FRESHWATER COUNTRY PROFILE

HUNGARY

Decision-Making

Programmes and/or Projects

A. Integrated Water Resources Development and Management
B. Water Resources Assessment
C. Protection of Water Resources
D. Drinking Water Supply and Sanitation
E. Water and Sustainable Urban Development
F. Water for Sustainable Food Production and Rural Development
G. Impacts of Climate Change on Water Resources

Status

Capacity-Building, Education, Training and Awareness-Raising

Information

Research and Technologies

Financing

Cooperation

Decision-Making: *Sustainable development*: As a regular mechanism, integrated decision-making takes place at government level (inter-ministerial conciliation mechanism in course of preparation of all new pieces of regulation), however, the comprehensive principles, approaches and long-term objectives of sustainability are still rarely taken into account. The national Commission on Sustainable Development was established by government resolution in 1993 as an inter-ministerial body responsible for coordination of analysis, planning and implementation of various national programmes related to sustainable development and for preparation of national information and/or position in relation to international meetings such as the sessions of the UN CSD. The Commission included representatives from all relevant ministries and government authorities (Prime Minister's Office, Ministry for Environment and Water, Ministry for Agriculture and Rural Development, Ministry for Education, Ministry for National Cultural Heritage, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Economic Affairs, Ministry of Justice, Ministry of Social and Family Affairs and Ministry of Health (Institute of Public Health) etc. The para-statal bodies, institutions and NGOs are associated with the Commission. In addition the National Environmental Council was established in 1996 as an advisory body to the government in accordance with the provisions of the 1995 Environmental Act. The main non-government constituencies are represented in the Council (environmental groups, academic institutes and business organizations).

Water resource management: The government agency primarily responsible for the policies on protection of freshwater resources is the Ministry for Environment and Water. The basic regulatory framework consists of the Water Act of 1995, and the legal instruments on environmental impact assessments. In addition, there are important general provisions on freshwater resources under the Act on Environmental Protection (1995).

Programmes and Projects:
A. Integrated Water Resources Development and Management: The National Environmental Programme includes substantial provisions and measures for the conservation and management of surface and subsurface water resources. Some of the key targets and approved policy directions are: regulation development to encourage sustainable and economical water use; improvement of water quality for the main watercourses/waterbodies (Danube and Tisza Rivers, Lake Balaton); gradual increase (to a level of 65%) of the number of settlements with sewers; at least biological treatment of wastewater from sewers; nitrate and phosphorous load reductions for highly protected and sensitive waters.

A governmental program – the New Vásárhelyi Plan – a has been started in 2004 on the enhancement of flood safety and the related regional and rural development in the Tisza Valley. The Plan comprises a complex program which covers beyond the creation of a higher level of flood safety, the improvement of the living standards of the rural and urban population of the region, the formulation and introduction of new types of agro-ecological land use in the area of the emergency flood retention reservoirs and the modernisation of the infrastructure in the settlements along the River Tisza.

B. Water Resources Assessment: Both the natural and the anthropogenic impacts on freshwater resources can be adequately analyzed in the country due to the good monitoring network. The standard network was established in 1968 to allow regular water quality monitoring of surface waters. Parallel monitoring for ground waters and for water quality in irrigation projects is also operational. The Hungarian Government has taken a decision in 2000 on launching the National Research and Development Programmes. In the framework of that programme, the Ministry of Education published a call for proposals for R&D actions in five thematic fields. One of the most important scientific priorities of the Programme is "Water Management" and "Quality of Water".

C. Protection of Water Resources, Water Quality and Aquatic Ecosystems: There are several sector-oriented programmes which directly address specific problems of water consumption (for instance, by

facilitating conservation policies in terms of water consumption). Some financial instruments are directly motivating the consumption of water resources, such as water resource fee, and fee on emissions into the aquatic environment. A governmental program is in progress for the protection of ground water sources used for drinking water.

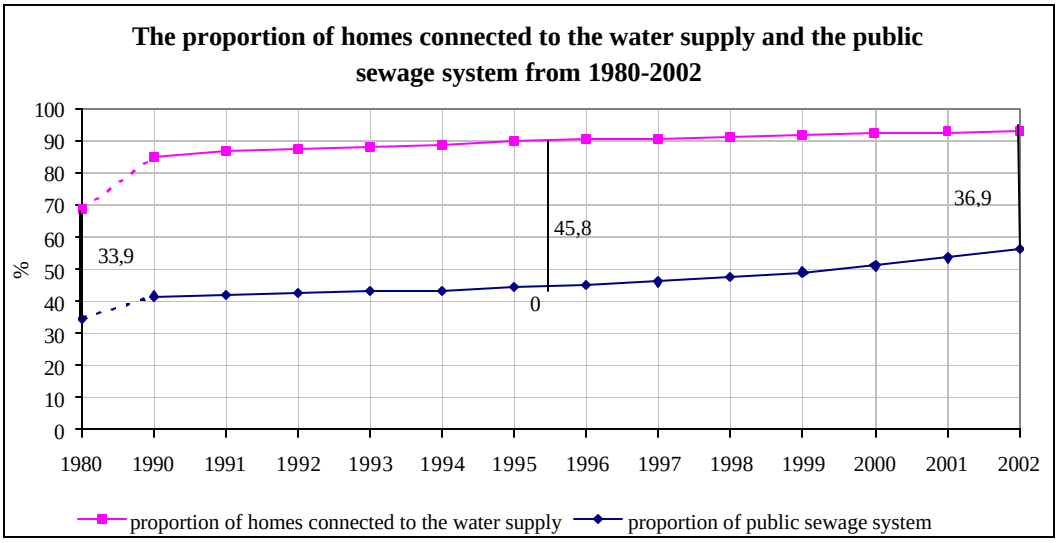
D. Drinking Water Supply and Sanitation: On the basis of European Union guidelines, wastewater drainage and cleaning should be resolved for all settlements of over 2,000 inhabitants by 2015. The government has passed a programme to improve water quality management. The objective of the programme is to develop waste-water treatment and drainage systems and improve technical monitoring systems to meet EU standards. The principal implementation problems of the programme were based on the transitional state of legislation, difficulties in collaboration between various governmental agencies and local/regional authorities, and the availability of financial resources. By year 2003 the Hungarian legal background of water quality protection became fully harmonized with the EU regulation, including the appropriate institutional setup. In year 2004 further sophistication of the relevant laws and decrees will continue, which is basically necessary for two reasons: i) adaptation of the Water Framework Directive (2000/60/EEC) and ii) improvement and simplification of the relevant decrees, on the basis of the experiences gained during the initial phase of implementation. Also, preparation of the pollution reduction programs (national and dischargers') has started, in compliance with the relevant EU directive (76/464/EEC). The extension of sanitation facilitates is being implemented, partly with the financial assistance from ISPA, the Cohesion and Structural Funds of EU. As a result of the integrated programs and measures, quality of the Hungarian surface water bodies shows permanently improving tendencies, as detected by the countrywide monitoring network.

E. Water and Sustainable Urban Development: In Hungary, practically all settlements have mains water supply with 98% of the population supplied with water. However, the quality of more than 42% of the drinking water supplies does not fully meet some of the limit values contained in the EC directive[1] and the Hungarian government decree published in 2001. Only 58% of the population live in settlements where the quality of drinking water meets quality standards.

In Hungary, the number of homes connected to the sewerage system was only 56.1% by the end of the year 2002, despite intensive developments since 1993. In 2002, the public utility gap was 36.9%, which means that waste water collection considerably lags behind public utility water supply. This lack of, and in many cases improper, waste water collection endangers potential drinking water resources. In the period between 1994 and 2000, the length of the sewerage network increased by approximately 7,500 km to 22,300 km. By the end of the year 2002, the ratio of biologically treated communal waste water increased to 61%, and 32% of biologically treated waste water (19.5% of the total waste water) underwent tertiary treatment.

[1] 98/83 /EC directive about the quality of drinking water

Figure 1.



Source: Ministry of Environment and Water

Many public utility network and wastewater treatment facilities are obsolete or worn out. Consequently, the capacity of wastewater treatment plants and the efficiency of treatment technologies do not comply with basic criteria at many locations in Hungary. Most facilities need refurbishment, and many need complete replacement of infrastructure.

As regards smaller-sized settlements, it is more economical to introduce individual environmentally sound procedures and to spread small wastewater treatment / disposal facilities to ensure environmentally sound, neutralised disposal.

F. Water for Sustainable Food Production and Rural Development: Monitoring for water quality in irrigation projects is operational. Elaboration of a new strategy to cope with the drought hazard is in progress.

G. Impacts of Climate Change on Water Resources: Analysis of long-term observations shows a decreasing tendency in precipitation amounts and average soil moisture content. Winter and spring precipitation amounts show a significantly decreasing trend. Drought frequency has increased, primarily in the last two decades. It is expected that one of the possible consequences of anticipated global climate change will be an average further decrease of precipitation levels for the next decades in the Hungarian region by approximately 50-100 mm/C annually. This could cause severe water supply problems in semiarid areas and dry lands. Another consequence of the climate change might be the increasing occurrence of extreme weather conditions causing also floods due to extraordinary heavy rains and fast thawing of the snow in the catchment areas including in mountains of the neighbouring countries.

A Special Scientific Committee was established to deal with possible consequences of climate change. The Committee is an important advisory body elaborating long-term strategies and response measures to mitigate the adverse impacts.

Status: *Socio-economic aspects*: The population living below the poverty level in Hungary is about 15%. This high rate is mainly due to the deep recession that has characterized the first stage of the transition process. Although the nearly 15% of unemployment prevailing prior to the economic upswing is now significantly lower at 6%, yet the chances of employment of the group of elderly unskilled persons with

low education have not improved. The groups being most affected by poverty are the long term unemployed; those with low salary; those who suffer from chronic sickness; Roma population (a significant minority with higher then average rates of unemployment due to low education and lack of professional skills); those living in small settlements.

By 2020, the population is expected to be 7.1 percent less than in 1999, and 12.5 percent less than in 1980 when the decline started. In addition, the aging process is projected to continue further. A specific characteristic of the Hungarian population is that mortality is unusually high for a country of its socioeconomic and cultural level. The mortality level had been gradually improving until the mid-1960s but, since then, has significantly deteriorated. However in the 90's the mortality level is rather stagnating and since the beginning of 2000 a definite improvement has been detected.

Water-related diseases are relatively low but pollution of surface waters, further arsenic of geological origin pose hazards to health. The past ten years, with all political and socio-economic changes were unfavourable to economic and social status (poverty, high unemployment, homelessness, etc) and although improvement can be recorded in the past few years, these facts remain the principal causes of ill-health.

Land: Increasing consumption and consequent economic activities exploit the available land faster than ever, expanding social pressure and placing an ever-increasing stress on the environment. This is especially true in the case of agriculture, which is associated with 85.5% of the total area of Hungary (agricultural lands) and an important player in further socio-economic development of the country. As a consequence, on the one hand, sustainable agriculture is vital from the point of view environmental protection and nature conservation. The performance and efficiency of agriculture, on the other hand, depends mainly on the state and quality of the environment and natural resources. The interdependence of environmental protection, agriculture and the rural development makes the co-ordination of these three areas, the establishment of an integrated land use system inevitable.

Extensive changes in land use have occurred during years of the transition to a market economy and the massive compensation and re-privatization processes. The total land area of Hungary is 93,000 km^2. About 70% of this area is agricultural land, an extraordinarily high percentage by international comparison. Of this, 73% (4.7 million ha) is arable land, 20% are pastures and meadows, and about 7% gardens, orchards, and vineyards. Eighteen percent of the total area is covered by forest. The country enjoys relatively favourable geographical and climatic conditions for agricultural cultivation. Seventy-three percent of the territory is flatland with highly fertile chernozem and brown earth soils. A large part of the arable area is sown with grain (wheat and maize) and industrial plants (sunflower, sugar beet). The agricultural sector accounted for 20% of Hungary's gross national product and employed 17% of the active earners. This situation has dramatically changed due to the economic restructuring, the recession in agriculture, and the loss of a large share of the market for agricultural products in the Central European region.

Water resources: Lake Balaton is the largest and warmest freshwater lake of Central Europe. The two most important rivers, the Danube (its length in Hungary is 417 kilometres), and the Tisza (597 kilometres), cross the country from North to South (See Table 1). Flood can endanger 52% of the country. The renewable water source is 120 billion m^3 annually, what is mainly provided by the Danube river (the amount of inflowing water per capita in Hungary is the highest in the world). About three fourth of the country's groundwater resources (shallow groundwater, bank-filtered and karstic water) is vulnerable. The half of the population is supplied with drinking water from bank-filtered wells, located along the Danube and other rivers which have excellent quality. The country is rich in thermal waters.

Table 1: The length and watershed of rivers

River	Length		Watershed area	
	Total, km^2	in Hungary	Total, km^2	in Hungary, %
Danube	2 860	417	817 000	5.7
Dráva	695	143	40 076	10.4
Tisza	977	597	157 183	29.7
Maros	754	50	30 332	6.2

Source: The Hungarian Central Statistical Office (HCSO)

Table 2: Biochemical oxygen demand (BOD) of largest rivers

mg O2/litre

Year	Danube	Tisza	Dráva	Maros
1988	4.0	3.5	3.4	11.8
1989	3.4	2.3	4.3	7.2
1990	3.1	1.5	3.4	9.4
1991	3.3	2.1	3.5	5.1
1992	2.4	2.2	3.7	5.8
1993	2.6	2.0	3.3	4.9
1994	2.5	2.0	3.1	3.8
1995	2.1	1.9	3.5	3.7
1996	2.6	1.5	3.1	4.3
1997	2.9	2.0	3.3	2.9
1998	2.6	2.6	3.1	3.3
1999	2.1	3.6	2.9	3.7
2000	1.6	2.9	2.8	5.4

Source: HCSO

Water users are partly responsible for the protection of subsurface drinking water sources to the extent specified in their licenses. The municipalities are responsible for healthy drinking water supply and sanitation. Scientists traditionally play an important role in Hungary in facilitating decision making related to the conservation and environmentally sound utilization of freshwater resources. Freshwater resources are also of special concern to various environmental NGOs. More than 90% of the total drinking water demand in Hungary is satisfied from subsurface resources. Signs of excessive use of these resources have appeared in some regions. Approximately 92% of the dwellings are connected to public drinking water network. The quality of water supplied by public utilities fulfils general national health requirements. However, meeting the relevant standards is a serious problem, especially, in light of the EU-accession related requirements. Freshwater resources have been of special concern for state authorities, local governments, and citizens for reasons other than for domestic consumption.

Table 3: Eutrophisation in selected lakes

µg N/I and µg P/I

Year	Nitrogen	Nitrogen	Phosphorus	Phosphorus
	Lake Balaton (Siófok)	Lake Velencei (Agárd)	Lake Balaton (Siófok)	Lake Velencei (Agárd)
1992	630	2 730	30	72
1993	800	2 980	30	51
1994	1 100	2 730	75	232
1995	690	2 200	69	173
1996	740	2 350	75	83
1997	1 060	2 390	110	81
1998	980	2 420	82	76
1999	940	2 070	56	68
2000	750	2 000	77	79

Source: HCSO

Table 4: Intensity of water use in Hungary

Year	Surface water	Groundwater	Total abstraction	Total abstraction
	million m3			m3/capita
1990	5 266.4	1 028.4	6 294.8	607.3
1995	5 085.7	968.7	6 054.4	591.9
1998	4 913.7	857.7	5 771.4	570.7
1999	4 601.6	938.4	5 540.0	550.3
2000	4 719.9	870.6	5 590.5	556.7
2000[1]	**5881,0+12257,0**	**740,0**	**18 878,0**	**1878,9[1]**
2001	**5974,0+14391,0**	**726,0**	**21 091,0**	**2072,8**
2002	**5808,0+14495,0**	**730,0**	**21 033,0**	**2073,8**

Source: HCSO **and National Water Authority**

[1] Methodology has been changed in 2000 which caused differences in figures. The total abstraction – according to the new methodology – includes also the in-situ water use of hydropower plants.

Table 5: Water abstraction

Year	Agriculture	Manufacturing Industry	Public water supply
	million m3		m3/capita
1990	987.6	272.3	97.6
1995	662.1	236.2	77.8
1998	407.2	208.7	71.2
1999	441.5	282.8	69.9
2000	501.5	227.5	72
2000[1]	**720,7**	**166,1**	**81,3**
2001	**716,3**	**161,8**	**78,9**
2002	**679,6**	**160,5**	**79,1**

Source: HCSO **and National Water Authority**

[1] Methodology has been changed in 2000 which caused differences in figures.

There are overwhelming drainage areas in Hungary. Large and agriculturally important areas have a semi-arid or dry climate with low humidity, which increases the need for extra freshwater resources. This raises waste water management issues. The state of sewerage and sewage treatment is much worse than that for drinking water supply. By 2000, the ratio of dwellings connected to the public sewerage network was 51%. 90% of the wastewater collected through sewerage network is treated. 65% of this amount is treated biologically or by an advanced treatment technology. This is a very unfavourable situation, because it endangers the quality of surface and subsurface waters in many locations. Sewage water treatment capacities are increasing, but there is slow progress for various reasons including the lack of financial resources. Recently, significant policy decisions are taken and efforts launched to improve this situation, as it is also a crucial criterion in terms of the EU-accession; for that reason, EU's pre-accession funds became also available for assisting the solution of these problems.

Decreasing trend of water consumption continued after the economic upsurge in the late 1990s. Households contributed to water saving mainly due to strong increase of water charges.

Capacity-Building, Education, Training and Awareness-Raising: The state is also responsible for training qualified personnel for water resources management and protection. Special experts in the field of freshwater protection and of wastewater handling are trained in post-graduate education courses: these are attended by "part-time" students who have been graduated from engineering courses. Basic education is given in the environmental engineering courses. The national Environmental Education Programme deals also with the issues of protection of freshwater resources, and it includes pre- and in-service teacher training courses on this matter, too. From the beginning of the 1990s, the students of Hungarian schools participated in the "River watch" European programme.

In Hungary water management is an important topic in professional training and higher education, both at engineering and agronomic faculties, therefore human resources are generally available in the country to undertake main activities concerning drought mitigation. But further professional adult training (especially among new land owners and/or users) is necessary for getting acquainted with means and measures of drought mitigation. The present level of awareness-raising is not adequate, much more should be done for proper public information on drought events, possible impacts and mitigation possibilities. The importance of drought preparedness, mitigation and the role of the related water resources planning and operation is underestimated.

Information: For monitoring of environmental effects, a network of monitoring water quality exists. Geographic information system (GIS) is widely used. See also under Programmes and Projects.

In order to demonstrate the changes we use the indicator set adopted by the European Union (based on UN system). This set is derived to assess the progress in terms of sustainable development and monitor the effects of the relevant policies and measures. These indicators are classified in four groups which correspond to the social, environmental, economic and institutional dimensions of sustainability, including water resources management (see tables 1-5 under Status). Hungary's recent development was basically determined by the changes of the political and socio-economic systems. The indicators reflect the so-called "transformation crisis" together with structural changes and some shift towards sustainability. For better description of these processes, i.e. for better tracking of the transition and its implications, some more indicators were necessary apart from the EU-set. These indicators were calculated by means of the Hungarian statistical data, that is, generally from the database of the Hungarian Central Statistical Office (HCSO). In some cases, annual data were not available for earlier time periods or the methods of data collection changed over the period considered. As a matter of fact, the Hungarian statistical system is also undergoing important development phases in light of the EU accession "harmonization" requirements. In spite of certain data problems, the indicators give a reliable picture of the changes during the transition period in all dimensions of sustainability.

Research and Technologies: The National Programme for Environmental Research and Development is being formulated jointly by the Ministry for Environment and Water and the NCTD. The programmes place special emphasis on improving the technical and technological conditions for environmental protection. Elements of these programmes include: development of environmentally sound public utilities; technologies for healthy drinking water supply; environmentally-sound technologies integrated into production; material, energy and water saving technologies; and environmental sanitation.

Scientists have examined the future of water management policy with special emphasis on environmental protection. See also under B. Water Resources Assessment on Programmes and Projects.

Financing: A special fund has been established – connecting the Environmental Fund with those for water issues – for technical development purposes to increase also freshwater supply. It is financed by fees, charges, and other contributions. The fund provides grants for different activities and investments related to the protection of water resources. Fees charged for water volume used provide financial resources for facilitating water conservation.

According to the database of the Hungarian Central Statistical Office (HCSO), the expenditures on water management in ratio of the total environment expenditures - industrial investment by environment domains are as follows: 38% in 1997; 16.5% in 1998; 40% in 1999; and 16% in 2000.

Cooperation: Cooperation with neighbouring countries is a significant priority. Existing agreements on transboundary waters is harmonized to certain extent with the relevant provisions of international agreements and EU regulations. Hungary actively participates in collaboration under various international treaties and in the international organizations, which deal with the problems of freshwater resources, in particular Global Water Partnership (GWP), International Commission on Irrigation and Drainage (ICID), UN ECE convention on transboundary watercourses, the Danube Convention, Ramsar Convention, UN ECE convention on transboundary industrial accidents etc.

Besides international actions and cooperation in order to implement these conventions, several bilateral cooperation agreements have been initiated and are in progress devoted in particular to the establishment and management of transboundary protected areas.

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