

FRESHWATER COUNTRY PROFILE

ROMANIA

Decision-Making

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Decision-Making: Sustainable development. The endeavour to incorporate the philosophy of sustainable development in any national or local development strategy is essential for Romania to cope with the requirements of, and fit into, the complex world we live in today. According to the Law on Environmental Protection No. 137/1995, republished, each ministry is obliged to establish its own environmental management and develop the relevant environmental strategies. In this respect, the Ministry of Environment and Water Management acts as a supervising authority. The Ministry of Environment and Water Management (MEWM) exercise the overall management of sustainable development. A special law, but not yet functioning, set up national Council for Environment and Sustainable Development (NCESD). All central public administration authorities are represented in this Council. It is also open to: all para-statal bodies and institutions; academic for a; and other organizations including the private sector that are interested in national socio-economic development. The mandate of NCESD is as follows: to promote the accomplishment of the objectives of AGENDA 21 on national plan, through elaborating and implementing the national and local AGENDA 21; coordinated at the national level by National Centre for Sustainable Development (NCSD) as Executing Agency of UNDP Romania; to represent a promoter and a warrant of changing towards sustainable development through the accomplishment of a social consensus based on a dialogue between authorities and civil society, in the process of elaborating and making decisions for a sustainable development; and to ensure a permanent institutionalized frame to fulfil the mandate. Environmental protection matters are particularly complex and concern all the economic, social, and political sectors. The appropriate solution to these matters demands the participation of: all those interested in environmental protection; the public and its elected representatives; non-governmental organizations; and polluters as well as the state structure.

The Ministry of Agriculture, Forests and Rural Development (MAFRD) are responsible for policies, strategies and legislation on agriculture and forest at national level. As for the integration of ecological concerns into agricultural and forest practices, both the MAFRD and the MEWM participate in interministerial commissions with other ministries (in particular the Ministry of Health) dealing with issues of common concern. The Ministry of Transport, Constructions and Tourism (MTCT) with its State Secretary for Transport is now responsible for the development of policy and legislation on transport-related emissions to air. It has issued legislation transposing the EU directives on vehicle emission and the roadworthiness of vehicles. There are inter-ministerial committees for road transport and for railway transport with their respective ad-hoc sub-groups dealing with legislative and regulatory projects; the MEWM participates in these groups. The Ministry of Economy and Commerce is responsible for fuel-quality policy and legislation. The Ministry of Environment and Water Management has overall responsibility for the environmental aspects of energy production and consumption. It cooperates with the environmental departments and agencies of other ministries, such as the Department of Energy of the Ministry of Industry and Mineral Resources and the Institute of Power Studies and Design. The national development plan (NDP) for 2000-2002, elaborated by the former Ministry of Development and Prognosis by means of a broad partnership with national and regional, governmental and non-governmental bodies involved in regional development, establishes among the strategic sector priorities the protection and improvement of the environment. The formal responsibility for public health, including environmental health, lies with the Ministry of Health (Law on Public Health Care, No. 100/1998). The County Directorates of Public Health in all 42 counties (one for each of the 41 districts and a separate one for Bucharest) carry out the activities at regional level. These activities include: monitoring environmental hazards (air quality, water quality, food, housing, noise, waste, radiation and hygiene at the workplace); and issuing permits for all the activities with a potential health impact.

Water resource management. The Ministry of Environment and Water Management (MEWM) carries out national water strategy and policy in the water resources quantitative and qualitative management field. The specific functions of the Ministry include: strategic planning including the elaboration of water management and development national programmes; preparation of legislation and policy; responsibilities for transposing and implementing EU aquis; allocation and management of national

budget resources for water management and development; setting the standards as well as the controlling and monitoring of compliance with; preparation of administrative process for regulated use of water resources through the system of license and permits; and international cooperation and cooperation on transboundary water bodies. National Administration “Apele Romane” (NARW) carries out the implementation of the national water strategy and policy, the quantitative and qualitative water management as well as the operation of the water management structures. This Authority has 11 regional branches organized according to hydrographic river basins of Romania. NARW has responsibilities for issuing licenses and permits as well as for the monitoring of water quality and emissions.

In Romania the water management is based on the principle of human solidarity and common interest through the close, all level collaboration and cooperation of the public administration, water users, representatives of the local communities and population, in order to obtain the maximum social benefit. Therefore, the Basin Committee is organized at each river branch of the “Apele Romane”, consisting of 15 members.

The general legislation and regulatory framework for water management is the Environmental Protection Law no. 137 of 1995 and the Water Law no 107 of 1996. The Environmental Protection Law has general provisions related to water resources protection and established the regulation of economic and social activities having an environmental impact, respectively the permitting procedure. The Water Law is the fundamental legal act on water management in Romania. This law covers all waters bodies with exemption of mineral and geothermal waters. The Law states that the waters are the integral part of public patrimony. The protection, reevaluation and sustainable development of the water resources are actions of general interest. The Law has established the ownership of water, keeping the major water assets as public domain. The provisions of the law have the following objectives: the conservation, development and protection of water resources, as well as ensuring of free water flow; protection against any form of pollution and modification of the characteristic of water resources, of their banks and beds or basins; the restoration of the surface and ground waters quality; the conservation and protection of the aquatic ecosystems; the ensuring of drinking water supply to population and public sanitation; the complex valuation of waters as economic resource and rational and balanced distribution of such resource; prevention and control of floods and of any other dangerous hydro-meteorological phenomena; and the ensuring of water requirements for agriculture, industry, power generation, transport, aquaculture, tourism, recreation as well as human activities. The 1996 Water Law also establishes the river basins concept management of water resources both surface and groundwater. Any water use is subordinated to obtaining a license and permit. Such licenses are also needed for wastewater discharges into water bodies, drainage water from deposit and mine. The law also states that the water supply for population prevails over the use of water for others purposes. The Law provides for establishing protecting zones if needed and River Basin Committee.

The Water Law 107/96 will be amended in order to transpose the provisions of the Water Framework Directive 2000/60/EC. The amendments were proposed by the MWEM and are under discussion with the other involved ministries.

The details of “water resource use regime”, standards, norms, etc. according to the Romanian legislation system have to be set up by Governmental Decisions or Ministerial Orders. The most important pieces of the secondary legislation have been introduced by transposing the EU Directives related to waters, as follows:

- GD 964/2000 concerning the approval of Action Plan for the protection of waters against nitrates from agriculture sources
- GD 459/2002 concerning the quality of bathing water
- Law 458/2002 concerning the quality of drinking water

- GD 118/2002 concerning the approval of the Action Programme on the reduction of pollution of the aquatic environment and groundwater caused by certain dangerous substances
- GD 202/2002 for the approval of the Technical Norms on the quality of fresh waters needing protection or improvement in order to support fish life
- GD 201/2002 for the approval of the Technical Norms on the quality required of shellfish waters
- GD 188/2002 on the approval NTPA 011, 001 and 002 regarding the discharging conditions of urban waste water into the aquatic environment
- GD 100/2002 for the approval of the Technical Norms on the quality required for surface waters intended for abstraction of drinking water, NTPA 013, and of the norms concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water NTPA 014

The responsibility for drinking water supply, wastewater disposal and treatment belongs to the local authorities. The water users are obliged to prepare and apply, if necessary, their own plans for prevention and control of accidental pollution that might occur as the result of their activity.

In Romania there is a unitary economic mechanism for the water management products and services, which consists of: prices; tariff; penalties; and allowances (bonus) – water charges. They aim at a rational and economical management of waters so that the users may follow the quality limits admitted for water discharges for preventing the exhaustion of the water resources and avoiding the damaging of their quality. The prices are the same all over Romania, but differ according to the source of water (inland rivers, Danube River, ground water) and the category of users (industry, households, power plant, agriculture, fisheries). The tariffs are levied on a set of emission charges on water pollution aimed at reducing the pollutants in the river flows on the limits set by the law. If the limits are exceeded, fines or penalties are levied. The penalties are levied for the non-compliance with the permits or contracts, both for water intakes and discharges for wastewater. The purpose is to reduce the environmentally harmful impacts of certain activities and to enforce the users to respect the provisions of the permits. The penalties are used as a source of Fund for Environmental Water Management. The income from all water charges is used to cover the cost of operation of “Apele Române”. It does not include any financial resources for development of infrastructures “Apele Române”. Its consumers pay drinking water, which is supplied, to the population by the municipal water supply systems. The tariffs for water supply and sewerage services differ individually in municipalities. Water Law no 107 of 1996 and Emergency Ordinance 107/2002 approved through the Law 404/2003 deal with pricing policy for all sectors.

National Administration "Apele Române" has activities and responsibilities concerning the application of specific economical mechanism in quantitative and qualitative water management; the complex valuation of waters as economic resource and rational and balanced distribution of such resource, carrying out of the specific water management services on contract basis; the ensuring of the specific function of unique services operator in water management field; proposal for tariffs for water management specific services and updating according to the current legislation.

The situation undergoes changes. Romania transposed the EU legislation covered by the Aquis Communautaire, including the European Union Water Quality Directives, and also the EU Water Framework Directive will be transposed through the amended Water Law. A key problem is to obtain derogation periods for those directives that call for “heavy investments.” For the transposition of EU Water Directive according to the Ministerial Order no. 913/15.10.2001 were approved the framework content of Water Management Plan in hydrographic basins and the Action Plan on 2002 for the implementation of the Directive. With regard to a policy for disaster preparedness there are commissions that operate at the national and local level as specified in the Law for Natural Disaster Preparedness no 124 of 1995.

Programmes and Projects:

A. Integrated Water Resources Development and Management: Programmes and projects in operation include: Pilot programme on transboundary waters to the 1992 Convention on protection and use of transboundary watercourses and international lakes; Programmes for the implementation of the EU Directives in the water field (mainly the Water framework Directive); Black Sea GEF Programme; PHARE Regional River Management Project and Delta ECO Activities Project - collaboration with the EU; etc. See also under G. Impacts of Climate Change on Water Resources.

Management of Forest: Now is in course of preparation the first draft of Development Forestry Programme for the next 5 years, starting with 2002, with US\$ 28 million provides by World Bank credit. This programme contributes to maintain and improve forest sustainable management, in concordance with National Sustainable Development Strategy and Agenda 21. Its most important components are to: provide sustainable management of private forest by capacity building of local forestry inspectorates and development of IT system for forest management and monitoring; build roads in order to facilitate access to the 2 million ha of mountain forests which are presently inaccessible in order to put better use the resources offered by forests; set up Center for Business Information in the field of forestry; and public involvement in sustainable management of forest. The implementation of the programme is the responsibility of the Ministry of Agriculture, Forests and Rural Development and National Forest Administration, in collaboration with non-governmental organizations and local communities.

Integrated management of coastal areas: Major programmes at the national level include: the Programme of Measures and Actions for the Protection and Rehabilitation of the Coastal Zone against Erosion, finalized and approved through Governmental Decision 164/2004; the National Plan for Preparedness, Response and Cooperation in case of accidental marine pollution with hydrocarbons, approved through GD 1592/2003; and the National Strategy and Action Plans for Biodiversity Conservation and Sustainable Use of its Components. At the regional level, the major programme is the Black Sea Environment Programme/GEF.

Major projects and activities underway, or planned to address the issues cited above include the following: assessment studies for decreasing the local sources of pollution; technical and functional refitting of Constanta harbor, in particular, those activities related to the wastes disposal and processing; implementation of the National Plan in case of accidental marine pollution with hydrocarbons; building of an institutional framework for carrying out all the management measures for the coastal zone established by the National Strategic Action Plan for the Black Sea; treatment station with incinerator facility for oily wastes on the petrochemical platform of the "PETROMIDIA" Company; modernization and extension of the Constanta Sud urban waste water treatment plant; collecting, storing and treatment technologies from waste water resulting from ships and Constanta Oil Terminal storage tanks; and modernization of the Constanta Nord urban waste water treatment plant and Mangalia urban waste water treatment plant.

B. Water Resources Assessment: Pilot project "Guidelines on monitoring and assessment of Mures transboundary river (Romania-Hungary)" is being implemented. Monitoring of lake pollution levels is also in place. Water quality is measured at point sources of pollution.

For specific monitoring of agricultural pollution caused due to diffuse sources, the recently issued Ministerial Order of the minister of agriculture, forests, waters and environment 1072/2003 approved the organization of the National Integrated Survey, Control and Decision Support Monitoring for reducing pollutants from diffuse agricultural sources within surface and groundwater, which is part of the Water National Integrated Monitoring System, managed by the National Administration "Apele Romane".

Water monitoring for nitrates will have a focal point connected with local systems for surveying and monitoring through informational network.

The monitoring programme for surface and groundwater quality concerning pollutants (nitrates) from diffuse agricultural sources will be finalized by National Administration “Apele Romane” and should be implemented within the Water National Integrated Monitoring System, on basin level. The existing monitoring network should be extended with additional sampling sections in areas supposed to exceeding pollution loading due to agricultural sources.

For surface water (rivers, lakes, transitional and coastal waters) both monitoring and assessment of chemical and biological status (biological elements, hydro-morphological and fizico-chemical elements – including specific trophic status elements) are carried out. According to the Law 458/2002 on drinking water quality, monitoring parameters are the same with those of the Drinking Water Directive 98/83/EC. The Ministry of Health, through the territorial Health Directorates has the responsibility to assure water quality monitoring for the output of treatment plants.

The list of the monitored parameters include the followings: total coliforms, fecal coliforms, fecal streptococci, residual chlorine, taste, color, smell, turbidity, total hardness, oxydability, ammonia, nitrites, nitrates, iron, aluminum, etc.

Monitoring program has the following scheme: 1 sample per month for population more than 5,000 inhabitants; 1 sample for every 5,000 inhabitants, every 5 days, for population between 5,000 and 10,000 inhabitants; 1 sample per each 10,000 inhabitants plus 10 additional samples, on daily basis, for population of more than 100,000 inhabitants.

According to the Ministerial Order 768/2000, of the minister of health, the monitoring results are gathered within an annual report on water quality in urban localities. According to report from 2000 developed for the 257 municipalities, which cover about 51 % of the total population, the following are revealed:

- 14.7 million inhabitants (65 % of the total population) are connected to a public water supply system out of which about 11.3 million inhabitants are living within rural areas (around 90 % of the urban population), and 3.4 million inhabitants within rural areas (around 33 % of the total rural population);
- out of the total samples, fecal biological parameters (total coliforms and fecal coliforms) exceeded the limits for 3 % respectively 1 % of the samples; and for chemical parameters the limits were exceeded for 3-5 %.

C. Protection of Water Resources, Water Quality and Aquatic Ecosystems: The Joint Action Programme for the Danube River Basin January 2001-December 2005 has identified as key priorities for implementation 10 “hot spots” in municipal waste water treatment, of which the one of Bucharest, 7 “hot spots” in industrial effluents control, 3 “hot spots” in agricultural pollution, and a number of “hot spots” related to pollution and potential accidental pollution caused by waste deposit sites and tailing ponds. The Danube Pollution Reduction Programme also contains objectives aiming at protecting the Black Sea and the Danube Delta against pollution by nutrient and hazardous substances.

The Green Corridor Programme comprises the lower Danube flow and was initiated by Romania, together with the Governments of Bulgaria, the Republic of Moldova and Ukraine. This will be the largest transboundary wetland protection and restoration attempt in Europe.

UNDP organized a training workshop on the management and prevention of water pollution incidents in the Somes-Tisa region for experts from government and from pollution hot spots.

Policy and economic instruments that are applied to discourage unsustainable and encourage sustainable consumption and production patterns. There is a water pollution non compliance fee and there are also financial mechanisms for the completion, modernization and rehabilitation of water quality improvements (water supply, wastewater treatment plant, sewage systems and networks, etc.) These mechanisms include State subsidies, government-guaranteed loans and exemption from import duties on environment technology.

Transboundary river basins, Danube and the Black Sea: Some hydro-technical projects are co-funded through grants from the PHARE-Cross Border Cooperation programme, such as in the Cris, Tisza, Tur, and Barcau river basins. To address the problem of eutrophication in the Black Sea, two GEF-UNDP project proposals on nutrient reduction measures (for the Danube and Black Sea basins) are pending. GEF-World Bank is currently supporting an agricultural pollution control project in the area of Calarasi, to reduce nitrate inputs into the Danube and the Black Sea.

Protection of aquatic ecosystems: On the “World Heritage List”, Romania was put down with approximately 45% of the Danube Delta; the Convention on wetlands of international importance especially as waterfowl habitat (Ramsar, 1971), ratified by Law 5/1991. The Danube Delta was declared Ramsar Site.

D. Drinking Water Supply and Sanitation: The oldest pre accession programme, PHARE, has been of major importance for Romania in the past few years. PHARE is still gaining importance and between 1998 and 2000 the MEWM implemented projects co funded by PHARE-Environment (total budget US\$ 10.8 million), PHARE Cross Border Cooperation (total budget US\$ 9.2 million) and PHARE Multi Country Programme (total budget US\$ 18 million). Within PHARE Environment, there is a component for strengthening the capacity of the MEWM. As part of this cooperation, two “twinning projects” are being implemented jointly with France (water quality) and Germany (waste management). Other relevant programmes and projects include: PHARE CBC Programme; ISPA Programme.

ISPA application refers to: the development and rehabilitation of wastewater treatment plants (Valea Jiului-Danutoni, Arad), the rehabilitation, modernization of sewerage and wastewater treatment plants (Craiova, Constanta, Timisoara, Braila, Oradea, Brasov and the neighboring localities, Focsani) the modernization, rehabilitation of water supply and sewerage networks (Pascani, Iasi, Cluj Napoca, Sibiu); the rehabilitation, modernization of water supply and sewerage systems, and wastewater treatment plants (Targu Mures, Satu Mare, Piatra Neamt).

Due to highly decentralized approach of public administration and high degree of local autonomy, the main line of the implementation of the National Environmental Health Action Plan (NEHAP) goes through the Local Environmental Health Action Plans (LEHAP). The local Plans are representing the opportunity for collaboration and partnership with the local authorities, in the framework of Agenda 21, and the environmental protection institution. Iasi city is one of the examples. There is a document at the level of the Municipal Council regarding the strategy of urban development of Iasi city. In this document there are proposals on specific domains as environmental protection and environmental health. They refer to the water supply of the villages, which will be integrated in Iasi city, to rehabilitate Timisesti and Prut sources of drinking water and to improve the supply network. There also exists a BERD loan, for the improvement of the sewage treatment plants with a Manessman technology.

E. Water and Sustainable Urban Development: Inland waterway network has: 6,5 km/1000 km² and is situated in South and South-East of Romania; 1.609 km length from what 1075 km Danube, 91 km internal waterway (Danube – Black Sea Channel and Poarta Alba – Navodari Channel). There are 35 waterways and marine ports.

F. Water for Sustainable Food Production and Rural Development: Irrigation water is subject to monitoring and evaluation before irrigation period. However, no data from this monitoring are available at national level. See under G. Impacts of Climate Change on Water Resources.

G. Impacts of Climate Change on Water Resources: *Climate vulnerability*: Romania has 21 project proposals for financing from international Convention To Combat Desertification In Countries Experiencing Drought And/Or Desertification, Particularly In Africa, or other credits amongst which are the following: “Sands fixing and environment conditions improvement by the forest vegetation use in Dabuleni area (Oltenia)”; “Improvement of the structure and functionality of the Dobrogean landscape”; “Ecological reconstruction of the forests affected by the phenomenon of dry, from the arid area of the south-west of Romania”; “Investigation of the soil erosion phenomena, land degradation and sediment yield within the Tinoasa-Ciurea pilot basin, aiming to information transfer at the Moldavian table scale”; “Mitigation of land degradation processes in Subcarpatians induced by deforestation, inappropriate agriculture practices and pollution”; “Farmer-adviser-researcher monitoring, simulation, and communication for best dry-land-cropping practice in drought affected areas of Dobrogea and South Moldova”; “Drought monitoring and mitigation in the south part of Oltenia, using agro-meteorological and remote sensing data integrated in a GIS”; “Assessment of aridisation-desertification processes in Northern Dobrogea by hydrological modeling at time and space micro-scale”; “Integrated management of the landscape belonging to the areas in Southern Moldavia and Northeastern Baragan-Romania, territories subject to the aridization/desertification/degradation phenomenon”; “Integrated monitoring of the hydrologic regime, of the water resources and of lands degradation in drought circumstances in Oltenia area”; “Water management of soil in land reclaimed agroecosystems for the irrigation pilot plot of” “the Calafat-Bailesti,” “the Carasu,” and “the Calmatui-Gropeni-Chiscani” systems “under the new conditions of the private Romanian agriculture and the aridity and waste land phenomena control rehabilitation”; “Completion of Sadova-Corabia land reclamation system with forestry, orchards and/or mixed shelter-belts in Dabuleni area”; “Accommodation of Boianu-Sticleanu surface drainage system under reversible working conditions (for irrigation) for a better control of the freatic level and for making a favorable microclimate to improve the waste land and aridity tendencies”; “Rehabilitation of the affected surfaces by the dryness and waste land phenomena from the Subcarpathian area”; “GIS for drought and dryness phenomena monitoring in the south-western part of Romania”; and “Correlation of the hydro improvement works with the agro-forestry measures”: “in Dobrogea and Southern Moldavia, and on the sandy soils of Oltenia and Western Plain for preventing and decreasing the negative effects of desertification” and “Influence of the climatic changes on yields and crop water consumption and on irrigation systems functioning within the zones with desertification potential in Romania.”

Status: *Socio-economic aspects*: Demographic and health characteristics of Romanian population are as follows: *Population dynamic*: The population of Romania is 22,435,205 million people in 2000, 3.2 % less than in 1990, which is due to the negative natural growth (since 1992) and out-migration. The population is getting older, with the proportion below 15 years of age decreasing (from 23.6 % in 1990 to 18.26 % in 2000) and those 65 years of age or older increasing (from 10.4 % to 13.3 %, respectively). This dynamic of ageing is faster in Romania than in Central and East European Countries on average, with a faster approximation of EU age structure. However, the proportion of young people is still by 2 % greater and of older by 3 % smaller in Romania than EU average. 54,6 % of the population lives in cities, and almost 10% are residents of Bucharest. This percentage of urban population is much lower than European average (73 %). Average population density (94.1 people per sq. kilometer) is low, at the level of 87 % of Central and East European Countries average, and 53 % of EU average. In recent years, migration from urban to rural areas was higher than in the opposite direction.

Mortality: After a decline by more than 1 year over the period 1992-95, life expectancy increased again reaching 70.6 years in 1999. It is still one of the lowest levels in Europe, shorter than Central and East

European Countries and EU averages by, respectively, 2.0 and 7.9 years. Within the country (for 1998-2000), the differentiation of life expectancy in the districts was rather small: from 63.26 to 68.88 years in men (Satu-Mare vs. Bucharest), and from 71.69 to 75.96 in women (Satu-Mare vs. Bucharest and Covasna). Infant mortality (20.5 deaths per 1000 live births in 1998 and 18.6 in 2000), though declining, remains at a very high level. In 2000, it was 1.6 times greater than Central and East European countries average and 3.5 times greater than in EU. Within the country, the rate varied from 12.2 (in Vilcea) to 28.3 (Bacau district) in 2000. Respiratory infections are leading cause of the infant deaths. In Bihor district, deaths due to digestive system diseases are 10 times more common than in the other districts (5.0 per 1000 live births, vs. 0.6 national average), contributing substantially to the high level of infant mortality in that district. The post-neonatal mortality (9.98/1000 in 1999) is also high in Romania, 1.9 times more than Central and East European Countries average and 5.5 times more than EU level. Post-neonatal mortality was twice as high in rural than in urban areas (13.0 vs. 6.6 deaths/1000), which is significantly greater than that of mortality in the 1st month of life (8.8 vs. 8.3/1000), indicating that the sanitary/hygienic conditions, as well as access of children to effective medical care are poorer in rural areas.

Land: The inventory carried out in the framework of the National soil Quality Monitoring System (organized by Research Institute for Soil Science and Agro chemistry) shows that about 12 millions ha of agricultural land. The inventory carried out in the framework of the National Soil Quality Monitoring System shows that about 12 millions ha of agricultural land of which 9,3 millions ha arable land are more or less affected by one or several limitations. The influence of these limitations deteriorates the characteristics of soil functions that affect the soil bio-productivity capacity as well as the yield quality and food security with severe consequences on the soil quality.

The main restrictive factors are: 7,100,000 ha frequent drought, 3,781,000 ha periodic excess of water-logging, 6,300,000 ha water soil erosion of which 702,000 ha landslides, 378,000 ha wind soil erosion, 614,000 ha soil salinity, 3,437,000 ha moderate and strong acidity, 8,620,000 ha low and very low, humus content 625,800 low and very low available phosphorous content, 5,088,000 ha low nitrogen content, 781,000 ha low available potassium content, 1500000 ha zinc deficiency, 900,000 ha chemical soil pollution, 50,000 ha pollution with oil and brine, 30,000 ha disturbed by various works, 18,000 ha covered with solid wastes.

Chemical soil pollution affects about 0.9 million ha, of which 0.2 million ha excessively polluted (pollution with heavy metals, acid rains, etc.). The main negative effects of pollution with heavy metals and acid rains consist in soil chemical composition alternation due to the accumulation of emission elements, soil acidification with 1-3 pH units, leaching of exchangeable bases, mobilization of high amounts of exchangeable Al with a toxic effect on plants, severe decrease of nutrients, especially mobile phosphorus, leading to poor plant fruiting, deregulation of microbiological activity decrease of bacteria population and dehydrogenises activity, increase of fungi population and index of colonization with micromycetes) leading to the decrease of humification rhythm of organic matter, excessive heavy metal accumulation in plants, etc. This type of pollution is present on important land areas in the zones of Baia Mare, Copsa Mica, Zlatna, etc. The total area affected by pollution in the Copsa Mica region covers approximately 180,750 ha, of which 31,285 ha forest and 149,465 ha agricultural lands. The severely polluted area, where at least one pollutant exceeds the maximum allowable limit (100 mg.kg⁻¹ Pb, 100 mg.kg⁻¹ Cu, 300 mg.kg⁻¹ Zn and 3 mg.kg⁻¹ Cd) covers 21,875 ha, of which 3,249 ha forest and 18,630 ha agricultural lands. Within the severely polluted area, the total forms (extraction with a mixture of HNO₃-HSO₄-HClO₄ at 2: 1:0.2 ratio) of heavy metals exceed the maximum allowable limits, that is: 3-30 times (Pb), 2-32 times for Cd, 2-3 times (Zn) and 2-4 times (Cu). Excessive contents of Pb, Cd, Zn and Cu in leaves of sugar and forage beat, maize, potatoes and winter wheat were detected with polluted area. For example, the contents in sugar beat leaves had contents of: 30-115 mg.kg⁻¹ Pb, 4.3-13.5 mg.kg⁻¹ Cd, 105-

167 mg.kg⁻¹ Zn, 12-30 mg.kg⁻¹ Cu, and in maize leaves was: 25-107 mg.kg⁻¹ Pb, 1.2-19.8 mg.kg⁻¹ Cd, 52.5-162.5 mg.kg⁻¹ Zn, and 10-37.5 mg.kg⁻¹ Cu.

In Zlatna area the acid deposition totally destroyed the vegetation on more than 2000 ha, which caused very intense processes of erosion and landslide. Other 3000 ha are subjected to degradation processes and heavy metals pollution has a moderated intensity on other 15000 ha. A more intense process of acidification takes place in an area covered by acid soil, the pH (in water) of soil being reduced from 3.9-4.1 to 2.6-3.2 in the severely polluted area. Consequently, the degree of base saturation diminished from 51-71% to 17-28% in severely polluted soils and to 37-43% in moderately polluted soils, due to exchangeable base content decreases.

Part of the high heavy metal contents have a geo-genetic nature and are close related with fine texture (clay loam and clay) as well as with organic matter contents. Some of the potential pollutant elements and substances exceeding normal value have occurred due to the industrial pollution (non-ferrous metallurgical industry, chemical and petrochemical industry, thermoelectric power plants, etc.) and agriculture (over dose fertilization and/or pest control substance, etc.). The economies in transition from planned to market-oriented systems need a framework to incorporate environmental considerations into economic activities, including agricultural.

Romania has a total landed stock of 23.8 million ha, of which 12 million ha agricultural lands (62,2% of the total country's surface) and 6,37 million ha forests (26.7%). The rest of 2.63 million ha consists of water areas, settlements, communication lines and others (according to the 1998 statistics). The agricultural land is composed of 9.3 million ha arable lands, 3.4 million ha grazing fields, 1.5 million ha hayfields, 0.3 million ha vineyards, and 0.3 million ha orchards. More than half of the country's forests play an ecological, special protection role of the environment (protection of water, soil, climate, genepool etc.). The area covered by forest has been continuously decreased from 80–85% at the beginning of the Christian era to 26.7% at present (below the European mean of about 33% and smaller by 1/3 than the one considered as being proper to the natural vegetation conditions). The forests are not uniformly spread across the country: only 7% in the plain region, where the climate is aridizing; only 28% in the hills; and 65% in the mountains, the origin of high floods. The diminution of forest area and its weakly condition are, to a great extent, responsible for amplification of the floods, land sliding and other land degradations. It is proved that in Romania the consequences of natural hazards and global climatic changes tend to be ample. These negative influences of the environment and the results of irrational human activities show an alarming dynamics, which has repercussion on the health and life of the human being.

Soil resources in Romania are extremely important because 62% of the total area of the country is agricultural land. Agriculture contributes 20% to the national income. Non-agricultural lands grew by 400,543 ha between 1989 and 1994; about 246.126 ha of this area are covered with buildings, roads and non-productive lands. The agricultural lands productivity is diminished by 20-30% due to certain limiting factors as chemical pollution due to the unreasonable utilization of fertilizers and pesticides, emissions of heavy metals and hydro carbonates. In drought periods, agricultural productivity diminishes severely in the affected areas.

Tourism is another significant industry in Romania. It counts for: total contribution to Romania's economy estimated at US\$ 1000 million direct and indirect employment of 400,000 jobs US\$ 526 million in foreign earnings.

Freshwater management. There are management tools (financial and administrative) for freshwater resources but they should be improved in the near future.

Until 1989, the water demand in the industrial and agricultural sectors increased continuously. Beginning in 1989, the water demand for both these sectors decreased in parallel with the increase in the quantity of water used by households. The water quality improved slightly owing both to the diminution of agricultural and industrial pollution and to the measures imposed on economic agents by the local EPA. The length of first quality watercourses grew from 35 % in 1985 to approximately 66 % in 2002 reporting to the monitored rivers sectors length. Nevertheless, there still remained some 6.6 % of the rivers' monitored rivers length, out of the proper quality for the development of the aquatic fauna.

There are no special statistics concerning the efficiency of water use in industry. There is water recycling system, varying, depending on the industry and factories from 10 to 95 %. In agriculture, the main water use is in irrigation, in which the efficiency of the water use ranges from 60 to 80%. The average specific water consumption per inhabitant per day in the urban area at the country level is about 513 l: domestic use (294 l); public use (70 l); economic activities use (122 l); and network losses (134 l). In the rural areas, specific water consumption is approximate 150 l.

There is a real concern for the water losses reduction. On average, at the national level, the losses will decrease from 34 % (in present) to 15 % by 2020. Through the introduction of the real water prices, the economic units will have an incentive to reduce the losses in water supply and to increase the re-circulation and re-use of the water. The most pressing issues include the low level of investments and slow application of reforms in the national economy.

Agriculture has the greatest responsibility for water pollution from methane (CH₄) (animal farms), nitrogen dioxide (NO₂) and ammonia (NH₃; over 95%). The water pollution in the upstream part of the Danube is increasing.

Drinking water supply and quality: According to the 1992 census, 85 % of urban population and 16 % of rural population had their households connected to water supply systems. More recent information shows an increase in the access to centralized drinking water system at households (inside or outside of the building) within the cities (to 93 %), but only to 17 % in the rural areas. Water available to most of the rural population with no access to centralized drinking water supply system comes from about 1 million wells, mostly shallow (5-20 m depth) and susceptible to contamination. Close to 19 % of surface water sources and 10 % of groundwater sources used for drinking water extraction have had no sanitary protection (data from 1991-95). The registered incidence of diarrhea diseases decreased from 414 cases per 100,000 population in 1990 to 339 per 100,000 in 1997, but increased in the more recent years again (to 361 per 100,000 in 1999).

Capacity-Building, Education, Training and Awareness-Raising: In Romania there are universities (technical, economic, etc) and also other forms of educational institutions, which are dealing with the issues of water and where the future specialists are educated. In the frame of the universities there are developed post-graduated courses and training programmes in different fields of water.

Training programmes are also developed by different institutes and also developed under the international projects/agreements and which create a favorable frame for improving the skills and abilities of the decision-makers and specialists in the concept and policy design of water environmental field. Such programmes are carried out both in Romania and in other countries. At present Romania has developed an intensive activity concerning the improvement capacity for the water management system, which will include the strengthening of the control and regulation activities and modernization of financial and economic tools.

Information: Information on water management and development is collected by the National Administration "Apele Romane" (NARW) (through its local subsidiaries) and transmitted to the MEWM.

It is distributed in real time by a regular system of data transmission and is presented in aggregate form to the decision-makers in the government and upon request, or in case of disasters, to the private sector and the public at large. This information is available in a partially coded form for use in the system of water management. It is not yet available on the Internet.

Many specialized NGOs publish booklets and magazines, such as ROMAQUA issued by ARA, the professional water association, for technical and scientific information on water management.

Research and Technologies: Under the MEWM there are several research national institutes, which are dealing with different scientific and technological aspects concerning water quality and quantitative management and aquatic environment protection and they include: the National Research-Development Institute for Environmental Protection ICIM – Bucharest; the Institute of Hydrology and Water Management under the NARW; Institute of Meteorology – Bucharest; the National Institute for Marine Research and Development “Grigore Antipa”- Constanta; and the Institute of Research and Development “Danube Delta”–Tulcea.

With support from Netherlands, cleaner technology project is being carried out. The United States provides technical assistance for cleaner technology issues. Environmentally Sound Technologies (ESTs) are most urgently needed in the energy and agriculture sectors as well as in the pulp and paper industries, the cement industry and the non-ferrous smelting industry. A copyright Law is in place but no reference is made in it to the promotion of investments related to the transfer of ESTs. To date there is no national policy or effort by the private sector to promote the transfer of ESTs or cleaner production processes.

Financing: The estimated costs for compliance with EU Directives on water protection quality is about 5,000 million Euro in the short term and about 15,000 million Euro until 2022.

Water supply: The end user charge for the water supply is made up of: a water extraction charge levied on the quantity of raw water extracted from rivers, including water from the Danube, lakes and groundwater; a water discharge fee for waste water discharged into water bodies; and a water consumption charge to cover the operating costs of the water supply companies. The water extraction charge is uniform throughout the country, but varies according to the source and the use of the water. Box 1 gives an indication of price levels for water abstraction. The water abstraction charges cover all raw water abstracted and subsequently resold to the local water supply distributors.

Box 1 Indicative prices for water abstraction in 2004
<i>Water abstracted from inland rivers:</i> for households, industry, and livestock: US\$ 7/1000 m ³ ; for irrigation and fishery: US\$ 0.5/1000 m ³ ; for hydropower generation: US\$ 0.03/1000 m ³
<i>Water abstracted from the Danube:</i> for households, industry, livestock and power generation: US\$ 0.82/1000 m ³ ; for irrigation and fishery: US\$ 0.52/1000 m ³
<i>Water abstracted from underground:</i> For households: US\$ 7.76/1000 m ³ ; for industry: US\$ 3.6/1000 m ³ ; for the irrigation and fishery: US\$ 0.5/1000 m ³ ; for livestock: US\$ 4.6/1000 m ³

1\$ = 34,000 lei

The water discharge fee comprises two components: a tariff for within limits discharge concentrations and a penalty for excessive discharge concentrations. The resulting end user prices vary among the water supply companies depending on their raw water cost, discharge fees, the operating technology of the water supply facilities, the autonomy of the individual water companies and the need for special flood protection measures.

The raw water prices that Apele Romane charges to the local supply companies is controlled by Office of Competition; the end user cost including both raw price and local cost is decided and approved by the Municipality, but with variations depending on how the local company is organized. All costs for extraction and delivery to local facilities, including flood protection for Apele Romane's delivery pipes, is borne by Apele Romane. From the point where the raw water is received, the local supply company is financially and operationally responsible for its own facility operation, management, maintenance, state of technology, new investments, and flood prevention measures.

At the end of 1997, some 80 % of consumers paid between US\$ 0.60/m³ and US\$ 0.75/m³ of drinking water. Of the other 20 %, some paid as little as US\$ 0.15/m³, others as much as US\$ 4/m³. In the average family budget, these water supply expenses were said to represent 2.5 3% of household income. At present, some 50% of Romania's water consumption is metered; the rest is based on estimated consumption.

Cooperation: Romania lies in the lower Danube basin, and shares several other transboundary river basins up or downstream with Hungary, the Republic of Moldova, Ukraine and Yugoslavia. Romania is a Party to the UN/ECE Convention on the Protection and Use of Transboundary Waters and International Lakes, which is complemented by regional and bilateral agreements, as well as to the Convention on Cooperation for the Protection and Sustainable Use of the Danube River.

Romania is Party to the following international agreements on transboundary waters: The UN/ECE Convention on protection and use of transboundary watercourses and international lakes, done at Helsinki 1992; The UN/ECE Protocol on Water and Health to the UN/ECE Convention protection and use of transboundary watercourses and international lakes, done at London 1999; and The Convention on protection and sustainable use of river basin Danube, done at Sofia 1994.

Romania is party to the bilateral agreements on transboundary watercourses management with Yugoslavia (1955), Hungary (2004) and the Ukraine (1997), which mainly address hydro-technical issues. The National Authority, has signed a memorandum with its counterpart in the Republic of Moldova concerning the Prut River. A hydro-technical agreement is in preparation. According to the principles and provisions of the international agreements on transboundary watercourses Romania is also in process of negotiation of an agreement on transboundary waters management with Republic of Moldova.. A new agreement on transboundary watercourses management will be develop and negotiate with Yugoslavia. Romania had signed the agreements/memorandum of understanding for development of cooperation in the field of integrated water management with the Netherlands, France (development of institutional capacities) and China, Bulgaria. The agreements on environmental protection between Romania and the State of Israel, Republic of Moldova, Bulgaria, Germany, R. of Turkey are also dealing with the issues of water quality and water management and establish the framework for development of exchange of information, training and projects.

Transboundary river basins, Danube and the Black Sea: Some hydro-technical projects are co-funded through grants from the PHARE-Cross Border Cooperation programme, such as in the Cris, Tisza, Tur, and Barcau river basins. To address the problem of eutrophication in the Black Sea, two GEF-UNDP project proposals on nutrient reduction measures (for the Danube and Black Sea basins) are pending. GEF-World Bank is currently supporting an agricultural pollution control project in the area of Calarasi, to reduce nitrate inputs into the Danube and the Black Sea.