle, but also due to large investments in wastewater infrastructure and BAT implementation. During both cycles of WFD implementation, different types of measures have been planned and applied in order to enhance the water bodies’ status and to restore their ecosystems.

▪ Use of groundwater bodies and surface water bodies: drinking water supply

Centralized drinking water supply is covering about 70 % of the total population, while the water is abstracted predominantly from surface waters (68%) followed by the groundwater resources. 3788 drinking water abstractions zones have been identified in 2018 within Romania’s river basins: 358 abstraction points from surface waters resources and 3430 from groundwater resources.

The rest of 30 % of population uses groundwater through individual wells. The drinking water abstraction are protected to avoid deterioration of their quality and to reduce the level of treatment in the process of drinking water production, by establishing protection zones.

Where groundwater resources are used, these generally do not require treatment.

Pressures on surface and groundwater bodies

The pressures and impact assessment is an important step of the river basin planning process and the National Management Plan (synthesis of 11 River Basin Management Plans) and its updates describes the methodological aspects and the results obtained.

▪ Organic pollution

Pollution with organic substances is mainly caused by direct or indirect emissions of insufficient treated or untreated wastewaters from human agglomerations, industrial or agricultural sources. At the end of 2019, 1,896 human agglomerations with 2000+ people equivalents (p.e.) were identified as potential significant sources of pollution, of which 198 with more 10,000 p.e.. The level of connection to the collective sewerage systems of p.e. is over 64%, while the connection to the urban wastewater treatment plants is about 61%.

Moreover, through the Large Infrastructure Operational Programme (LIOP) 2014-2020, the process of developing the sewer systems and wastewater treatment plants continues under Priority Axis 3 „The development of environmental infrastructure based on an efficient management of resources”.

The Romanian competent authorities (Ministry of Environment, Waters and Forests and National Administration „Romanian Waters”) are in process of implementation (2019-2020) of a national project with support of the World Bank experts, financed by European Social Funds 2014-2020. The main scope of the project is to support the national authorities in achieving the Urban Waste Water Treatment Directive (UWWTD) objectives, through revising the UWWTD Implementation Plan, development of a National Strategy for the Water Supply and Sanitation Sector and updating the national mechanism for monitoring, evaluation and reporting on

UWWTD implementation.

The status of the Danube River, Danube Delta and Black Sea depends considerably on the pollutant inputs from all Danube River Basin countries and in this respect a Joint Program of Measures (JPM) was developed and updated in the frame of the Danube River Basin District Management Plan (2009) and its update (2015). The JPM has foreseen the measures which are planned for reaching the agreed visions and management objectives for organic, nutrient and hazardous substance pollution.

- Nutrient discharge

Point sources of nutrient pollution are similar to those for organic pollution. In terms of human agglomerations, since 2005 Romania has declared its entire territory as a nutrient-sensitive area thus ensuring environmental protection from the negative effects of urban wastewater discharges.

Diffuse sources, in particular human agglomerations without collection systems and agriculture activities contribute to nutrient emissions to both surface waters and groundwater. Since 2013, whole territory approach is applied for implementation of the Nitrates Action Programs for protection of waters against nitrates from agricultural sources. To quantify nutrient emissions from different sources, a modelling tool was applied (MONERIS model).

The measures under implementation have been contributing to the reduction of nutrient inputs into Black sea waters, but further efforts are still needed, since the transported loads to the marine environment are still higher than those of the early '60s, which indicates a further load reduction potential. The achievement of the nutrient vision at the basin-wide level requires further implementation of measures for reduction of point and diffuse sources pollution.

- Priority substances

Priority substances are discharged to water resources from point sources of pollution (industry, mining activity, and urban wastewater sector) and from diffuse sources (in particular agriculture and old contaminated sites).

At the sub-basins level, several basic and supplementary measures have been implemented or are being implemented, in order to reduce or phasing out pollution of waters with the priority substances and priority hazardous substances.

The Inventory of emissions, discharges and losses of priority substances was developed for the first time in the 2nd RBMP, according with the EQSD requirements. This inventory is an effective tool for water authorities to identify sources of pollution, to establish adequate monitoring programs, to identify and establish proper measures for addressing hazardous substances emissions and achieving good chemical status of all surface and ground water bodies.

- Hydromorphological alterations

Different infrastructure works built on water or related to water for ensuring different uses, such as flood protection, hydropower generation, water supply, navigation, during the time led to significant changes in the surface water bodies' hydromorphology. The hydromorphological alterations have an impact on the surface water bodies' ecological status by interrupting their longitudinal and lateral continuity and changing the natural hydrological regime and morphological conditions.

Based on specific criteria, several categories of works have been inventoried in the National Management Plan – Update 2015 that act as potential significant pressures, respectively: dams and reservoirs, derivations and regularization channels, embankments, water intakes, dykes and

other flood protection works etc. Approximately 18 % from total surface water bodies not achieve good ecological potential due to river continuity and morphological conditions or hydrological regime.

Status and Impacts on surface and groundwater bodies

The assessment of ecological status/potential and chemical status of surface water bodies and quantitative and chemical status of groundwater is used in the river basin planning process together with pressures analysis for identification of water bodies failing to achieve the environmental objectives. The results of this process, as is showed in the National Management Plan – Update 2015, are below indicated, considering the water bodies' categories:

- Rivers' water bodies (2737 water bodies)

Ecological Status/Potential:

- good and better: 66%
- moderate and worse than moderate: 34%

Chemical Status:

- good: 98%
- other than good: 2%

- Lakes' water bodies (284 water bodies (lakes and reservoirs))

Ecological Status/Potential:

- good and better: 62%
- moderate and worse than moderate: 36%
- unknown: 2%

Chemical Status:

- good: 95%
- other than good: 5%

- Transitional water bodies (2 water bodies)

Ecological Status/Potential:

- good and better: 0%
- moderate and worse than moderate: 100%

Chemical Status:

- good: 0%
- other than good: 100%

- Coastal water bodies (4 water bodies)

Ecological Status/Potential:

- good and better: 0%
- moderate and worse than moderate: 100%

Chemical Status:

- good: 100%
- other than good: 0%

- Groundwater bodies (143 water bodies)

Chemical Status:

- good: 90%
- poor: 10%

Quantitative Status:

- good: 100%
- poor: 0%

Measures

At the national level, based on pressures and impacts analysis and status assessment of water bodies, effective measures have been established and implemented, according to the DPSIR approach.

Specific basic and supplementary measures are applied for each significant water management issue identified (organic pollution, nutrient pollution, pollution with priority / hazardous substances and hydromorphological alterations), as previous described. The basic measures have been applied for all water bodies with potential significant pressures and for prevention of deterioration of water bodies' good status. In case of water bodies that are still at risk of failing environmental objectives, supplementary measures have been identified and are under implementation.

These measures are targeted to address point and diffuse pollution sources (human agglomerations, industrial and agricultural sources) mainly through building, development, upgrading collection and wastewater treatment systems, application of BAT, action programs, codes of good practices, plant protection products regulations. Also measures for restoring and improving longitudinal and lateral connectivity and hydromorphological conditions of water bodies are under implementation.

In the frame of the approved program of measures of the first planning cycle (2009-2015), the implemented basic and supplementary measures were estimated at about 9.1 bill. Euro, while for the measures planned in the second National Management Plan (2016-2021) the national financial effort is of about 15 bill. Euro.

For further detailed information on the national program of measures, the National Management Plan and the 11 River Basin Management Plans – Update 2015 can be consulted.

Web-links

<http://www.rowater.ro/SCAR/Planul%20de%20management.aspx>

<http://www.rowater.ro/PMRI/Planul%20de%20Management%20al%20riscului%20la%20Inundatii.aspx?PageView=Shared>

<https://insse.ro/cms/>

<http://www.ddbra.ro>