DANUBE POLLUTION REDUCTION PROGRAMME

NATIONAL REVIEWS 1998
HUNGARY

TECHNICAL REPORTS

Part A: Social and Economic Analysis

Part B: Financing Mechanisms

Ministry of Environment
Ministry of Transport, Communication and Water Management

in cooperation with the

Programme Coordination Unit
UNDP/GEF Assistance

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Preface

The National Reviews were designed to produce basic data and information for the elaboration of the Pollution Reduction Programme (PRP), the Transboundary Analysis and the revision of the Strategic Action Plan of the International Commission for the Protection of the Danube River (ICPDR). Particular attention was also given to collect data and information for specific purposes concerning the development of the Danube Water Quality Model, the identification and evaluation of hot spots, the analysis of social and economic factors, the preparation of an investment portfolio and the development of financing mechanisms for the implementation of the ICPDR Action Plan.

For the elaboration of the National Reviews, a team of national experts was recruited in each of the participating countries for a period of one to four months covering the following positions:

- Socio-economist with knowledge in population studies,
- Financial expert (preferably from the Ministry of Finance),
- Water Quality Data expert/information specialist,
- Water Engineering expert with knowledge in project development.

Each of the experts had to organize his or her work under the supervision of the respective Country Programme Coordinator and with the guidance of a team of International Consultants. The tasks were laid out in specific Terms of Reference.

At a Regional Workshop in Budapest from 27 to 29 January 1998, the national teams and the group of international consultants discussed in detail the methodological approach and the content of the National Reviews to assure coherence of results. Practical work at the national level started in March/April 1998 and results were submitted between May and October 1998. After revision by the international expert team, the different reports have been finalized and are now presented in the following volumes:

Volume 1:	Summary Report
Volume 2:	Project Files
Volume 3 and 4:	Technical reports containing:
	- Part A: Social and Economic Analysis
	- Part B: Financing Mechanisms
	- Part C: Water Quality
	- Part D: Water Environmental Engineering

In the frame of national planning activities of the Pollution Reduction Programme, the results of the National Reviews provided adequate documentation for the conducting of National Planning Workshops and actually constitute a base of information for the national planning and decision making process.

Further, the basic data, as collected and analyzed in the frame of the National Reviews, will be compiled and integrated into the ICPDR Information System, which should be operational by the end of 1999. This will improve the ability to further update and access National Review data which is expected to be collected periodically by the participating countries, thereby constituting a consistently updated planning and decision making tool for the ICPDR.

UNDP/GEF provided technical and financial support to elaborate the National Reviews. Governments of participating Countries in the Danube River Basin have actively participated with professional expertise, compiling and analyzing essential data and information, and by providing financial contributions to reach the achieved results.

The National Review Reports were prepared under the guidance of the UNDP/GEF team of experts and consultants of the Danube Programme Coordination Unit (DPCU) in Vienna, Austria. The conceptual preparation and organization of activities was carried out by **Mr. Joachim Bendow**, UNDP/GEF Project Manager, and special tasks were assigned to the following staff members:

- Social and Economic Analysis and Financing Mechanisms: **Reinhard Wanninger**, Consultant
- Water Quality Data: **Donald Graybill**, Consultant,
- Water Engineering and Project Files: **Rolf Niemeyer**, Consultant
- Coordination and follow up: **Andy Garner**, UNDP/GEF Environmental Specialist

The **Hungarian National Review** was prepared under the supervision of the Country Programme Coordinator, **Ms. Maria Galambos**. The authors of the respective parts of the report are:

- Part A: Social and Economic Analysis: **Mr. Judit Rakosi**
- Part B: Financing Mechanisms: **Ms. Klara Toth**
- Part C: Water Quality: **Mr. Gyorgy Pinter**
- Part D: Water Environmental Engineering: **Mr. Sandor Kisgyorgy**

The findings, interpretation and conclusions expressed in this publication are entirely those of the authors and should not be attributed in any manner to the UNDP/GEF and its affiliated organizations.

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Ministry of Transport, Communication and Water Management

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Part A

Social and Economic Analysis in Relation to Impact of Water Pollution

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List of Abbreviations
on Social and Economic Aspects

CSO	Central Statistical Office
DWA	District Water Authorities
EPI	Environmental Protection Inspectorates
HEHAP	Hungarian Environmental Health Action Programme
LRA	the Land Registration Agency
MACD	the Ministry of Agriculture and Country Development
ME	the Ministry of Environment
ME	the Ministry of Economy
MTCWM	the Ministry of Transport, Communication and Water Management
MH	the Ministry of Health
NCB	Nature Conservation Boards
NEP	National Environmental Programme
NPB	National Park Boards
PHMOS	State Public Health and Medical Officer Service
TI	the Transport Inspectorates

1. Summary

Description of the State of the Danube Environment

In 1997 the Parliament adopted the National Environmental Programme (NEP). The starting point of the NEP is the identification of the main problems and their most important causes. Due to the basin like character of the country the annual, average water quantity flowing through Hungary (120 billion m3 /year) per inhabitant is the highest in the world. Hungary with respect to water is also a typical transit country, water reserves both quantitatively and qualitatively depend on the interventions in the neighboring countries.

a. Temporary alga development in Danube is still growing and bacterial pollution is not decreasing. The nitrate contents of Danube increases every year and extreme values exceeding even 20 mg/l are not rare. Because of river regulation and peppe dredging, sludge has accumulated in the vicinity of some bank-filtered wells. Due to the decomposition of organic substances, iron, manganese and the dissolved organic content of water from wells has grown. In certain regions the accumulation of toxic materials in bed-deposits can be observed;
b. Besides the improvement of several parameters the ortho-phosphate content in the river Tisza has greatly increased;
c. The majority of tributaries are regarded polluted;
d. In case of Lake Balaton recent measures have stopped the nutrient load growth. A significant factor of eutrophication is phosphor, within it the invariable level of inside phosphor load (redissolved from the bed deposits) is decisive. If the weather is favorable for algae development, because of low nitrogen content of the lake, blue algae propagates can bind the nitrogen of the air. This phenomenon results in the temporary growth of the N-load of Balaton. In these periods atmospheric N load may be three times higher than of bank side load.
e. The irrigation canals built in the Great Plain are often used for drainage of sewage from settlements. The use of water polluted this way is limited for irrigation.
f. First of all, several years of drought and at some lakes the unjustifiable water drainage of small gradient canals have led to major water level decreases in the natural sodic lakes representing great natural values in the Great Plain; in addition, the growing quantity of in-flowing wastewater has significantly deteriorated water quality:
g. A major pollution source is the fact that while 96-97% of the population live in areas with public utility supply water, the percentage living in areas with sewers is only 57% the gap is almost 40%.
h. The majority of sewage is either not purified or if it is, not adequately. Especially the capital and some big towns lag behind. Treatment of sludge coming from wastewater treatment and its harm free disposal in general have not been solved.

Analysis and Projection of Population and Water Sector Relevant Characteristics

Analysis of demographic data and projection of urban and rural population in the Danube catchment areas.

The population of Hungary in 1997 was 10,135,000 of which urban population 6,382,000 rural population is 3,753,000. In long term it can be expected: 2010 year 9,908 x 10^3persons, 2020 year 9,483 x 10^3 persons.

Estimation of actual and future demand for water

In Hungary for the different economic activities and for the household produced total water amount is 6,279.1 $10^6 m^3$/a. 5,302.7 $10^6 m^3$/a (84.5% of the total) is ensured from surface water, the rest 976.4 $10^6 m^3$/a (15.5% of the total) is ground water.

The domestic demand on raw water for almost all people of the country is ensured by the public water supply system with the exception of the households, which are in peripheries. About 3-4% of the population lives here.

In the public water supply in Hungary the most important economic factor is the water supply system based on ground water (94.7%). The public supply systems based on surface water ensure freshwater only for some local consumers. More than 2/3 part of the total production of public water supply system serves the freshwater supply of the population, and the rest serves the other economic activities. It can be estimated that only 4% of the population served by surface water originated water. In the water supply comfort of the population there are significant differences. Beside of the supply where the households are directly connected to the water supply system, a significant part of the population satisfies its water demand with the help of water taps which are on the courtyard of the house or even in the street. Water consumption per capita in urban areas 128l/capita/d, in rural areas 71l/capita/d.

Average in the country: 107 l/capita/d.

In long term the population demand on raw water will be growing by 35-37% until 2010-2020. The increase of the domestic water demand is at first because of the demand on perfect water supply level. Because of the increase of the population water demand level in long term there will be not so big difference between the urban and the rural areas. (The per capita water demand will be equalized). By 2010 the now existing water supply differences between the catchment areas will significantly decrease. The underdeveloped areas begin to develop and the equalization will take place about at 2020. The per capita water demand will be about equalized as well.

Estimation of actual and future production of waste water

The canalization and the sewerage systems are in backwardness compared to the water supply system. About 45% of the population is connected to centralized sewerage system in the country, in urban areas the ratio is 67%, in rural areas 6%.

The population living in the area where are no sewerage system use septic tanks for the wastewater disposal, but about the 2/3 part of these are inefficient and are dangerous to the environment (especially for the vulnerable ground water).

The aim of the Sewerage Framework Plan of Hungary 2010 is, that the about 45% sewerage rate increases about to 68%. For the areas, where there will be no sewerage system even after the realization of the long range plan, must be at least 23% construct professional individual wastewater treatment plants for healthy dumping of the wastewater.

Analysis of health hazards through water pollution and unsanitary conditions

At first it must be mentioned that the drinking water supply of Hungary is ensured by ground water.

The classification of surface water - used as drinking water - according to EU prescriptions (75/440/EEC Directive) hasn't been done yet, but according to the used technologies and operating experiences Danube, Tisza and all the tributaries can be considered as being in A2 class. There are problems only at special contamination where for some time the water can be considered as being in A3 class. Especially dangerous are the periods of unexpected oil contamination and great microbiological contamination. The cleaning technologies are not always prepared for protection against this kind of contamination. From the point of view of health risk the water supply from

surface water works vary in space and time. During the year the surface water works in general comply with the strict prescriptions given for water quality, so there is a minimal risk for the population. Similarly there is a minimal of risk at waterworks where the drinking water can be substituted with other water basis (e.g. ground water) in some contamination period. Where there is no possibility for substitution there grows the health risk of the population at the rate of the contamination.

The planned utilization of bank water resources shows that the surface water production will be at the same level in the future as it is now.

According to bathing water quality out of a total of 2086.3 km river stretch, 525.5 km (25.2 %) have proven as seriously polluted, 1185.3 km (56.8 %) as unacceptable, 342.2 km (16.4 %) as acceptable and 33.3 km (1.6 %) as excellent water quality. In settlements along these stretches lives a total population of 3,807,309, of which 628,896 (16.5 %) and 2,849,203 (74.8 %) respectively, is living by stretches of seriously polluted and unacceptable quality. The number and percentage of population settled by stretches of acceptable and excellent respectively quality is rather low: 294,609 (7.7 %) and 34,601 (0.9 %), respectively.

Among water related environmental health problems the following are to be highlighted related to water (NEP):

1. Regarding drinking water, adequate settlement of problems of drinking water containing arsenic, bacteriological infection, nitrate contents and chlorinating by-products.
2. Reduction of the threat of swimming-pool epidemics from bacteriological infection.

Analysis of actual and expected impact of economic activities on water demand and potential pollution of aquatic systems

Industrial activities

Some industrial plants have their own water supply systems. The planned water amount produced with the help of the unique water plant, according to the source of water is:

- surface water	4,326.2	$10^6m^3/a$	(97.6%)
- ground water	148.6	$10^6m^3/a$	(3.3%)
Total of own production:	**4,474.8**	**$10^6m^3/a$**	**100.0%)**

From the ground water 55.5 $10^6m^3/a$ is mining water. The industrial plants refill their own water production with water from the central water supply system and with water originating from other water plants, and it happens too, that they give some part of their own production to other consumers. Considering all of these the water amount for industry is 4,695.2 $10^6m^3/a$. From this the surface water is 4,587.6 $10^6m^3/a$ (97.7%).The cooling water is 4,416.5 $10^6m^3/a$.

The distribution of water use among the industrial branches is as follows: electricity production 92.4%, manufacturing 6.9%, construction and other activities 0.7%. Because of the industrial growth the water demand could increase, but the water sparing technologies could counteract. At the same time it can be expected that in the fields of public water supply the now existing high water loss will decrease.

The industrial discharge amount according to the method of disposal is as follows: central sewerage system 28.9%,discharged directly to the rivers 63.0%, to the soil 2.2%, utilization 4.5%,other 1.4%. Beside this the industrial plants discharge wastewater, which is contaminated only with heat and doesn't need any treatment. The total amount of this is 4,472.4 $10^6m^3/a$.

In connection with the industrial wastewater discharged to central sewerage system there is a country-wide problem, namely that the industrial pre-treatment isn't solved, nor has good efficiency. This has high load to the central treatment plants, has danger of water contamination, renders more difficult or makes impossible the disposal of sludge. Only 40% of industrial wastewater discharged directly to the rivers is treated with suitable method. The valid regulation promotes only to some extent to meet the wastewater treatment requirements. In the plants which are being constructed in the future only those solutions will get permission which comply with the environmental and water management prescriptions. The pre-treatment of the wastewater discharged to public sewerage must be solved similarly. At some places the mining operation - where direct contamination is possible - causes water quality problem and similarly, there could be problem at the environment of abandoned mines and with mines being under water - especially with the karst water resources. The contamination, which occurred and nobody is responsible for causing it, the permanent environment contamination are very big problems. Releasing the damages has social, economical, political and judicial relations. Because of this it became governmental task.

Municipal discharges

The municipal sector represents one of the most important sectors leading to both surface and ground water pollution. The importance of municipal sector in connection with water pollution is based on the fact that into surface water discharged municipal wastewater exceeds 80% of total of surface water discharged wastewater needing treatment. This amount is approximately four times as much as the industrial wastewater needing treatment, which is discharged directly into surface water and many thousand times as much as the wastewater discharge from agricultural point sources. The majority of sewage is either not purified or if it is, not adequately. (The ratio of biologically treated municipal wastewater is less then 40%, while that of advanced treated municipal wastewater is below 3%, only mechanically treated wastewater is 44%, wastewater without treatment is 14 %). Especially the capital and some big towns lag behind.

Since only 45 % of the households are connected to the sewer system (while the 96-97% of population is supplied with healthy public drinking water), the majority of household wastewater is desiccated, however, it is characteristic in Hungary, that the septic tanks are very often improperly managed causing infiltration of wastewater into the ground. The low level of canalization significantly contributes to inappropriate desiccation of household waste water. In areas with canalization water pollution is caused by the low level of willingness to connect to the municipal sewer system, because people can hardly afford the high sewer prices. Therefore in Hungary in general there are very low utilization of operating municipal sewer and wastewater treatment plants, causing water pollution. The public sewerage system serves the conduction of precipitation as well.

It is a basic goal that the wastewater discharged to surface water must be treated at least by biological treatment. The nutrient sensitive water resources (lakes, back water, reservoirs) are especially to be protected. Here must decrease the nutrient load. This needs advanced wastewater treatment. According to the EU prescriptions the wastewater sewerage and treatment must be solved at the end of 2000 on the settlements which are bigger then 15000 inhabitant-equivalent and at the end of 2005 on the settlement which are bigger then 2000 inhabitant-equivalent. These tasks will be completed in Hungary at 2010. Among the tasks is to solve the treatment and harmless dumping or utilization of the wastewater sludge.

Agricultural activities

The distribution of agricultural water production - 1,028.4 $10^6 m^3/a$ (100%) according to the source of water can be estimated as follows: surface water used for 935.3 $10^6 m^3/a$ (90,9 %), irrigation and fish-ponds, for other purposes and in some part, for irrigation used ground water (estimated)

93.1 $10^6 m^3/a$ (9.1 %). The information of water authorities, which were obliged to give data reflects very well the situation namely the continuously decreasing agricultural water use. The agricultural water use will increase to some extent. However it will show fluctuation. This will improve the utilization of capacity.

According to the available information the estimated discharged wastewater of main agricultural farms is 1.2 $10^6 m^3/a$. 10-20% of this amount is the liquid manure of animal husbandry. The majority of agricultural nutrient load is coming from non-point sources. The importance of water contamination originating from agriculture is shown by the fact, that the 60-70% of nutrient load (N,P) is the result of population load, probably only 15% is the result of agriculture.

The amount of agricultural wastewater comparing to the domestic and industrial wastewater discharge will remain unimportant. Changes in the property form, which happened in agriculture, will result wastewater discharge increase, but this will be in connection with the public sewerage and wastewater treatment. From water quality protection point of view the dumping of manure from animal husbandry which is an important part of agriculture endangers the water resources. As the result of enforcement of regulation the negative effect will decrease.

Solid waste disposals and possible soil and groundwater contamination

Collection of municipal solid waste is not full scale, (from 2/3 of household it is collected regularly), selective waste collection is at low level and the technical level and state of the applied devices is very poor.

Only 30% of the 2,700 community disposal sites meets the regulations more or less and the number of illegal and legal dumpsites, which are potential pollution sources is high. Free disposal capacity is low and no modern procedures are applied. About 20-30 % of landfills is located in areas dangerously close to groundwater or inland waters, therefore 60 % of the drinking water bases have been polluted over the past 30 years.

The main improvement is that there are so called target support systems from the central budget to the settlements which build regional landfills. According to NEP 10-15 regional waste landfill has to be built annually. In spite of this good development in the building new landfills, it can't be said that the pollution from the old landfills is decreasing. It is because no legal requirement for systematic recultivation of abandoned landfills was adopted.

The quantity of industrial waste is unjustifiably great and the survey of this waste is not satisfactory. Hazardous waste disposal capacity in Hungary is insufficient. The on-site disposal of unknown quantities of soil polluted with heavy metals and/or hydrocarbons has not been solved.

Other water uses

The utilization of **hydro power** at river sections is distributed disproportional. Their development is very low because of natural and geographical potentiality of Hungary.

In connection with hydro power utilization it can be stated that the currently operating power stations will work in the future too.

According to the **fishery** statistics of the Ministry of Agriculture in 1996 from the waters of Hungary 21,124 tons of fish were fishing up . 13,518 tons (64%) originate from fish ponds farming by intensive fish production, 7,606 tons (36% originate from natural waters and reservoirs). The GDP value of the fisheries was 1183 HUF in 1995, which is about 9,412 Million USD. This is about 0,02% of the GDP.

The total length of **navigable water ways** of Hungary is 1,622 km, of which the "always navigable" is 1,373 km. From this it is 419 km the main section of Danube which is at the half point of the international Danube-Rhine-Main waterway. In 1996 the productivity of transportation

of goods (freight ton-kilometers of goods) on waterways is the 10% of the transportation of the country. The transportation of passengers (passenger km) is even worse because it is only the 0.1% of the total of the country (in passenger km). In 1992 the parliament passed a law about the establishment of National public transportation ports. Nowadays the National public transportation ports are: Győr-Gönyü (confessional competition is going on) Csepel, RORO and container port in Nagytétény, Dunaújváros, Baja and in the future Szekszárd and on the Tisza: Szeged.

Hungary was in the recent years a real paradise of **water tourism** and could be developed in a very short time to a new branch of tourism if the necessary conditions could be ensured. In connection with the water quality used for recreation the followings must be mentioned:

- Danube is appropriate for water sports (e.g. shipping) and for line-fishing. Bathing is restricted by water quality. In some periods the water is inadequate for bathing.
- the large lakes are appropriate almost all recreation utilization (for bathing too)
- Tisza and bigger tributaries are appropriate for rolling and other water sports and for line-fishing too. Using them for bathing depends on water quality.

Water tourism needs a lot of governmental decisions for starting and running in it as a new branch of tourism.

Analysis of Relevant Institutional Framework and Actual Policies and Strategies

In the chapter 6 there is a detailed documentation, listing and short analysis of the relevant institutional framework, organizations and responsibilities in different level of institutional structure: Central Government Organizations; Regional Organizations, Agencies performing functions of Authorities; Local Governments; Special Institutes and Organizations. Strengthening the Environmental Institutional System is fundamental for the implementation of the National Environmental Programme both on the level of the national institutions and regional, local levels. In the chapter 7 there is the documentation of the relevant, accepted, ongoing programmes within the framework of the National Environmental Programme to reduce water pollution and to assure sustainable human development and healthy environment in the Danube basin.

2. State of the Danube Environment

2.1. Water Resources

95% of the surface water originates from abroad. The main characteristic is that it arrives in some big river (Danube, Tisza, Dráva, Rába, Maros, Körösök, Ipoly, Sajó, Hernád, Bodrog, Szamos, Kraszna, e.t.a.) and in a lot of small streams, but it leaves the country concentrated to three rivers namely Danube, Tisza, Dráva.

Table 2.1. Annual surface water resources of Hungary in 1996. (1) m^3/min

Natural resources	2386.0
Minimum acceptable flow (-)	1177.0
Foreign committed resources(-)	174.7
Increase from storage (+)	86.6
Ground water	
Waste water discharge (+)	16.9
Mining water	2.8
Utilizable water resource	**1139.5**

The average rate of flow of the surface waters entering Hungary in the catchment area of the Danube shows a decreasing tendency of 5-10% between 1960 and the middle of the nineties. The average rate of the surface waters entering Hungary in the catchment area of Tisza shows already a decreasing tendency of over 15% for the same period.

The ground water resources are of basic importance of drinking water, and make up more than 90%. According to present knowledge the utilizable ground water resources can be estimated as 5 x 106m3/d. This value is about the 2/3 part of the permitted amount. Distribution according to water resource types is:

10 % subsoil water

30 % bank water

20 % karst water

40 % stratum water

Production from ground water had been increased till the mid eighties and at the beginning of the nineties - because of financial problems - decreased enormously. All the production in 1987-88-ban was an average 4.5 Million m^3/d, in 1995 only 3.1 Million m^3/d.

The quantity of the surface water and ground water resources is determined by the hydrometeorological circumstances. In the middle part of the Carpet-basin in a very extent the precipitation decreased and the potential evapotanspiration increased in the last decades. The surface and ground water flow which is the difference between the precipitation and the real evapotanspiration - which was about zero still in the wet decade too - had been decreased with order of magnitude and in the middle area of the Great Plain became negative. The decrease wasn't so high in the mountains and in the western part of the country. Because of the reservation and drainage processes, the ground water resources are determined by the hydrometeorological circumstances of long periods. This means that the surplus or lack of some years can be accumulated, so when a dry period is over the lack could be continue for some time.

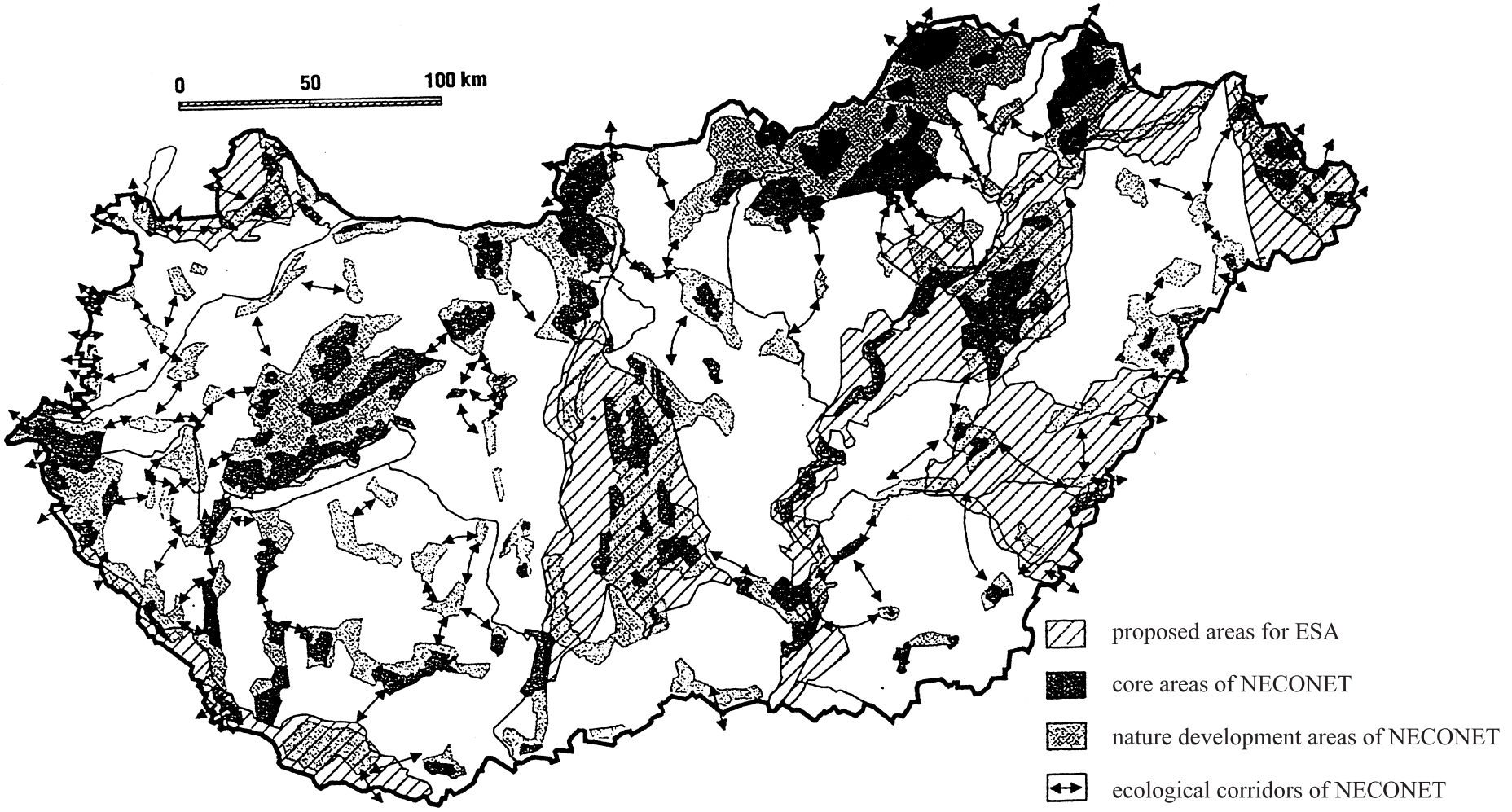
2.2. Biological Resources and Eco-systems

The Conception of National Nature Conservation Politics (1994) (2) consider as most important habitats among others the water spaces and wetlands. Because of the drying up and eutrophication the Conservation the flora and fauna of the wetlands has a high priority in the Nature Conservation politics. The Hungarian rivers and their catchment areas - due to their original Nature - are essential elements of National Ecological Network. They cross basic areas of international and national interest, connect them and at the same time establish connections with the elements of bioregional network over the boundaries. The magnitude of the protected area - comparing to the situation in 1984 - increased at a great extent and is continuously growing. Figure 2.2.1. shows the water- and terrestrial- system of ecological corridors.

The main specific features and problems related to water flora and fauna are the following as stated by the National Environmental Programme (NEP) (3) NEP, which was adopted in 1997 by the Parliament.

a. Water habitats are the most endangered, in addition to natural drying up and biological degradation traced back to human activity, by pollution of human origin. One has to give up the idea that wetlands are natural recipients of pollution, which absorb and transport everything.
b. Drying up valuable bogs and bogmeadows is not simply the consequence of unfavorable climate changes (or just fluctuation) but harmful technical intervention in the water catchment areas and the elimination of wetlands has also contributed to the problem.
c. The state of wet and medium wet (mezophyl) meadows, grasslands and pastures has significantly deteriorated - especially in the last 20-25 years - because of unreasonable management and traditional utilization. The areas of grasslands and meadows have also decreased significantly because of arable Land, forestry management and other utilization forms (fishing ponds, industrial plants, uses coming from urbanization, segregation by transportation). Nuisance effects by human activities have started degradation processes in great parts of grasslands.

Figure 2.2.1.National Ecological Network (NECONET) and Environmentally Sensitive Areas (ESA)



2.3. Human Impact and Key Issues of Environmental Degradation

In 1997 the Parliament adopted National Environmental Programme (3). The starting point of the NEP is the identification of the main problems and their most important causes.

Surface water

Due to the basin like character of the country the annual, average water quantity flowing through Hungary (120 billion m^3/year) per inhabitant is the highest in the world. Hungary also with respect to water is a typical transit country, water reserves both quantitatively and qualitatively depend on the interventions in the neighboring countries.

a. Temporary algae development in Danube is still growing and bacterial pollution is not decreasing. The nitrate contents of Danube increase every year and extreme values exceeding even 20 mg/l are not rare. Because of river regulation and peppe dredging, sludge has accumulated in the vicinity of some bank-filtered wells. Due to the decomposition of organic substances, iron, manganese and the dissolved organic content of water from wells has grown. In certain regions the accumulation of toxic materials in bed-deposits can be observed;
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d. In case of Lake Balaton recent measures have stopped the nutrient load growth. A significant factor of eutrophication is phosphor, within it the invariable level of inside phosphor load (redissolved from the bed deposits) is decisive. If the weather is favorable for algae development, because of low nitrogen content of the lake, blue algae propagates can bind the nitrogen of the air. This phenomenon results in the temporary growth of the N-load of Balaton. In these periods atmospheric N load may be three times higher than of bank side load.
e. The irrigation canals built in the Great Plain are often used for drainage of sewage from settlements. The use of water polluted this way is limited for irrigation.
f. First of all, several years of drought and at some lakes the unjustifiable water drainage of small gradient canals have led to major water level decreases in the natural sodic lakes representing great natural values in the Great Plain; in addition, the growing quantity of in-flowing wastewater has significantly deteriorated water quality:
g. A major pollution source is the fact that while 96-97% of the population lives in areas with public utility supply water, the percentage living in areas with sewers is only 57% the gap is almost 40%.
h. The majority of sewage is either not purified or if it is, not adequately. Especially the capital and some big towns lag behind. Treatment of sludge coming from wastewater treatment and its harm free disposal in general have not been solved.

Ground water

Ground water is vital from the point of view of ensuring life conditions. It has an outstanding role in the drinking water supply (with an over 90 share), in balneological utilization and through its relation to other media of the environment.

Quantitatively:

a. The sinking of ground water on plain areas of the country in the last one or two decades, on the average, has been 0.1 m/year, between the Danube and the Tisza Rivers it has exceeded 0.3 m/year and at some places approaches even 5m. In Szigetköz the groundwater has sunk following the diversion of Danube. Resulting from groundwater

sinking, besides agricultural damage, the water reserve of wetland habitats, and groundwater lakes has fallen, buildings have been damaged in areas characterized by layers susceptible for collapse.

b. Stratum water sinking in the basin areas of the country is 0.1-0.4 m/year expressed in water column, in the deeper thermal water reservoirs it exceeds 1 m/year.
c. Karst water sinking in the Transdanubian Mountains was 1m/year until the end of the 1980s, but at some places much higher. Depression on average reached 30 m, at some places 100 m.
d. The yield decrease of karst springs in the Transdanubian Mountains resulted in spring drying up, in the case of edge thermal karst springs it resulted in dangerous yield decrease in the 1980s. Regeneration began when mining water withdrawal was halted.

Qualitatively:

a. Pollution in ground water is mainly nitrate among the regularly measured components primarily because of the lack of sewers at settlements and animal breeding plants, and non-point source effect of fertilizers and manure.
b. Mining activity causes water problems where the threat of direct pollution exists; wrong transportation, disposal, storage of pollutants and waste, and the existence of the abandoned, uncontrolled dumpsites.
c. Water quality has deteriorated at bank filtered water aquifers in the riverbed, in addition to pollution of background groundwater, as a result of anaerobe processes caused by fine particle depositions.
d. In case of drinking water aquifers are the most important instrument of water quality protection of areas and structures but because of the lack of regulations and economic problems (e.g. lack of Land use management compensation) they do not exist. Regulation is being updated.
e. Clean-up in connection with pollution and durable environmental damage without a responsible body has become a huge task which primarily falls on the state due to social, economic, political and legal causes.

3. Actual and Future Population and Water Sector Relevant Demographic Characteristics

The organization of water services is prescripted by the 4/1990. (X. 24.) KHVM regulation. Most of the regional water management tasks are performed by the Water Authorities. The operational areas of the Water Authorities are delimited by a designated reach of the big rivers and tributaries or a designated reach of the tributaries. In consequence the working area of the 12 Water Authorities - which covers the total area of the country - represents each of the large catchment areas. Because of this, the texts, tables and other appendices are carried out according to Water Authorities catchment areas. The areas are grouped according to the catchment areas of Danube and the catchment areas of the Tisza Rivers and the different sections of this paper which show the situation of the country are worked out in compliance with this.

Catchment Area of the Danube	
01. Győr	North Transdanubian Water Authority
02. Budapest	Middle Danube Valley Water Authority
03. Baja	Lower Danube Valley Water Authority
04. Székesfehérvár	Middle-Transdanubian Water Authority
05. Pécs	South-Transdanubian Water Authority
06. Szombathely	West-Transdanubian Water Authority

Catchment Area of the Tisza	
07. Nyíregyháza	Upper-Tisza Area Water Authority
08. Miskolc	North Hungarian Water Authority
09. Debrecen	Over the Tisza Water Authority
10. Szolnok	Middle-Tisza Area Water Authority
11. Szeged	Lower Tisza Area Water Authority
12. Gyula	Körös Area Water Authority

It must be remarked that the used statistics reflect the 31.12.1996 situation. These data are the latest Information for the present situation.

Data could be given for Danube and tributaries only where there were reliable information in the statistics.

3.1. Present Situation

3.1.1. Population

The population data by settlements are published by Hungarian Central Statistical Office (CSO) (4). In Table 3.1.1. data were calculated according to catchment areas for urban, rural part and for the total of the country.

Table 3.1.1. Population 1996

Water Authority	Figures for population		
	Total	Urban	Rural
Catchment Area of the Danube			
01. Győr	738104	428944	309160
02. Budapest	3018149	2311678	706471
03. Baja	292653	130325	162328
04. Székesfehérvár	1068896	584973	483923
05. Pécs	709959	382800	327159
06. Szombathely	583366	313834	269532
Total of the Danube	6411127	4152554	2258573
Catchment Area of the Tisza			
07. Nyíregyháza	540625	233034	307591
08. Miskolc	1005120	504502	500618
09. Debrecen	600977	439869	161108
10. Szolnok	553000	339595	213405
11. Szeged	769046	562620	206426
12. Gyula	294547	192812	101735
Total of the Tisza	3763315	2272432	1490883
Total of the country	**10174442**	**6424986**	**3749456**

The population total of the country for 01.01.1998 is 10,135,000 capita, of which urban population is 6,382,000, rural population is 3,753,000.

3.1.2. Area

The data for the area of the country are shown in table 3.1.2. (4) according to catchment areas and for the total of the country. Figure 3.1.2.1. shows a map for the catchment areas.

Table 3.1.2. Area

Water Authority	Area km^2
Catchment Area of the Danube	
01. Győr	635859
02. Budapest	838465
03. Baja	558406
04. Székesfehérvár	1270260
05. Pécs	987360
06. Szombathely	764346
Total of the Danube	5054696
Catchment Area of the Tisza	
07. Nyíregyháza	549804
08. Miskolc	1021841
09. Debrecen	702927
10. Szolnok	711003
11. Szeged	860816
12. Gyula	401915
Total of the Tisza	4248306
Total of the country	**9303002**

Figure 3.1.2.1. Map of Water Authorities in Hungry

frontier of the country

boundary of water authority

01 – 12. number of water authority

△ chief town of water authority

Area of water authorities

Total of the catchment area of the Danube: 5054696 hectares

Total of the catchment area of the Tisza: 4248306 hectares

Total of the country: 9303002 hectares

Water Authorities

Catchment Area of the Danube

01. Győr	North Transdanubian Water Authority
02. Budapest	Middle Danube Valley Water Authority
03. Baja	Lower Danube Valley Water Authority
04. Székesfehérvár	Middle-Transdanubian Water Authority
05. Pécs	South-Transdanubian Water Authority
06. Szombathely	West-Transdanubian Water Authority

Catchment Area of the Tisza

07. Nyíregyháza	Upper-Tisza Area Water Authority
08. Miskolc	North Hungarian Water Authority
09. Debrecen	Over the Tisza Water Authority
10. Szolnok	Middle-Tisza Area Water Authority
11. Szeged	Lower Tisza Area Water Authority
12. Gyula	Körös Area Water Authority

3.1.3. Per Capita Income

Table 3.1.3.1. Average earnings of employees average income per capita and minimum monthly wage in 1997

	HUF	USD
gross earnings	57240	306.5
net earnings	38145	204.3
average income per capita	22000	117.8
minimum monthly wage	17000	91.0

Data of average earnings with more than 20 employees, relating to full-time employees. Source: Institutional labor statistical surveys of Central Statistical Office (5). Minimum monthly wage is defined by government. Annual average medium rates quoted by National bank of Hungary: 1 USD means 186.75 HUF in 1997. In 1998 the official minimum monthly wage is 19,500 HUF, (USD 95.04). (1 USD 205.18 HUF in 6 January 1998).

Per capita net income of households amounted to 22,000 HUF/month in III quarter 1997 with a growth rate 21.1 per cent to III. quarter 1996. This statement is on the base of regular household budget survey of CSO. The value of per capita current consumer expenditure was 20,800 HUF/month in III quarter 1997.

3.1.4. Domestic Water Demand

The domestic demand on raw water for almost all people of the country is ensured by the public/centralized water supply system with the exception of the households, which are in peripheries. Here lives about 3-4% of the population.

The public/centralized water supply system ensures the raw water demand of population, the institutions, recreation centers, trade and connected industrial units as well.

In the water supply comfort of the population there are significant differences. Beside of the supply where the households are directly connected to the water supply system, a significant part of the population satisfy their water demand with the help of water taps which are on the courtyard of the house or even in the street.

The water supply data are in table 3.1.4.A.1. and 3.1.4.A.2. They are accounted according to the publication of the Hungarian Central Statistical Office (6).

Table 3.1.4.A.1. Domestic water demand 1996

Water Authority	Domestic (population) demand on raw water 1000 m^3/a			Domestic per capita demand on raw water liter/capita/d		
	Total	Urban	Rural	Total	Urban	Rural
Catchment Area of the Danube						
01. Győr	35265	22761	12504	131	145	111
02. Budapest	227981	200979	27002	207	238	105
03. Baja	13587	6448	7139	127	136	120
04. Székesfehérvár	49874	32054	17820	128	150	101
05. Pécs	33817	22133	11684	131	158	98
06. Szombathely	25295	16382	8913	119	143	91
Total of the Danube	385819	300757	85062	165	198	103

Catchment Area of the Tisza						
07. Nyíregyháza	22641	11643	10998	115	137	98
08. Miskolc	39076	24933	14143	107	135	77
09. Debrecen	24808	19237	5571	113	120	95
10. Szolnok	21652	14888	6764	107	120	87
11. Szeged	39523	31840	7683	141	155	102
12. Gyula	12117	8454	3663	113	120	99
Total of the Tisza	159817	110995	48822	116	134	90
Total of the country	**545636**	**411752**	**133884**	**147**	**176**	**98**

Table 3.1.4.A.2. Domestic water consumption 1996

Water Authority	Domestic consumption			Domestic per capita consumption		
	1000 m^3/a			liter/capita/d		
	Total	Urban	Rural	Total	Urban	Rural
Catchment Area of the Danube						
01. Győr	25613	16531	9082	95	106	80
02. Budapest	165582	145971	19611	150	173	76
03. Baja	9868	4683	5185	92	98	88
04. Székesfehérvár	36224	23281	12943	93	109	73
05. Pécs	24561	16075	8486	95	115	71
06. Szombathely	18372	11898	6474	86	104	66
Total of the Danube	280220	218439	61781	120	144	75
Catchment Area of the Tisza						
07. Nyíregyháza	16444	8456	7988	83	99	71
08. Miskolc	28381	18109	10272	77	98	56
09. Debrecen	18018	13972	4046	82	87	69
10. Szolnok	15725	10813	4912	78	87	63
11. Szeged	28705	23125	5580	102	113	74
12. Gyula	8801	6140	2661	82	87	72
Total of the Tisza	116074	80615	35459	85	97	65
Total of the country	**396294**	**299054**	**97240**	**107**	**128**	**71**

The domestic demand on raw water could be estimated from the country statistics with the help of two informations. First, from the water amount supplied to the households, second from the proportional quota of the network and service losses. The summarization of these two amounts shows the population demand on raw water.

The number of people connected to the central water supply system is not collected in our country statistics. There are data only for the households connected to this system (6). From this could be estimated the share of population connected to the centralized water supply system by the help of the average population per households. The other part of the population ensures its water demand with the help of water taps, which are on the courtyard of the house, or in the street (with the exception of the households, which are in peripheries). Because of the significant differences in water supply system the table 3.1.4.B. contains this differences as well.

Table 3.1.4.B. Share of population connected to centralized water supply system in 1996.

Water Authority	Population connected to centralized water supply system					
	population			%		
	Total	Urban	Rural	Total	Urban	Rural
Catchment Area of the Danube						
01. Győr	671681	411657	260024	91	96	84
02. Budapest	2850872	2311678	539194	98	100	76
03. Baja	272706	120177	152529	93	92	94
04. Székesfehérvár	955083	533481	421602	89	91	87
05. Pécs	639163	366653	272510	90	96	83
06. Szombathely	529904	284971	244933	91	91	91
Total of the Danube	5919409	4028617	1890792	92	97	84
Catchment Area of the Tisza						
07. Nyíregyháza	409288	194870	214418	76	84	70
08. Miskolc	808982	468400	340582	80	93	68
09. Debrecen	524904	389846	135058	87	89	84
10. Szolnok	459090	290072	169018	83	85	79
11. Szeged	706507	539265	167242	92	96	81
12. Gyula	269012	176278	92734	91	91	91
Total of the Tisza	3177783	2058731	1119052	84	91	75
Total of the country	**9097192**	**6087348**	**3009844**	**89**	**95**	**80**

Remark: this table contains the population directly connected to centralized water supply system. Further 7% of the population is supplied with drinking water with the help of water taps which are on the courtyard of the house or in the street.

3.1.5. Domestic Wastewater Production

The canalization and the sewerage systems are in backwardness compare to the water supply system. About 43% of the population is connected to centralized sewerage system. The other part use septic tanks for the wastewater disposal.

The wastewater collected by centralized system is treated biologically in general, but most of these plants are old and the applied technology not always satisfies the water quality requirements. Especially big problem is that of the wastewater of Budapest (laying by Danube) which is collected to central sewerage system only in 15-16 % is conducted to treatment plant, and in Dunaújváros there is no treatment. By Tisza there are two big cities (Szolnok and Szeged) which have no treatment plants.

The population living in the area where there are no sewerage system uses septic tanks for the wastewater disposal, but about the 2/3 part of these are inefficient and are dangerous to the environment (especially for the vulnerable ground water).

The wastewater disposal data are given in tables 3.1.5.A.; 3.1.5.B.; 3.1.5.C. They are accounted according to the publication of the Hungarian Central Statistical Office (6). There is no information for the areas not connected to the centralized sewerage system so these data are estimated (it is estimated 80l/capita/d domestic wastewater production for the counting).

It is to be mentioned that the data must be handled with high precaution because our statistics register the domestic wastewater production based on the measured water consumption measured by meter. For the real amounts there are no available data. The wastewater production can be estimated as the 85-90% of the reported statistical data.

Table 3.1.5.A. Domestic wastewater production 1996

Water Authority	Domestic waste water production				
	Connected to centralized sewerage system			Septic tanks	Total
	1000 m^3/a				
	Total	Urban	Rural		
Catchment Area of the Danube					
01. Győr	14753	13351	1402	10553	25306
02. Budapest	122546	120014	2532	30106	152652
03. Baja	1599	1591	8	8052	9651
04. Székesfehérvár	19170	17798	1371	17791	36961
05. Pécs	12195	11133	1062	11427	23622
06. Szombathely	10588	9541	1047	9231	19819
Total of the Danube	180851	173428	7422	87160	268011
Catchment Area of the Tisza					
07. Nyíregyháza	5535	5210	326	10963	16498
08. Miskolc	14014	13199	815	18199	32213
09. Debrecen	7492	7373	118	11740	19232
10. Szolnok	6600	6204	397	12145	18745
11. Szeged	13812	13770	42	16769	30581
12. Gyula	2913	2785	128	6660	9573
Total of the Tisza	50366	48541	1826	76476	126842
Total of the country	**231217**	**221969**	**9248**	**163636**	**394853**

Table 3.1.5.B. Average per capita domestic wastewater production 1996

Water Authority	Domestic per capita waste water production				
	Connected to centralized sewerage system			Septic tanks	Total
	liter/capita/d				
	Total	Urban	Rural		
Catchment Area of the Danube					
01. Győr	118	120	102	73	94
02. Budapest	159	160	124	90	139
03. Baja	112	114	21	87	90
04. Székesfehérvár	126	128	106	75	95
05. Pécs	112	112	114	76	91
06. Szombathely	117	124	79	75	93
Total of the Danube	144	146	106	81	115

Catchment Area of the Tisza					
07. Nyíregyháza	132	132	125	71	84
08. Miskolc	108	111	75	77	88
09. Debrecen	116	115	137	76	88
10. Szolnok	128	127	142	81	93
11. Szeged	149	149	167	89	109
12. Gyula	107	106	134	83	89
Total of the Tisza	123	124	99	79	92
Total of the country	**139**	**141**	**105**	**80**	**106**

Table 3.1.5.C. Share of population connected to centralized sewerage system in 1996

Water Authority	**Population connected to centralized sewerage system**					
	Population			**%**		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Catchment Area of the Danube						
01. Győr	343581	305783	37798	47	71	12
02. Budapest	2106716	2050712	56004	70	89	8
03. Baja	39239	38209	1030	13	29	1
04. Székesfehérvár	416112	380676	35436	39	65	7
05. Pécs	298774	273264	25510	42	71	8
06. Szombathely	247277	211100	36177	42	67	13
Total of the Danube	3451699	3259744	191955	54	78	8
Catchment Area of the Tisza						
07. Nyíregyháza	115088	107955	7133	21	46	2
08. Miskolc	356432	326594	29838	35	65	6
09. Debrecen	177488	175121	2367	30	40	1
10. Szolnok	141270	133589	7681	26	39	4
11. Szeged	253710	253020	690	33	45	0
12. Gyula	74784	72161	2623	25	37	3
Total of the Tisza	1118772	1068440	50332	30	47	3
Total of the country	**4570471**	**4328184**	**242287**	**45**	**67**	**6**

3.2. Projection for Planning Horizons 2010 and 2020

3.2.1. Population

According to the prediction of the Demographic Scientific Research Institute of the CSO (7) the population in Hungary decreases and it will be decreasing at the same manner. In long-range term it can be expected as follows:

2010 year 9,908 x 10^3 persons
2020 year 9,483 x 10^3 persons

There is no long term information about the distribution of the population among the catchment areas. So it can be supposed, that the decrease in the catchment areas will be proportional to the country as a whole. According to this counting table 3.2.1. shows the estimated long-range population. (At the estimation were used the data of the Sewerage Framework Plan of Hungary (8) which were calculated according to Water Authority population.)

Table 3.2.1. Population (1000 capita)

Water Authority	2010	2020
Catchment Area of the Danube		
01. Győr	713	683
02. Budapest	2943	2864
03. Baja	287	275
04. Székesfehérvár	1040	986
05. Pécs	694	664
06. Szombathely	565	541
Total of the Danube	6242	6013
Catchment Area of the Tisza		
07. Nyíregyháza	525	474
08. Miskolc	981	948
09. Debrecen	585	541
10. Szolnok	535	512
11. Szeged	753	711
12. Gyula	287	284
Total of the Tisza	3666	3470
Total of the country	**9908**	**9483**

3.2.2. Domestic Water Demand

In long term the population demand on raw water will be growing in spite of that:

- the centralized water supply system ensures for almost all of the population the healthy drinking water
- the earlier prodigal water use attitude changes to water saving attitude because the water prices are high comparing to the income of the population
- the water service organization will make effective measures for water losses abatement

The increase of the domestic water demand is at first because of the demand on perfect water supply level. Nowadays increases the demand for water supply comfort where the households are directly connected to the centralized supply system The population whose drinking water demand was ensured through water taps being in the courtyards or in the street wants higher comfort, namely direct connection, which results in water demand increase. It can be expected water demand increase at the households as well, where the direct connection exists but the household has not yet all comfort. The domestic water demand will increase with 35-37% to the 2010-2020 year.

Because of the increase of the water demand level - outlined in the previous paragraph - in long term there will be not so big difference between the urban and the rural areas. (The per capita water demand will be equalized)

The prediction of domestic population demand on raw water was made with the help of the above mentioned things. Table 3.2.2. contains the detailed data.

Table 3.2.2. Domestic population demand on raw water 2010 and 2020

Water Authority	Domestic (population) demand on raw water 10^6 m^3/a		Domestic per capita liter/capita/d		Share of population Connected to centralized Water supply system	
	2010	2020	2010	2020	2010	2020
Catchment Area of the Danube						
01. Győr	48.5	49.6	190	200	98.0	99.0
02. Budapest	246.7	250.4	230	240	100.0	100.0
03. Baja	18.2	18.6	180	190	98.0	99.0
04. Székesfehérvár	74.5	75.2	200	210	98.0	99.0
05. Pécs	44.5	45.6	180	190	98.0	99.0
06. Szombathely	40.1	40.5	200	210	98.0	99.0
Total of the Danube	472.5	479.9	209	220	98.9	99.4
Catchment Area of the Tisza						
07. Nyíregyháza	36.5	35.4	200	210	95.0	97.0
08. Miskolc	70.1	71.9	200	210	98.0	99.0
09. Debrecen	45.6	43.4	220	225	98.0	99.0
10. Szolnok	39.0	39.4	210	215	96.0	97.0
11. Szeged	58.4	55.8	220	225	95.0	96.0
12. Gyula	18.2	18.6	180	190	95.0	96.0
Total of the Tisza	267.8	264.5	208	214	96.0	97.4
Total of the country	**740.3**	**744.4**	**210**	**217**	**98.0**	**99.0**

By 2010 the now existing water supply differences between the catchment areas will significantly decrease. The underdeveloped areas begin to develop and the equalization will take place about at 2020. The per capita water demand will be about equalized as well. Similar equalization can be expected for the urban and rural areas, though there are no information in this context for catchment areas.

3.2.3. Domestic Wastewater Production

The basis for the improvement of the sewerage and wastewater treatment is the number 2207/1996 (VII.24.) Government resolution on the directives for sewerage and wastewater treatment programme in Hungary. The Sewerage Framework Plan of Hungary contains the detailed tasks, which were made taking into consideration the EU directives.

The aim of the Sewerage Framework Plan (8) of Hungary 2010 is, that about 43% sewerage rate should increase to about 68%. For the areas, where there will be no sewerage system even after the realization of the long range plan, must be at least in 23% construct professional individual wastewater treatment plants for healthy dumping of the wastewater. This aim is directed to approach the developed EU countries after the 2010 year the developments must be continued to reach the level of the EU countries. The Sewerage Framework Plan of Hungary doesn't contain the predictions after 2010, so this paper could work with the Plan's data only till 2010. After this term it could be given only approximate estimations.

Table 3.2.3. shows the data for catchment areas.

Table 3.2.3. Domestic waste water discharge 2010 and 2020

Water Authority	Total of domestic discharge to public sewerage system (average)		Domestic per capita wastewater		Population connected to public sewerage system	
	10^6 m^3/a		liter/capita/d		%	
	2010	2020	2010	2020	2010	2020
Catchment Area of the Danube						
01. Győr	29.2	42.7	170	190	66.4	90.0
02. Budapest	179.2	216.4	210	230	79.6	90.0
03. Baja	7.7	14.6	140	160	52.0	90.0
04. Székesfehérvár	42.3	64.6	180	200	62.2	90.0
05. Pécs	21.5	35.0	140	160	60.6	90.0
06. Szombathely	21.1	32.1	160	180	64.1	90.0
Total of the Danube	301.0	405.4	188	205	70.4	90.0
Catchment Area of the Tisza						
07. Nyíregyháza	19.0	30.3	180	195	55.5	90.0
08. Miskolc	37.6	60.6	180	195	58.5	90.0
09. Debrecen	30.3	39.0	200	220	70.7	90.0
10. Szolnok	21.5	35.4	190	210	61.9	90.0
11. Szeged	38.7	51.5	200	220	70.6	90.0
12. Gyula	11.7	16.8	160	180	69.4	90.0
Total of the Tisza	158.8	233.6	188	205	63.3	90.0
Total of the country	**459.8**	**639.0**	**188**	**205**	**68.0**	**90.0**

4. Actual and Future Population Potentially Affected by Water Pollution

4.1. Actual and Future Population Potentially Affected by Health Hazards through Raw Water Quality Exceeding Defined Quality Standards for Drinking Water

At first it must be mentioned that the drinking water supply of Hungary is ensured by ground water. The surface water resources utilization as drinking water is only the 5.3% of the fresh water demand. The data of water production from surface water is given in Table 4.1.A. Data of this chapter are based on (9), (10).

Table 4.1.A. Water production from surface water

	Water production		Standard capacity $10^6m^3/d$	Produced water $10^6m^3/d$	According to 75/440/EEC
	Longitu-dinal section	Place			
Catchment area of the Danube					
Danube	1059.0	Surface water work in Budapest (peak water work)	200	3 090	A3
Danube	1737.0	Surface water work in Lábatlan (of local importance)	3	600	A2
Balaton	-	Surface water works on Balaton	94	3 690	A3
Total of the Danube:			**297**	**15 813**	
Catchment area of the Tisza					
Tisza	335.5	Szolnok surface water work	80	9464	A2
Eastern Main Canal (KFCS)	-	Balmazújváros surface water work	45	5 550	A2
North reservoirs	-	Lázbérc, Köszörüvölgy, Csórrét, Hasznos, Mihálygerge reservoirs Borsodszirák enrichment of ground water	62	10 426	A2
Total of the Tisza:			**187**	**25 443**	
Total of the country:			**484**	**41 256**	

The classification of surface water - used as drinking water - according to EU prescriptions (75/440/EEC Directive) hasn't been done yet, but according to the used technologies and operating experiences Danube, Tisza and all the tributaries can be considered as being in A2 class. There are problems only at special contamination when for some time the water can be considered as being in

A3 class. Especially dangerous are the periods of unexpected oil contamination and great microbiological contamination. The cleaning technologies are not always prepared for protection against this kind of contamination.

From the point of view of health risk the water supply from surface water works varies in space and time. During the year the surface water works in general comply with the strict prescriptions given for water quality, so there is a minimal risk for the population. Similarly there is a minimal risk at waterworks where the drinking water can be substituted with other water basis (e.g. ground water) in some contamination period. Where there is no possibility for substitution there grows the health risk of the population at the rate of the contamination.

The health risk for the population supplied with drinking water originated from surface water is shown in Table 4.1.B.

Table 4.1.B. Health risk of the population supplied with drinking water originated from surface water

	Population of health risk 10^3 capita	
	Minimal risk	**Serious risk**
Section of the Danube above Budapest (At extraordinary contamination instead of the water of the surface water work of the capital, Budapest can be supplied by groundwater so the drinking water of the prescripted quality can be ensured)	1730	-
The section of the Danube above Lábatlan (The surface water work has no reserved groundwater)	-	5
Balaton (Some part of the surface water can be replaced with ground water so can be the water quality partly ensured)	~ 148	~ 250
Total of the Danube:	**1879**	**255**
Section of Tisza above Szolnok (There is no reserve of the surface water work)	81	-
Eastern Main Canal (Instead of the water of the surface water work the groundwater of Debrecen can be used)	226	212
North reservoirs (These are some part of regional water supply system. The water can be substituted with other resources)	-	-
Total of the Tisza:	**307**	**212**
Total of the country:	**2186**	**467**

In Hungary a major part of the drinking water demand (about 40%) is ensured by bank water. The bank water is by natural way filtered water of the river and the subsoil water flowing from the direction of the bank. The quality of raw water is in strict connection with the water quality of the river and the subsoil water. At some places due to contamination (Fe, Mn) originating from stratum the water must be treated. The most important bank water resources are at both sides of Danube, Rába, Dráva and Mura. The operating water basis of vulnerable bank water is shown in Annex 2-1. The drinking water supply of the population living by the banks of Danube is ensured from bank water. (By the help of connecting up some areas being at a distance get bank water as well). Over the existing water resources important potential water resources will be available in the future (11). These are shown in Annex 2-2.

As there can't be expected changes in the existing structure of water production, the protection of the existing and potential bank water resources in vulnerable areas is very important because of the future of the water supply. The protection must cover the water quality of the river and subsoil water as well. The protection of water quality results in minimizing the health risk too. The planned utilization of bank water resources shows that the surface water production will be at the same level in the future as it is now.

4.2. Actual and Future Population Potentially Affected by Health Hazards and Other Impacts on Welfare through Unsanitary Conditions in the Danube River System

Quality of bathing water in Hungary with special reference to the Danube River and its tributaries.

It was in 1996 that the first time a National bathing water monitoring system has been created and supplied data for a central database, making it possible to prepare an overall quality evaluation. The monitoring system is based on the work of the 19 County and the Budapest Capital Institutes of the State Public Health and Medical Officer Service and the Department of Water Hygiene of the National Institute of Environmental Health, National Center for Public Health.

1. ***Sampling and sampling frequency***

   Samples have been collected throughout the bathing season and in several instances about one month before and after it. Although the basic requirement - coinciding with that of the European Directive 76/160/EEC on the quality of bathing water - is that sampling has to be done fortnightly throughout the bathing season, it is fulfilled only in a minor part of the cases.

2. ***Range of bacteriological tests***

   Sampling is generally done only for bacteriological examinations covering the parameters prescribed by the National standard "MSZ 13690-3:1989; Bathing water. Qualification of bathing water by bacteriological tests" as ordered by the statutory order "37/1996 NM (X.18.) On the public health provisions of establishing and running public baths". These parameters are numbers of total and fecal coliforms, fecal enterococci, colonies growing on Endo agar (only for stagnant waters), and finally the presence or absence of Salmonella in 1 liter sample. Sampling and the laboratory tests have been performed according to page 2. of the above standard.

3. Evaluation of the results

The results of the examinations have been evaluated per sample according to a four-category scoring system as agreed by a committee consisting of the representatives of each of the institutes. The limit values of acceptability for bathing are near to those of the above mentioned EU Directive, but there is also an additional category for "excellent" and another one for "seriously polluted" quality. The limit values are shown in the following table.

Bacteriological parameter (numbers)	Volume	Excellent	Acceptable	Not acceptable	Seriously polluted
Total coliforms	100 mL	1000	10000	100000	>100000
Thermotolerant coliforms	100 mL	100	1000	10000*	> 10000
Fecal enterococci	100 mL	100	1000	10000	> 10000
Endo/colonies**	100 mL	50000	-	-	-
Salmonella (P/A)	1000 mL	not detected	not detected		

* *differently from the EU limit value of 20000 for acceptability.*

** *to be examined only at stagnant waters.*

The bathing sites themselves have not usually been categorized in Hungary, and thus the above described scoring system has no real impact on the evaluation of them; the public health authority decides on a more or less subjective basis in whenever being requested to approve the official designation of bathing sites by the municipality.

The following results leading to compilation of series of maps of relevant Hungarian water bodies however have been arrived at, by applying the principle outlined in the EU Directive, i.e. bathing sites with more than 5 percent of not acceptable results were considered as unacceptable. Although the EU Directive does not explicitly allows for it, sites where the frequency of excellent results (not exceeding limit values similar to those of "G" /guideline/ values in the Directive/) was at least 20 percent were considered as of "excellent" water quality.

The 5 percent frequency tolerance limit was also applied to the seriously polluted results, with the reservation that whenever any result like that occurred, the qualification of the site might have not been better than "unacceptable".

This system seems however to be extremely rigorous with an effect of disproportionately unfavorable qualification of most of the bathing sites. It holds in spite of the fact that in fact the results of two years' (1996 and 1997) season have been combined in order to eliminate the negative effect of too few samples per site per year, also originating from the limited length of bathing season. Sampling sites with less than five samples during the two years are not classified and are not indicated on the maps.

Also, inclusion of the results of the salmonella-test, required by the Hungarian standard but not by the EU Directive, has effected in a worse qualification at a lot of sampling sites, although the presence of Salmonella in numbers near to the detection limit (1 viable organism in 1 liter) is far from a level of unacceptable health risk for the bathers, and may originate from the animal fauna, living in or around the water. On the other hand, as the presence of Salmonella in a sample is explicitly unacceptable according to the EU Directive, too, results like that could have not been disregarded. In principle the fecal enterococcal number parameter, also requested to perform only by the Hungarian standard, but not by the EU Directive may worsen the qualification, but in fact this is a relatively rare case, since the limit values for the enterococci seem to be a bit loose.

4. Sampling sites involved in the monitoring system

Altogether 354 sampling points were involved on 116 water bodies in or near to 203 localities in the years 1996 and 1997, with the overwhelming majority of them in both years. Out of the 116 water bodies 17 were rivers (the different branches of Körös taken together) with 126 sampling points, 17 were dead or at both end sluiced sections of rivers with 35 sampling points, 37 lakes with 141 sampling points, 22 reservoirs with 26 sampling points and 23 excavations with 25 sampling points.

157 of the sampling points were officially designated as bathing site, 31 thereof by rivers, 111 by lakes, and the rest on other stagnant water bodies. 115 further sites (48 by rivers, 19 by lakes, 17 by dead sections, 13 by reservoirs and 18 by excavations) are registered as customary bathing sites on the basis of the data of frequency and density of use for bathing, even if their designation has not been proposed by the municipalities. The rest of the sites (81) are either used for other water sports only, or occurrence of bathing is negligible, or they were involved only as main riverine sampling sites of the National Surface Water Monitoring System on water bodies, some sections of which are also used for bathing. Several sites have been combined on the basis of their immediate vicinity or problems of indicating them on maps (e.g. sampling sites on the same cross section of a river, shore side and deeper sites on the same location by a lake, etc.)

5. Map (Fig.4.2.1.) indicating bathing water quality according to the above principles

On the map riverine bathing sites are indicated by marking clearly discernible from other sampling sites. The color of the markings is set according to the respective score as indicated in the legends. The river sections downstream a sampling site is also marked with the color of the respective score until the next sampling site. Rivers without sampling sites and river sections without classified upstream sampling sites are represented by the usual way (thin blue line).

6. Number of population living in communities located at river stretches with "unacceptable" or "seriously polluted" qualification (See Table 4.2.1.)

The population data has been collected from a database complied on the basis of the 1990 census. Only communities located right on the shore or not farther than 5 km are included. Out of a total of 2,086.3 km river stretch, 525.5 km (25.2 %) have proven as seriously polluted, 1,185.3 km (56.8 %) as unacceptable, 342.2 km (16.4 %) as acceptable and 33.3 km (1.6 %) as excellent water quality. In settlements along these stretches lives a total population of 3,807,309, of which 628,896 (16.5 %) and 2,849,203 (74.8 %) respectively, is living by stretches of seriously polluted and unacceptable quality. The number and percentage of population settled by stretches of acceptable and excellent respectively quality is rather low: 294,609 (7.7 %) and 34,601 (0.9 %), resp.

It is however necessary to call the attention of the users of the above data on some serious limitations regarding their usefulness. Firstly, people are not expected to use water for bathing if it is widely known that it is seriously polluted, which is the case in many instances, most outstandingly in Budapest. Only a very limited number of the population of the Capital bathes in the water of the Danube, so the data are really misinforming in this respect. Secondly, there are very frequented bathing sites that attract people from relatively faraway places, and on the basis of common knowledge (even if there are no official data) e.g. on the basis of lacking Information on adverse health effect of bathing and other attracting factors as amusement possibilities and commercial attractions settled to such places, these preferred sites are chosen instead of close but suspicious sites.

Table 4.2.1. Length of river stretches with different classification according to the bathing water quality scoring system and population living nearby them

river	water quality	population	length (km)
DANUBE	seriously polluted	138230	43.7
	unacceptable	2387210	410.7
Danube, Szentendre branch	unacceptable	27388	31.0
Danube, Ráckeve branch	seriously polluted	48476	18.7
	unacceptable	35347	33.3
	acceptable	2744	0.9
	excellent	1261	1.0
TISZA	seriously polluted	293382	197.2
	unacceptable	207943	287.1
	acceptable	130698	59.7
	excellent	33340	32.3
BODROG	seriously polluted	5102	7.7
	unacceptable	2407	11.0
	acceptable	19873	29.9
HERNÁD	seriously polluted	19659	69.8
	unacceptable	9018	18.5
TÚR	seriously polluted	90	13.9
	unacceptable	3996	45.4
KELETI–FŐCSATORNA	unacceptable	18398	13.6
	acceptable	63737	81.4
MAROS	seriously polluted	44650	47.9
DRÁVA	seriously polluted	1927	7.1
	unacceptable	5635	56.4
	acceptable	19822	100.6
IPOLY	seriously polluted	33387	66.4
	unacceptable	4752	43.7
RÁBA	seriously polluted	16890	30.5
	unacceptable	58644	124.7
KÖRÖSÖK	seriously polluted	27103	22.6
	unacceptable	88465	109.9
	acceptable	57735	69.7
Altogether		**3807309**	**2086.3**
	seriously polluted	628896	525.5
	unacceptable	2849203	1185.3
	acceptable	294609	342.2
	excellent	34601	33.3

Figure 4.2.1. Map of Hungary with rivers classified according to the bathing water quality scoring system

4.3. Main Health Hazards Through Water Pollution in the Danube River System

The health and particularly the mortality indicators characterizing the Hungarian population indicate that in this field we face very grave problems and partly environmental impacts are to blame. As NEP (3) stated that in 1990 50% more people died in the age 40-60 age group than 20 years ago, premature mortality of the Hungarian population has increased significantly. The rate of cancerous diseases clearly traceable back to Environmental causes among the causes of death is unfavorable in both Hungarian and international respects. Regarding different types of cancer the change in head, neck and lung cancers is striking, among both sexes the rate of mortality in the 40-59 age group has increased many-fold (3-8 fold) in the past 20 years. Suspended particulate causes 3-5% increase in mortality and 7-10% increase in occurrence of respiratory diseases. Susceptibility to allergies is up to 40%, according to figures asthmatic diseases have doubled between 1983-1992 and have never has quadrupled.

The management of environmental health problems is a task on the level of each Environmental medium and system, among them the following are to be highlighted related to water (NEP):

a. Regarding drinking water, adequate settlement of problems of drinking water containing arsenic, bacteriological infection, nitrate contents and chlorinating by-products.
b. Reduction of the threat of swimming-pool epidemics from bacteriological infection.

The Hungarian Environmental Health Action Programme (HEHAP) (12) elaborated according to the Guidance of WHO details the problems and tasks relating to human health.

Human health priority of factors impairing the quality of drinking water (HEHAP)

In the following the most significant factors that impair the quality of drinking water are listed in order of priority.

1. Arsenic

Arsenic is the most dangerous factor, from a health perspective, having chronic effects at even low doses. This substance occurs in large areas of the country. Although a major part of the problem was successfully solved (but at very high cost) its occurrence in significant concentrations is not rare in individual water supply systems.

2. Bacterial contamination

In the districts of the Great Plain with a unique water quality, a significant proportion of drinking water samples are not yet acceptable because of bacterial aftergrowth. The solution is not solely of a financial nature, since no generally applicable technology is available. The reorganization of waterworks that is taking place may aggravate the problem. The bacterial contamination nay even lead to disease outbreaks. To prevent this, protection zones must be established to avoid wastewater contamination.

3. Nitrate

The situation is expected to deteriorate in some water sources on vulnerable aquifers. The problem has not been solved in some, mostly peripheric settlements that are not yet supplied from waterworks. The prevention applied earlier to protect the health of babies, e.g. education and bottled water supply, is less organized in these areas. Another source of risk stems from the consumption of private well water that is being used increasingly as a consequence of the high water rate.

4. Sodium (lack of calcium and magnesium)

The problem exists in major parts of the Great Plain. The excess of sodium may especially affect the health of patients who are dependent on a low salt diet due to cardiovascular disease or renal failure. An inadequate intake of calcium is a problem for pregnant and elderly women. Also, the lack of magnesium may be of health importance.

5. Nitrite

As a result of secondary pollution in the distribution systems, nitrite occurs in bacteriologically contaminated pipelines. Nitrite is 10-15 times more toxic than nitrate. First of all babies are at risk, but high concentrations are also of importance to the health of adults.

6. Chlorination by-products

As a result of earlier measures, chlorination by-products are not generally present in high concentrations. Potential risk is related to the presence of unknown, less volatile (and not yet measured) mutagenic compounds. Sometimes it is indispensable to chlorinate water with a high humic content, which may also produce unknown substances.

7. Other micropollutants

Among microcontaminants, boron, lead and pesticides may be mentioned, but no general knowledge is available about their occurrence, so that the possible risk cannot be estimated. According to unrepresentative explanatory surveys, pesticide contamination of drinking water does not at present seem to be a problem. The occurrence of boron and lead is still to be estimated but the probability is low that lead should be of concern. Barium nay occurs in mineral water, bottled for sale, where the concentration exceeds the limit value by one order of magnitude. No data are available for piped drinking water.

8. Geographical differences

This priority list is not equally valid for all Hungarian regions. Some differences exist as some constituents represent a health risk in only some parts of the country.

According to existing knowledge, arsenic occurrences are confined to the region beyond the river Tisza (with the exception of the northern and southernmost part) and to that between Tisza and Danube. Bacterial aftergrowth is characteristic of the major part of the region beyond the Tisza River, and the flat regions laying on the right bank of Tisza, but it also occurs in other places. Nitrate is found in drinking water in districts that use groundwater, first of all in Borsod, Veszprém, and Pest counties, but it may be found almost everywhere, except in the region beyond Tisza. Sodium, i.e. soft water, is characteristic on the Great Plain.

Nitrite is the result of aftergrowth in warmer waters. Chlorination by-products may occur in regions supplied by surface water, such as Szolnok and its surroundings, the regional distribution system of the Mátra mountains, around Lake Balaton, and occasionally in Salgótarján and its surroundings.

5. Economic Significance of the Danube River System and Impacts of Economic Activities

5.1. Actual Situation

5.1.1. Abstraction of Raw Water from the Danube River System

In Hungary for the different economic activities and for the household produced total water amount is 6,279.1 10^6m^3/a. 5,302.7 10^6m^3/a (84.5% of the total) is ensured from surface water, the rest 976.4 10^6m^3/a (15.5% of the total) is ground water.

The water uses based on surface and ground water at the different economic activities vary from the point of view of the source of water, depending on the water supply methods. The 1996 situation of the surface and ground water production is shown in table 5.1.1.

Table 5.1.1. 1996 situation of the surface water and the ground water production

	Present situation of the surface water and the groundwater production							
Water Authority	**Municipal Water**		**Industrial water**		**Water used for agriculture**		**Total**	
	10^6m^3/a	**%**	**10^6m^3/a**	**%**	**10^6m^3/a**	**%**	**10^6m^3/a**	**%**
Total of surface water:	41.2	5.3	4326.2	96.7	935.3	90.9	5302.7	84.5
From the ground water:								
- subsoil water	22	2.8	10.7	0.2	93.1	9.1	125.8	2.0
- stratumwater	286.6	36.9	60.2	1.4			346.8	5.5
- bank water	330.6	42.6	11.2	0.3			341.8	5.4
- karst water	88.2	11.4	7.0	0.1		0.0	95.2	1.5
- thermal and medical water	7.3	1.0	4.0	0.1			11.3	0.2
- mining water		0.0	55.5	1.2			55.5	0.9
Total of ground water:	734.7	94.7	148.6	3.3	93.1	9.1	976.4	15.5
Total of surface and ground water	**775.9**	**100.0**	**4474.8**	**100.0**	**1028.4**	**100.0**	**6279.1**	**100.0**

Municipal water means: drinking water served by public utility for households, industry and others

5.1.1.1. Domestic Raw Water Demand

The domestic water demand of the country is for almost all of the population ensured by central water supply system. The water supply plants ensure the water demand of other activities as well.

The distribution of the total water amount ensured by central water supply system (13) from the point of view of the source of water is as follows:

- freshwater from surface w.	41.2	10^6m^3/a	(5.3 %)
- freshwater from ground w.	734.7	10^6m^3/a	(94.7%)
Total:	**775.9**	**10^6m^3/a**	**(100.0%)**

In the freshwater supply in Hungary the most important economic factor is the water supply system based on ground water. The freshwater supply systems based on surface water ensure freshwater only for some local consumers.

The distribution of the total water production between the households and the economic activities are as follows:

-	population	545.6	$10^6m^3/a$	(70.3%)
-	institutions, commercial and other service activities	147.0	$10^6m^3/a$	(18.9%)
-	industrial plants connected to central water supply system	83.3	$10^6m^3/a$	(10.8%)
	Total:	**775.9**	**$10^6m^3/a$**	**(100%)**

More than 2/3 part of the total production of central water supply system serves the freshwater supply of the population, and the rest serves the other economic activities.

There is no information about the distribution of the surface water between the households and the different economic activities, but it can be estimated that this rate is similar to the ratio of the country total. It means, that about the 70% of the 41.2 $10^6m^3/a$ surface water (29 $10^6m^3/a$) serves the water supply of the population. Assuming 200l/capita/d consumption this is about 400,000 people supplied from surface water. It is only the 4% of the population of Hungary. Table 5.1.1.1. shows the freshwater amount originated from surface water in the different catchment areas (13) (9).

Table 5.1.1.1. Drinking water originated from surface water 1996

Water Authority	Surface water production for centralized drinking water supply system		From the total: Estimated quantity used in households
	1000 m^3/a	%	1000 m^3/a
Catchment Area of the Danube			
01. Győr	600	1.4	372
02. Budapest	7461	18.1	4626
03. Baja			
04. Székesfehérvár	8367	20.2	5188
05. Pécs	3756	9.1	2328
06. Szombathely			
Total of the Danube	20184	48.8	12514
Catchment Area of the Tisza			
07. Nyíregyháza			
08. Miskolc	6055	14.7	3754
09. Debrecen	5550	13.5	3441
10. Szolnok	9467	23.0	5869
11. Szeged			
12. Gyula			
Total of the Tisza	21072	51.2	13064
Total of the country	**41256**	**100.0**	**25578**

The estimated quantity used in households is counted as the 62.7% of the total
*4,371*1000 m^3/a is conducted to the Tisza catchment area*
*From the total of the Danube 20,184*1000 m^3/a surface water production*

One must pay attention to the fact that the surface water plants serve only the surplus demand at peak time. (see in the 4.1. section as well)

5.1.1.2. Industrial/Mining Raw Water Demand

Some industrial plants have their own water supply systems (13) (15). The planned water amount produced with the help of the unique water plant, according to the source of water is:

- surface water	4,326.2	106m3/a	(97.6%)
- ground water	148.6	106m3/a	(3.3%)
Total of own production:	**4,474.8**	**106m3/a**	**(100.0%)**

From the ground water 55.5 $10^6 m^3$/a is mining water.

The industrial plants refill their own water production with water from the central water supply system and with water originating from other water plants, and it happens too, that they give some part of their own production to other consumers. Considering all of these the water amount for industry is 4,695.2 $10^6 m^3$/a. From this the surface water is 4,587.6 $10^6 m^3$/a (97.7%).

The cooling water is 4,416.5 $10^6 m^3$/a.

The distribution of water use among the industrial branches is as follows:

Electricity production	92.4 %
Manufacturing industry	6.9 %
Construction and other activities	0.7 %
Total:	**100.0 %**

The fresh water available for industry, the surface water amount and the cooling water use are given in table 5.1.1.2. according to catchment areas.

Table 5.1.1.2. Abstraction of raw water from the Danube River system 1996

Water Authority	Industrial raw water demand				
	Raw water available for industry	From the total:			
		surface water		cooling water	
	$10^3 m^3$/a	$10^3 m^3$/a	%	$10^3 m^3$/a	%
Catchment Area of the Danube					
01. Győr	50176	41203	82.1	12061	24.0
02. Budapest	893305	847271	94.8	818042	91.6
03. Baja	637	87	13.7	152	23.9
04. Székesfehérvár	2934864	2919749	99.5	2890707	98.5
05. Pécs	7966	703	8.8	2239	28.1
06. Szombathely	2566	1373	53.5	1000	39.0
Total of the Danube	3889514	3810386	98.0	3724201	95.7
Catchment Area of the Tisza					
07. Nyíregyháza	204	0	0.0	1049	514.2
08. Miskolc	777672	759442	97.7	682557	87.8
09. Debrecen	7275	6476	89.0	5344	73.5
10. Szolnok	10062	9865	98.0	1394	13.9
11. Szeged	8392	157	1.9	917	10.9
12. Gyula	2068	1538	74.4	1006	48.6
Total of the Tisza	805673	777478	96.5	692267	85.9
Total of the country	**4695187**	**4587864**	**97.7**	**4416468**	**94.1**

5.1.1.3. Agricultural Raw Water Demand for Irrigation

The most important part of the agricultural water demand is the surface water used for irrigation and for fishponds. The other agricultural water demand is ensured from ground water. The most important capacity and water supply data of the primary mains are given in table 5.1.1.3 (13) (14).

Table 5.1.1.3. The important capacity and water service data of agricultural primary mains 1996

Water Authority	Water production		Bought water	Total amount of water	Water supply				Trans-ferried (bulk) water	Total of supplied and trans-ferried	Loss or surplus of system
	Pum-ping	gravita tion			Irriga-tion	Fish ponds	Other	Total			
Catchment Area of the Danube											
01. Győr	0.0	62.5	0.0	62.5	0.9	14.8	39.8	55.5	0.0	55.5	-7.0
02. Budapest	0.0	38.0	0.0	38.0	2.7	5.3	0.9	8.9	26.9	35.8	-2.2
03. Baja	0.0	130.1	27.0	157.1	7.6	7.9	0.0	15.5	144.8	160.3	3.2
04. Székesfehérvár	0.0	33.1	1.5	34.6	0.5	6.1	3.5	10.1	1.9	12.0	-22.6
05. Pécs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06. Szombathely	0.1	1.3	0.0	1.4	0.1	1.1	0.0	1.2	0.0	1.2	-0.2
Total of the Danube	0.1	265.0	28.5	293.6	11.8	35.2	44.2	91.2	173.6	264.8	-28.8
Catchment Area of the Tisza											
07. Nyíregyháza	0.1	4.7	0.0	4.8	1.9	2.8	0.0	4.7	0.0	4.7	-0.1
08. Miskolc	0.1	8.8	0.0	8.9	1.6	0.4	0.0	2.0	0.0	2.0	-6.9
09. Debrecen	0.0	500.0	0.0	500.0	19.8	112.1	26.0	157.9	267.0	424.9	-75.1
10. Szolnok	8.3	83.9	8.4	100.6	48.9	22.6	22.4	93.9	3.1	97.0	-3.6
11. Szeged	31.8	0.0	9.5	41.3	21.7	8.4	0.5	30.6	0.0	30.6	-10.7
12. Gyula	45.0	20.1	14.1	79.2	18.5	29.3	0.0	47.8	21.7	69.5	-9.7
Total of the Tisza	85.3	617.5	32.0	734.8	112.4	175.6	48.9	336.9	291.8	628.7	-106.1
Total of the country	**85.4**	**882.5**	**60.5**	**1028.4**	**124.2**	**210.8**	**93.1**	**428.1**	**465.4**	**893.5**	**-134.9**

The distribution of agricultural water production according to the source of water can be estimated as follows (14):

surface water used for irrigation and fishponds	935.3	$10^6 m^3/a$	(90.9 %)
for other purposes and in some part for irrigation used ground water (estimated)	93.1	$10^6 m^3/a$	(9.1 %)
total:	**1028.4**	**$10^6 m^3/a$**	**(100.0%)**

The agricultural water supply in 1996 was greatly influenced by the changeable weather, the disruption of the large agricultural organizations and the situation because of the growing up the water prices. The information of water authorities, which were obliged to give data, reflects very well the situation, namely the continuously decreasing agricultural water use.

From the irrigation area of $308x10^3$ hectares[1] (permitted by water laws) $127x10^3$ hectares are irrigated. From the $29x10^3$ hectares fishponds only $26x10^3$ hectares are supplied with water. The amount of sold water in 1996 decreased comparing to the earlier time at the irrigation with about 30% and at fishponds with about 15%.

5.1.2. Wastewater Discharge to the Danube River System

5.1.2.1. Municipal Discharge

A certain part of wastewater discharged by households is conducted by public sewerage system and after treatment or without any treatment is discharged directly to the rivers (to surface water). At the areas having no sewerage system the wastewater is deposited in septic tanks to the soil. The wastewater discharge of the population is written in section 3.2.3.

The central sewerage systems collect not only the wastewater from households but the wastewater of institutional, commercial and service activities. Besides some large industrial plants are making use the services. The public sewerage system serves the conduction of precipitation as well.

The 64% of the amount of wastewater collected via public/central sewerage system is from the households. Table 5.1.2.1. shows the wastewater discharge data by water authorities (13).

Table 5.1.2.1.A. Municipal waste water discharge ($10^3m^3/a$) 1996

Water Authority	Municipal discharge					
	Treated waste water				Conducted with no treatment	Total
	mechanical	biological	advanced	total		
	treatment					
Catchment Area of the Danube						
01. Győr	14649	18098	5278	38026	3704	41729
02. Budapest	226106	61896	423	288425	51550	339976
03. Baja	2943	1595	0	4538	5	4543
04. Székesfehérvár	5943	23333	8956	38233	717	38949
05. Pécs	144	21694	245	22083	591	22674
06. Szombathely	141	22234	334	22709	235	22944
Total of the Danube	249926	148850	15236	414014	56802	470815
Catchment Area of the Tisza						
07. Nyíregyháza	1574	10399	5	11978	315	12293
08. Miskolc	1634	29940	117	31691	156	31847
09. Debrecen	8090	16683	72	24844	555	25399
10. Szolnok	3027	5856	0	8883	4869	13752
11. Szeged	1572	17325	0	18897	24692	43589
12. Gyula	65	10612	0	10678	0	10678
Total of the Tisza	15962	90815	194	106971	30587	137558
Total of the country	**265888**	**239665**	**15430**	**520985**	**87389**	**608373**

[1] 1 hectare = 2,471 acres

Table 5.1.2.1.B. Municipal wastewater discharge (%) 1996

Water Authority	Municipal discharge					
	Treated waste water				Conducted with no treatment	Total
	mechanical	Biological	advanced	total		
	treatment					
Catchment Area of the Danube						
01. Győr	35.1	43.4	12.6	91.1	8.9	100.0
02. Budapest	66.5	18.2	0.1	84.8	15.2	100.0
03. Baja	64.8	35.1	0.0	99.9	0.1	100.0
04. Székesfehérvár	15.3	59.9	23.0	98.2	1.8	100.0
05. Pécs	0.6	95.7	1.1	97.4	2.6	100.0
06. Szombathely	0.6	96.9	1.5	99.0	1.0	100.0
Total of the Danube	53.1	31.6	3.2	87.9	12.1	100.0
Catchment Area of the Tisza						
07. Nyíregyháza	12.8	84.6	0.0	97.4	2.6	100.0
08. Miskolc	5.1	94.0	0.4	99.5	0.5	100.0
09. Debrecen	31.9	65.7	0.3	97.8	2.2	100.0
10. Szolnok	22.0	42.6	0.0	64.6	35.4	100.0
11. Szeged	3.6	39.7	0.0	43.4	56.6	100.0
12. Gyula	0.6	99.4	0.0	100.0	0.0	100.0
Total of the Tisza	11.6	66.0	0.1	77.8	22.2	100.0
Total of the country	**43.7**	**39.4**	**2.5**	**85.6**	**14.4**	**100.0**

The attention must be called to especially big problem that the large amount of wastewater discharging directly to the rivers after mechanical treatment or without any treatment. This results in significant water quality deterioration.

The municipal sector represents one of the most important sectors leading to surface water pollution. The importance of municipal sector in connection with water pollution is based on the fact that of total in surface water discharged wastewater needing treatment, in surface water discharged wastewater makes up more than 80%. This amount is approximately four times as much as the industrial wastewater needing treatment, which is discharged directly into surface water and many thousand times as much as the wastewater discharge originated from agricultural point sources. Municipal wastewater discharge consists of wastewater discharged by households, institutions and industrial facilities. Untreated wastewater discharge of households, institutions and industries in canalized areas causes significant surface water pollution. The majority of sewage is either not purified or if it is, not adequately. (The ratio of biologically treated municipal wastewater is less then 40%, while that of advanced treated municipal wastewater is below 3%, only mechanically treated wastewater is 44%, wastewater without treatment is 14 %). Especially the capital and some big towns lag behind.

The municipal wastewater discharge due to untreated wastewater of public services, industrial facilities, household causes pollution to the environment either because the wastewater is discharged into the recipient because of the lack of wastewater treatment plant, or, in the case of wastewater plants in existence, because of the applied insufficient wastewater treatment practices. Lack of wastewater treatment is the most important reason of surface water pollution in the municipal sphere. Another reason for municipal pollution is the discharge of households resulting from illegal practices of discharging either to the separated precipitation canal or directly to the sewer. The underlying factor to this behavior is the unwillingness of the individuals to comply with the legal regulations.

The percentage of population connected into public sewer system is only 45%, the gap being more than 52%, while the 96-97% of population is supplied healthy public drinking water. Since only 45 % of the households are connected to the sewer system, the majority of household wastewater is desiccated, however, it is characteristic in Hungary, that the septic tanks are very often improperly managed causing infiltration of wastewater into the ground. The low level of canalization significantly contributes to inappropriate desiccation of household wastewater. In areas with canalization water pollution is caused by the low level of willingness to connect to the municipal sewer system, because people can hardly afford the high sewer prices. Therefore in Hungary in general there is very low utilization of operating municipal sewer and wastewater treatment plants, causing water pollution.

5.1.2.2. Industrial/Mining/Shipping Discharge

The large industrial plants use the central sewerage system and have their own sewerage and treatment systems as well. The industrial discharge amount according to the method of disposal in 1996 is as follows (15):

	$10^6 m^3/a$	%
central sewerage system	64.4	28.9
discharged directly to the rivers	140.3	63.0
to the soil	4.9	2.2
utilization	10.0	4.5
other	3.2	1.4
total:	**222.8**	**100.0**

Beside this the industrial plants discharge wastewater, which is contaminated only with heat and doesn't need any treatment. The total amount of this is 4472.4 10^6m3/a

The amount of industrial discharge to public sewerage system is less than half of discharge directly to the rivers.

In connection with the industrial wastewater discharged to central sewerage system there is a countrywide problem, namely that the industrial pre-treatment isn't solved, nor has a good efficiency. Pretreatment processes of industrial plants are often missing.

This has high load to the central treatment plants, has danger of water contamination, renders more difficult or makes impossible the disposal of sludge.

The treatment data for directly to the rivers discharging wastewater (15) is shown by catchment areas in table 5.1.2.2.

Table 5.1.2.2.A. Industrial waste water directly discharging to the rivers ($10^3m^3/a$) 1996

Water Authority	Waste water				Used water which need no treatment	Total
	Suitably treated	Partly treated	Not treated	Total		
Catchment Area of the Danube						
01. Győr	11478	1339	1447	14264	28793	43057
02. Budapest	8203	25816	4626	38645	809759	848404
03. Baja	29	0	0	29	108	137
04. Székesfehérvár	18613	39659	1866	60138	2860103	2920241
05. Pécs	1851	825	851	3527	1573	5100
06. Szombathely	968	270	0	1238	1613	2851
Total of the Danube	41142	67909	8790	117841	3701949	3819790
Catchment Area of the Tisza						
07. Nyíregyháza	440	150	0	590	537	1127
08. Miskolc	8340	98	289	8727	740917	749644
09. Debrecen	331	1546	77	1954	4773	6727
10. Szolnok	4839	4566	20	9425	1101	10526
11. Szeged	683	625	402	1710	615	2325
12. Gyula	20	44	27	91	583	674
Total of the Tisza	14653	7029	815	22497	748526	771023
Total of the country	**55795**	**74938**	**9605**	**140338**	**4450475**	**4590813**

Table 5.1.2.2.B. Industrial waste water directly discharging to the rivers (%) 1996

Water Authority	Waste water			
	Suitably treated	Partly treated	Not treated	Total
Catchment Area of the Danube				
01. Győr	80.5	9.4	10.1	100.0
02. Budapest	21.2	66.8	12.0	100.0
03. Baja	100.0	0.0	0.0	100.0
04. Székesfehérvár	31.0	65.9	3.1	100.0
05. Pécs	52.5	23.4	24.1	100.0
06. Szombathely	78.2	21.8	0.0	100.0
Total of the Danube	34.9	57.6	7.5	100.0
Catchment Area of the Tisza				
07. Nyíregyháza	74.6	25.4	0.0	100.0
08. Miskolc	95.6	1.1	3.3	100.0
09. Debrecen	16.9	79.1	3.9	100.0
10. Szolnok	51.3	48.4	0.2	100.0
11. Szeged	39.9	36.5	23.5	100.0
12. Gyula	22.0	48.4	29.7	100.0
Total of the Tisza	65.1	31.2	3.6	100.0
Total of the country	**39.8**	**53.4**	**6.8**	**100.0**

Only 40% of industrial wastewater discharged directly to the rivers is treated with suitable method.

It must be mentioned that the Hungarian recording contains the treatment data not distributed for biological and advanced methods. According to the recording - given in the attached table - all the parameters of the sustainable treated wastewater meet the requirements with the biological or unique limits. The partly treated wastewater contains contamination over fine limit values. The not treated wastewater discharged to the rivers gets no kind of treatment.

5.1.2.3. Agricultural Discharge (major point sources)

By the irrigation and the water supply for fishpond originate no wastewater (15). The wastewater of agricultural activities in the settlements is discharged to central sewerage system or is deposited into septic tanks. The agricultural plants working in the peripheries deposits their wastewater into the soil by the help of septic tanks.

According to the available Information the estimated discharged wastewater of main agricultural farms is 1.2 $10^6 m^3/a$. According to our estimation 10-20% of this is manure from animal husbandry. The regulation of agricultural discharges was accepted in Hungary in 1988, prohibiting any direct flow from animal husbandry directly into surface water. So after mechanical treatment probably 120-240 thousand m^3 of liquid manure is discharged into surface water. The accidental facts are unfortunately not registered yet. The majority of agricultural nutrient load is coming from non-point sources. Examining the question from the other side, the importance of water contamination originating from agriculture is shown by the fact, that the 60-70% of nutrient load (N,P) is the result of population load, probably only 15% is the result of agriculture.

Table 5.1.2.3. contains the sustainable treated or not treated wastewater from point sources discharged to the rivers according to catchement areas.

(Remark: the terminology used in the table for wastewater treatment plants are the same as in the previous section).

Table 5.1.2.3. Agricultural waste water directly discharging to the rivers ($10^3 m^3/a$) 1996

Water Authority	Waste water			
	Suitably treated	Partly treated	Not treated	Total
Catchment Area of the Danube				
01. Győr	0	0	0	0
02. Budapest	0	0	0	0
03. Baja	0	0	0	0
04. Székesfehérvár	22	0	0	22
05. Pécs	34	0	0	34
06. Szombathely	0	0	0	0
Total of the Danube	56	0	0	56
Catchment Area of the Tisza				
07. Nyíregyháza	0	0	0	0
08. Miskolc	19	48	0	67
09. Debrecen	0	0	0	0
10. Szolnok	0	0	0	0
11. Szeged	0	0	0	0
12. Gyula	0	0	0	0
Total of the Tisza	19	48	0	67
Total of the country	**75**	**48**	**0**	**123**

5.1.3. Pollution of Aquatic Systems through Potential Soil and Ground water contamination

In Hungary almost 104 Million tones of waste are generated a year (3). Of this amount about 4 Million per year is municipal solid waste and about 20 Million t/year is treated municipal liquid waste.

The improper handling of municipal solid waste is caused by lack of appropriate disposal sites for solid wastes. Lack of suitable disposal of solid wastes has a negative effect on the environment (soil, water, vegetation).

Only 30% of the 2,700 community disposal sites meet the regulations. Free disposal capacity is low and no modern procedures are applied. There is no legal requirement and practice for systematical recultivation of abandoned landfills. Significant portion of landfills (20-30%) is located in areas dangerously close to the groundwater table or surface waters. It is also a part of the problem, that the wastewater sludge disposal practices of the municipalities are not appropriate.

In the opinion of the working group the reason for the improper handling of municipal solid waste is the lack of financial resources and inadequate public awareness.

Inadequate solid waste management of municipalities is critical activity leading to pollution. In order to decrease pollution it is necessary to develop the following activities:

- establishment of regional waste disposal sites with appropriate physical containment,
- elimination of inadequate landfills to be followed by recultivation.

The remaining some 80 Million t/year is from industrial, agricultural or other economic activities. Of production waste about 4.2 Million t/year are hazardous waste of which 1.52 Million t/year is red mud. Waste coming from industry is somehow decreasing while municipal waste is slightly increasing by 2-3% annually.

See summary map "Conditions of solid waste management in Hungary" (Figure5.1.3.1.), which shows environmental geology and waste disposal.

5.1.3.1. Municipal Solid Waste Disposal

The "Environmental Programme for the Danube River Basin National Review 1993"(16) collected informations about landfills and disposal facilities. The main statements were:

87-88 % of all the treatable solid wastes (household waste and waste similar in character) is dumped at the 2,682 registered landfills. About two-thirds of these, i. e. 1,700 or so landfills, are being operated in a manner specified and permitted by the authorities. (These do not include the so-called illegal dumps.)

Out of this total number, 286 landfills have a technical basis allowing proper and professional handling and treatment. Only 30 % of the landfills conform to current, valid public sanitation and Environmental protection regulations. 52-55 % of the 1,700 approved landfills is in an objectionable state. Out of the remaining 1000 or so landfills, the status and condition of 800 does not comply in any way with requirements. An annual amount of about 5 Million m^3 waste is disposed of without any control at ”garbage dumps”, in addition to the 286 landfills that have the proper organizational background.

The most important and mostly regional-type landfills of the country of which there are 66, serve 230 communities and 2,800,000 inhabitants. Each of these is operated by a specific organization. The available capacity of the landfills is 41,000,000 m^3 which, keeping in mind the current rate of waste production, allows continued dumping for about another 10 years. Only 66 % of the sites are enclosed by a fence system. 46 % have permanent attendance service and day and night watch. Daytime watch is available for 54 % of the sites (a single work shift).

56 % of the mentioned landfills were established in an organized way, based on technical plans, while the other 44 % operate in a tolerated manner. Most of the latter ones belong to the 5-10 year capacity category. Daily coverage is guaranteed at about 45 % of the 66 landfills, while for the rest, coverage is applied once a week. 30 landfills have weighing bridges (bridge balance), but data on incoming amounts is registered and processed at 6 landfills only. Biogas is extracted and utilized at 8 landfills. Some sort of waste testing is applied at 62 % of the landfills (inspection, analysis, laboratory), but data processing is employed at only 6-7 sites. 67 % of the sites do not have a discharge water conduit or collection facilities, and 78 % of them are without isolation or technical protection.

Only a small percentage of all landfills are working on a regional basis.

There is only casual information on the establishment of new landfills, without the availability of nation-wide data. Nor is there satisfactory information on actual abandoned, systematically recultivated landfills or on ones planned to be similarly treated. No survey exists on abandoned landfills (most of them are still used illegally), hence the purposes of utilization are not known either.

The percentage of landfills serving several municipalities is now 12 %. The primary obstacle to create regional landfills is the inappropriate regional administrative approach and philosophy, which hinders proper actions. The conceptual-level creation of a nation-wide network could facilitate the solution of the problem. In case of a nation-wide system of landfills, less sites would be needed than the number currently being operated.

Present situation

Collection of municipal solid waste is not full scale, (from 2/3 of household is collected regularly), selective waste collection is at low level and the technical level and state of the applied devices is very poor.

Only 30% of the 2700 community disposal sites meet the regulations more or less and the number of illegal and legal dumpsites, which are potential pollution sources, is high.

Free disposal capacity is low and no modern procedures are applied.

Since 1992, the situation has not been changed essentially. The main improvement is that there are so-called target support system from the central budget to the settlements which build regional landfills. (The state subsidy portion is 40%.) So presently new landfills with a regional character are being built. With the help of target subsidy 19 new regional municipal landfills have been built since 1996 (The total cost of investment is 2974 Million HUF, and 12 since 1997 (The total cost of investment is 3472 Million HUF). These 31 new regional municipal landfills will serve 176 settlements.

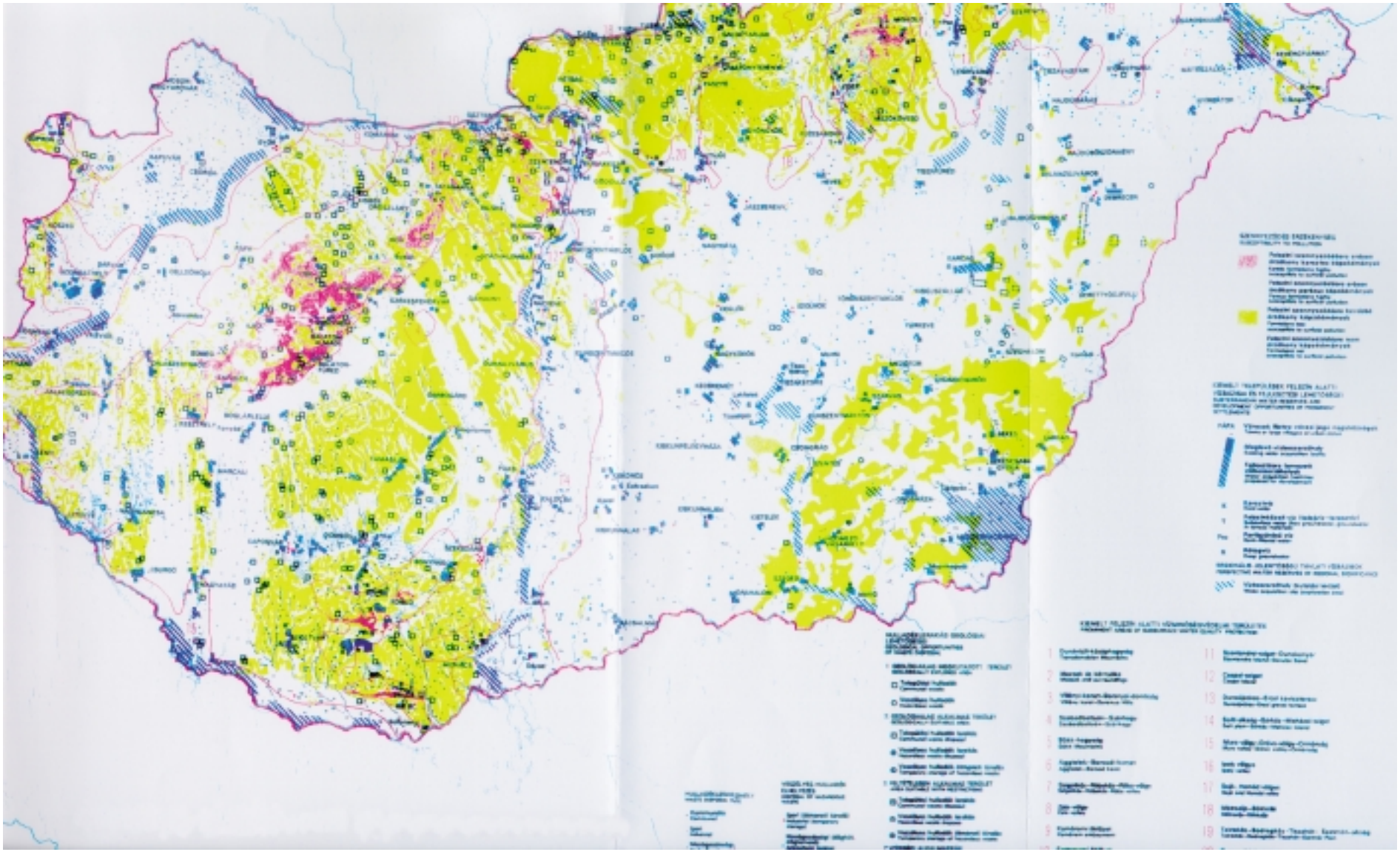
According to NEP (3) 10-15 regional waste landfill have to be built annually.

In spite of this good development in the building new landfills, it can't be said that the pollution from the old landfills is decreasing. It is because there is no legal requirement for systematic recultivation of abandoned landfills. It is planned in the new law on waste management, but it has not been passed yet.

About 20-30 % of landfills is located in areas dangerously close to groundwater or inland waters. This fact, as well as the philosophy of "here is a pit, let us fill it up with garbage", constitute a partial explanation for the phenomenon that 60 % of the drinking water bases have been polluted over the past 30 years or so.

The time-delayed detrimental effects, such as water pollution, are particularly dangerous, because their elimination is technically sophisticated and involves considerable costs.

Figure 5.1.3.1. Conditions of solid waste management in Hungary



5.1.3.2. Industrial/Mining/Hazardous Solid Waste Disposal

General problems according to NEP (3).

The quantity of industrial waste is unjustifiably great and the survey of this waste is not satisfactory.

The extent of waste minimization and utilization is not satisfactory, the introduction of low waste technologies and production systems is slow.

Survey of soil and underground water pollution caused by industrial facilities and other waste, treated as production and municipal waste, from small scale plants has not been done.

Hazardous waste disposal capacity in Hungary is insufficient.

The on-site disposal of unknown quantities of soil polluted with heavy metals and/or hydrocarbons has not been solved.

A part of the industrial wastes defined as non-hazardous is dumped at municipal solid waste landfills, thereby reducing the municipal solid waste storage capacity.

Occasionally, hazardous wastes are also treated at municipal solid waste landfills. This is the case when certain oily wastes are decomposed along with municipal solid wastes for the extraction of biogas under controlled circumstances: there are 9-10 such landfills. In the first place, hazardous wastes of category III are dumped at municipal solid waste landfills, but with limited possibilities.

In Hungary there is a special waste problem caused by the red mud coming from alumina factory. The red mud annual generation will be reduced as a consequence of the crisis in alumina factory. The forecasts expect this to happen by the year 2000 (16).

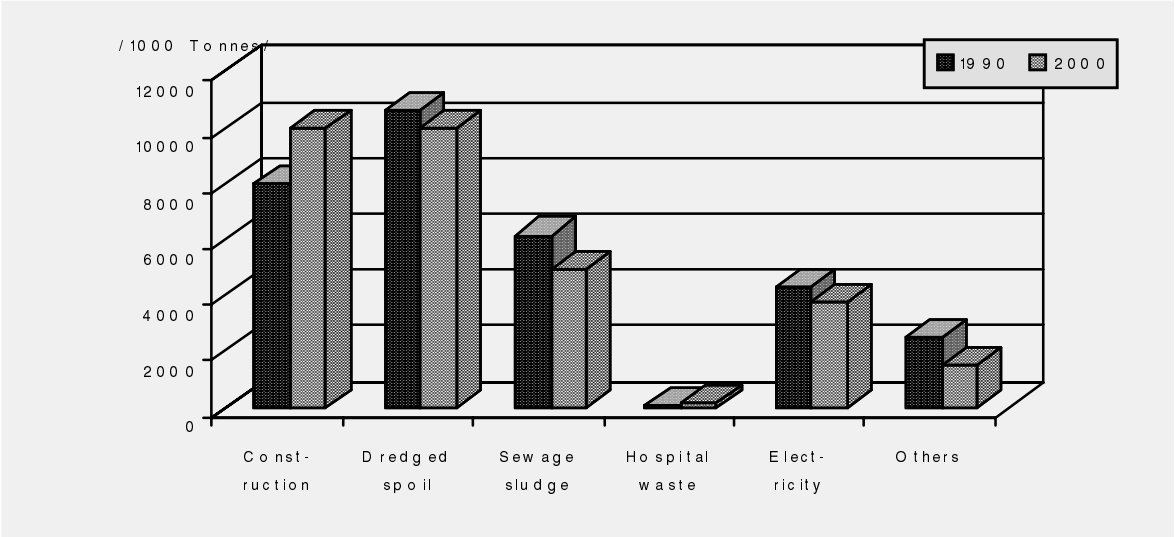


Figure 5.1.3.2. Assessment the change of solid waste generation between 1990 and 2000.

(Source: "Environmental Programme for the Danube River Basin National Review 1993")

The existing incineration plant for hazardous waste at Dorog and the modern waste dumping site at the area of Aszód-Galgamácsa can treat only a small part of the produced hazardous waste (Dorog 25,000 t/év, Aszód 5,000 t/év). For neutralization of hazardous wastes besides this two modern plant there are some other incineration plants and regional reservoirs. (Százhalombatta 16 kt/year, Tiszaújváros 3.5kt/year of capacity plants are operating, the incineration plant of Nitrokémia Inc.

(11 kt/year of capacity) is under reconstruction because the waste gas treatment system didn't meet the requirements). There are regional reservoirs at **Egerszalók** of 5,000 m^3 capacity, **Balmazújváros** of 4,000 m^3 capacity, **Hernádkéres** of 8000 m^3 capacity, in the area of **Nyíregyháza** of 4,000 m^3 capacity (3).

The investment in some neutralization plants were not realized because of the protestation of the inhabitants, because of technical and/or financial problems, and some are in the preparation period (Garé, Rudabánya). The neutralization got into the business sector and the bottleneck situation results in monopolistic situation, which misuses this possibility. Because of this situation the governmental responsibility can't be validate.

The high-safety landfill of Aszód-Galgamácsa, with a capacity of 250,000 tons and provisions for the disposal of approx. 10,000 tons of hazardous waste a year, was built in 1990 with combined technical protection, leachate collection and a permanent monitoring system, to conform to the strictest European standards. The technology applied for dumping procedures further enhances the security of peculiarly hazardous inorganic wastes when dumped (packing and embedding etc.) The disadvantage of the system is that the landfill has no physical-chemical pre-treatment facility of its own.

Hungary experiences a range of serious Environmental problems due to hazardous waste disposal, including:

- illegal, uncontrolled waste disposal on the nearest sites where there are wild bushes or forests but there are geologically and technically unsuitable conditions;
- stockpiling of wastes on backyard of factories, without technical protection and control;
- contamination of sites and soils by illegal dumping of hazardous wastes (in barrels or in sacks);
- water and air pollution where the waste is in brook-valley or near river on open air sites (the dried surface moved by wind);
- animal/fish is killed by toxic contamination in the lakes and brooks (drinking water for the wild animal);
- hazards from toxic emissions on public health by food chain and drinking water sources;
- fires, spills, poisonings and safety risks from uncontrolled mixing and handling on the illegal disposal sites.

Some examples of the public health effects and accidents caused waste contamination (most of them related to water) recognized in the last decade are:

- Toxic, heavy metal content slag involving dust generation caused soil contamination, which resulted in toxic heavy metal presence in the drinking water wells and in the agricultural products (food). The human utilization and consumption of the water and food were forbidden. (Metallokemia, Nagytétény)
- Lead contamination in fodder of cows caused high level of lead contamination in milk and milk products and the death of cows. (Etyek, Mészfõcsanok, Alsónémedi)
- Heavy metal soil contamination polluted the drinking water wells with heavy metals, which caused some illnesses and death cases among the inhabitants of the involved villages. (Monorierdõ, Apajpuszta)
- Halogenated pesticides caused soil contamination and Environmental damages. (Garé)
- Most of the industrial factories deposited all their production waste (slag, ash, chemical, organic residues, etc.) on the nearby pits, which affected and caused groundwater and surface water contamination.
- Waste fires happening on the waste landfill sites generated extensive fuel-gas emission with strong odor, etc.
- There is a red mud disposal site established at the bank of Danube. High groundwater level areas are being used for slag and ash and other industrial waste disposal.

5.1.4. Hydro Power

The utilization of hydropower at river sections is distributed disproportionate. Their development is very low because of natural and geographical potentiality of Hungary. The main rivers are of middle section and lower section characteristics with low slope. The hydropower resources can be used with great investments. Because of this the Hungarian hydropower utilization is only of additional characteristics, where the regulation of rivers with barrage became unavoidable because of other - dominant - utilization tasks. (e.g. irrigation, regulation of water level). Data are from (17)

In the main bed of the Hungarian section of Danube there are no barrages nowadays. In the catchment area of Danube in the 100.56 km section of Rába River at Ikervár is a hydro power plant with low power potential. Besides some very small (with low power potential) power station serves the local requirements only.

In the Tisza valley on Tisza at Kisköre (403.42 km section) and at Tiszalök (524.20 km section) are the main hydro power stations. In North-Hungary on the Hernád River at Kesznyéten (13.56 km), at Felsõdobsza (54.35 km) and at Gibárt (65.9 km) there are hydro power plants with low power potential. In East-Hungary there are some very small (with low power potential) power plants. The data of the existing power plants are given in table 5.1.4. In the area of utilization of hydro power beside the power plant there are dams. By the big hydro power plant - on the navigable rivers - it is built locking as well.

Table 5.1.4. Utilization of hydro power 1996

Water Authority	Productivity of being available	Productivity of really utilizable	Annual maximal peak	Produced electricity	Produced electricity really usable
	MW	MW	MW	MWh	MWh
Catchment Area of the Danube					
Ikervár (Rába)	1.5	1.5	2.0	13386.0	13347.0
Nyugati tötpék	0.4	0.4	0.4	2987.0	2983.0
Total of the Danube	1.9	1.9	2.4	16373.0	16330.0
Catchment Area of the Tisza					
Kisköre (Tisza)	15.5	14.7	28.0	108087.0	103989.0
Tiszalök (Tisza)	7.2	7.1	11.8	56850.0	55027.0
Kesznyéten (Hernád)	2.8	2.8	4.4	20773.0	20625.0
Felsődobsza (Hernád)	0.2	0.2	0.3	1526.0	1467.0
Gibárt (Hernád)	0.4	0.4	0.5	3317.0	3291.0
Keleti törpék	0.1	0.0	0.1	19.0	19.0
Total of the Tisza	26.2	25.2		190572.0	184418.0
Total of the country	**28.1**	**27.1**		**206945.0**	**200748.0**

The capacity of electricity and the annual production:

total available capacity of power production	7,280.0 MW
of which hydro power plants (0.39 %)	28.1 MW
total electricity production	36,988,806 MWh
of which hydro power plants (0.56 %)	206,945 MWh

The utilization of hydro power in Hungary doesn't reach 1% of the electric energy system of Hungary.

Looking at the future of the utilization of hydro power it can be expect that it remains of additional characteristics as well, and this kind of investment will be made when it is connected to some other development of water management or environment protection characteristics.

5.1.5. River Fisheries (Danube and Main Tributaries)

(18) declares that the order of magnitude of river fisheries in Hungary is hardly changed in the last 20 years, the technical conditions and the natural potentiality are worse now. There are 170 fisheries in the country, from these 15 farm are on natural water, 40 have natural water and fish ponds and 115 farm have only fish ponds. In the fishery branch work 2,910 people including manufacturing. In the fish processing firms work average 250 employee/year.

The fish farming activity is spreading all over the country but there are three very important regions:

- Region Balaton where the dominant is the fishing on natural water and a background with fish ponds for hatching. This region ensures the 11% of fish production of the country.
- The main characteristic of the South-Hungarian Plain region is that the fish ponds were established on bad arable lands. The natural water in the Körösök, the low section of Tisza and its backwater, has role both in the recreational and in the commercial fishery. This region ensures the 15% of fish production of the country.
- Region Hortobágy is an artificial constructed fish pond system which are on arid lands. This region ensures the 19% of fish production of the country.

According to the statistics (19) of the Ministry of Agriculture in 1996 from the waters of Hungary 21,124 tons of fish were fishing up. 13,518 tons (64%) originate from fish ponds farming by intensive fish production, 7,606 tons (36% originate from natural waters and reservoirs. This amount is behind of the last year with 7.6%. The increase was at the fisheries in fish ponds, but the fished amount in the natural waters incremented with 4%.

Table 5.1.5.1. The amount of catch in the natural waters and reservoirs according to the type of fishes in 1996.

Type	Total		From the Danube and back waters	
	ton	%	Ton	%
Carp	2717	35.7	130	20.4
Amur	346	4.5	25	3.9
White busa	862	11.3	32	5
Dotted busa	74	1.0	0	0
Pike-perch	224	2.9	26	4.1
Wall eyed p-p.	100	1.3	19	3
Glanis	201	2.6	22	3.5
Pike	46	0.6	6	0.9
European eel	579	7.6	10	1.6
Bream	22	0.3	4	0.6
Sterlet	34	0.4	7	1.1
Barbel	37	0.5	34	5.3
Other types	2364	31.1	322	50.5
Total	7606	100.0	637	100.0

In the table there is the total of the data of the commercial fishery, individual line-fishing in the rivers, natural lakes and reservoirs. There is no statistics for river fishery. From the catch the fishing organizations and the fishermen out of organizations had a share of 57% in 1996.

The output of fisheries of 2,816 Million HUF was in 1995 (20), which is about 22.404 Million USD. The GDP value of the fisheries was 1183 Million HUF in 1995, which is about 9.412 Million USD. (According to the data of CSO). This is about 0.02% of the GDP. In 1996 there are data only together with agriculture and forestry. In 1997 there are no data.

5.1.6. River Shipping

The total length of navigable water ways of Hungary is 1,622 km, of which the "always navigable" is 1,373 km. From this it is 419 km the main section of Danube which is at the half point of the international Danube-Rhine-Main waterway.

The document (3) with the title of Traffic Policy of Hungarian Government (21) states: In the inland shipping the main waterway is Danube which with the opening of Danube-Rhine-Main waterway became more valuable, it is transcontinental waterway now. The depth of the river above Budapest is very low and this makes impossible the economical transportation. On the big rivers of the country there are no modern docks complying with the requirements of the West-European demands, and the density of ports are far from the ports being on the West-European waterways. The stock of ships are getting old, the operating costs are increasing.

According to the CSO statistics (20) in 1996 the productivity of transportation of goods (freight ton-kilometers of goods) on waterways is the 10% of the transportation of the country. The transportation of passengers (passenger km) is even worse because it is only the 0,1% of the total of the country (in passenger km).

On the Hungarian section of Danube the international traffic was 13,159 ships in 1996.

Table 5.1.6.1. International ship traffic on the Hungarian section of Danube in 1996.

		ship	%
ships with Hungarian destination		3338	25.4
of which:	foreign	2383	18.1
	Hungarian	955	7.3
ships starting from Hungary		3623	27.5
of which:	foreign	2746	20.9
	Hungarian	877	6.7
transit traffic		6198	47.1
of which:	foreign	9191	47.0
	Hungarian	7	0.1
Total of international ship traffic:		**13159**	**100**

The transport of goods by waterways in Hungary shows Table 5.1.6.2., the passenger transport is shown in Table 5.1.6.3.

Table 5.1.6.2. The productivity of transport of goods on waterways in 1996

	The amount of goods transported thousand tons	Freight ton-kilometers Million
Inland traffic	692	25.6
Import traffic	499	570.2
Export traffic	604	576.8
Transit traffic (not concerning Hungary)	313	1309.6
Total	**2108**	**2482.3**
Of which: river	1911	1284.3
marine	197	1198.0

The inland traffic is about the 33% of the total, the transit traffic is about 15%. The Central Statistical Office takes into consideration the data of the Hungarian traffic organization only.

Speaking not only on the Hungarian traffic, the total transport of goods productivity than according to the Institute for Traffic Sciences (oral report) the total transport of goods was 8.3 tons in 1996 of which the transit was 3.8 Million tons, the export was 2.7 Million tons, the import was 1.5 Million tons and the inland traffic was 0.3 Million tons. On river Tisza about 0.5 Million tons of goods were transported.

Table 5.1.6.3. The productivity of passengers transport on waterways.

	Number of passengers, thousands			Passenger-kilometers, thousands		
	river	Balaton	total	river	Balaton	Total
Long-distance	1221	1042	2263	31000	10000	41000
Local	82	159	241	800	3200	4000

Table 5.1.6.4. The length of navigable waterways according to the (EEC) categories (km)

Waterway	I.	II.	III.	IV.	Total
sections of waterways					
Duna	-	-	417	-	417
Mosoni Duna	-	-	14	-	14
Szentendre Duna	-	-	32	-	32
Ráckeve Duna	-	-	58	-	58
Balaton	-	77	-	-	77
Sió	-	-	121		121
Dráva	-	-	128		128
Tisza	-	-	525	-	525
Keleti főcsatorna	-	-	-	43	43
Bodrog	-	-	-	7	7
Hortobágy-Berettyó főcsatorna	-	-	10	-	10
Sebes-Kőrös	-	-	115	-	115
Hármasés Kettős Körös	-	-	25	-	25
Maros	-	-	25	-	25
Total	-	77	1495	50	1622

Source: Informatory data of Traffic, Post and Telecommunication, water management 1993,1994,1995,1996 KHVM 1997(22)

Ports: the technical level of the existing ports and docks is behind of the usual ports of western countries. The most important port of the country is the National Free Port (Budapest). The number of the sheltered basins are 3, the water surface is 12 hectares, the length of docks are 1,7 km, the loading surface is 181.6 km^2, of which the duty free area is 9.5 km^2 . The weakest point of the port is the restriction of the railway service and the capacity of roads, which is the consequence of being surrounded by the capital.

According to the survey in 1995 of the Institute for Traffic Sciences all the loading capacity of the big operating ports was the following:

- Győr-Gönyü 68 Million tons
- Csepel Szabad kikötő 860 Million tons
- Dunaújváros (Dunaferr) 1100 Million tons
- Baja 256 Million tons

The production of the ports expressing in operational tons shows +/- 100 thousand tons fluctuation so the above numbers are good approximation for 1996 and 1997.

There are 36 ports of public transportation in the country. According to (18), both on Danube and on Tisza there are public transportation ports, which belong to the Hungarian Shipping Inc. All the ports which serve the international passenger transport (Komárom, Esztergom, Budapest, Mohács, Szeged) belong to the shipping enterprise.

In 1992 the parliament passed a law about the establishment of National public transportation ports. Nowadays the National public transportation ports are: Gyõr-Gönyü (concessional competition is going on) Csepel, RORO and container port in Nagytétény, Dunaújváros, Baja and in the future Szekszárd and on the Tisza: Szeged.

5.1.7. Water Related Recreation/Tourism

The data of the tourism is shown in table 5.1.7.1. (20)

Table 5.1.7.1. Summarized data of the most important recreation area and of the total of the country 1996

	Guests of public accommodation establishments Persons	Nights of public accommodation establishments number	Nights of guests %
Budapest	1779583	4640048	27.1
Balaton	839689	4645971	27.1
Dunakanyar	129959	334015	1.9
Velenceitó	70063	296920	1.7
Mátra-Bükk	368725	923984	5.4
Sopron-Kõszeghegyalja	269766	910187	5.3
Other areas	1853685	5390629	31.5
Total	**5311470**	**17141754**	**100**

From the most important recreation areas Danube is the only river area. The participation of the total number of nights doesn't reach the 2%.

The foreign and domestic tourism is shown in table 5.1.7.2.

Table 5.1.7.2. Tourist arrivals in public accommodation by holiday regions in 1996.

	Budapest	Lake Balaton	Lake Velence	Danube-bend	Mátra and Bükk mountains	Sopron-Kőszeg mountains	Other	Total
	Tourist arrivals, thousands							
Domestic	292	282	42	98	278	154	1187	2333
International	1487	429	28	32	91	116	795	2978
Total	1779	711	70	130	369	270	1982	5311

The international tourism receipts was in 1995 1714.2 Million USD, in 1996 2245.7 Million USD, in I-XI months of 1997 2753 Million USD. It can be seen that the incomes had been continuously increased during the years (Source: CSO (20)).

Table 5.1.7.3. Balance of international tourism
Million USD

	1996	1997 I-XI
Income	2246	2390
Expenditure	957	1060
Balance	1288	1330
balance in % of GDP	2.8	

It can be seen from the data, that in 1997 the receipts and the balance had been significantly increased. About the whole income there are no separated data.

According to Bibliography (23) in 1995 the share of Hungary in the world tourism is - considering the member of arrivals - is 3,65% and - considering the income - is only 0,46%. This shows that in Hungary there is no profitable tourism.

The surface area of the main rivers and lakes and some sections of their banks in Hungary are very important parts of the recreation. Some of them are important holiday regions of home and international importance.

The most important areas:

Danube

Danube is used at total length for domestic and international sport shipping. (rolling, kayak, canoe etc.) and for sport line fishing. Down by the banks free bathing places are operated by almost all the local governments.

The Hungarian Danube recreation areas are of international importance, especially the Danube-band recreation area and some parts in Budapest (Római part) and Ráckeve, Soroksár sections. Moreover all the towns of the Danube banks established big recreation centers. (Gyõr, Esztergom, Dunaújváros, Baja, Mohács).

Catchment area of Danube

The most important recreation areas of Hungary are the holiday regions of Balaton. They are of international importance as well. There are important recreation areas at Lake Velence, Fertõ and Tata. On the mentioned lake all types of the tourism and recreation can be found (bathing, boating, rolling, sailing, line-fishing, etc.). At the tributaries of Danube there are recreation centers of local importance.

Catchment area of Tisza

The Tisza is used at total length for sport shipping (at first of domestic importance). The settlement down by the river established recreation centers partly on Tisza, partly on back waters of Tisza (bathing, rolling, line-fishing). The bigger are: Szolnok-isle, Csongrád mouth of Kõrös, Szeged.

Important recreational area is Tisza tó (reservoir of Kisköre barrage), where besides bathing the rolling and line-fishing is of great importance too.

By the banks of some tributaries of Tisza there are recreation areas of local interest (e.g. Szarvas and Gyula by the Kõrös)

The submitting in 1998 for Hungarian Tourist Committee with the title "The state of domestic water tourism and suggestions for developing it" (24) states that Hungary was in the recent years a real paradise of water tourism and could be developed in a very short time to a new branch of tourism if the necessary conditions could be ensured. After constructing the water barrage system the water tourism was surpassed. At the same time the Hungarian waterway system, Danube, Tisza and their tributaries, Balaton, Lake Velence, Fertõ and the smaller lakes give suitable possibilities for all kind of water tours. These possibilities are utilized by participants on International Danube Tour (800-1000 persons from 15-17 countries), and the participants of International Tisza Tour or other tourists. (In recent years beside the International Tisza Tour there were summer weeks when 100-300 persons/day were on Tisza individually or by the organization of a tourist office).

As for the potentiality Danube is one of the most beautiful waterway of Europe. It is suitable for shaping a rout for yacht and boat tours. 28 yacht ports were constructed from 1989. The traffic being on the up-grade was restricted by the Bõs-Nagymaros barrage system - especially the variant C - and the south Slavic war. Because of this nowadays there are only 6-8 yacht port on Danube.

In connection with the water quality used for recreation the followings must be mentioned:

- Danube is appropriate for water sports (e.g. shipping) and for line-fishing. Bathing is restricted by water quality. In some periods the water is inadequate for bathing.
- the large lakes are appropriate almost all recreation utilization (for bathing too)
- Tisza and bigger tributaries are appropriate for rolling and other water sports and for line-fishing too. Using them for bathing depends on water quality.

5.2. Projection of Economic Significance/Impacts

5.2.1. Projection of Abstraction of Raw Water

In chapter 3.2.2. the prediction of domestic water demand was elaborated. According to that the demand will increase with 37% to the 2010 year. Because of the industrial growth the water demand could increase, but the water sparing technologies could counteract. The agricultural water use will increase to some extent however it will show fluctuation. This will improve the utilization of capacity. At the same time it can be expected that in the fields of public water supply the now existing high water loss will decrease (20-21%).

5.2.2. Projection of Wastewater Discharge

5.2.2.1. Domestic Wastewater Discharge

It is an important contamination source that while the population is supplied with public water in 96-97%, the rate of population supplied with public sewerage system is only 45%. At the areas without any canalization to the soil discharged wastewater - which is not properly treated - endangers in a great extent the vulnerable water basis. For ceasing this the accepted Sewerage Framework Plan of Hungary (8) lays down a 68% canalization rate for 2010.

Nowadays a significant part of wastewater is not treated or is not properly treated. Especially high the backwardness is in the capital an in some big towns.

It is a basic goal that the wastewater discharging to surface water must be treated at least biological treatment. The nutrient sensitive water resources (lakes, back water, reservoirs) are especially to be protected. Here must decrease the nutrient load. This needs advanced wastewater treatment.

According to the EU prescriptions the wastewater sewerage and treatment must be solved at the end of 2000 on the settlements which are bigger then 15000 inhabitant-equivalent and at the end of 2005 on the settlement which are bigger then 2000 inhabitant-equivalent. These tasks will be completed in Hungary at 2010.

Among the tasks is to solve the treatment and harmless dumping or utilization of the wastewater sludge.

5.2.2.2. Industrial/mining Wastewater Discharge

The circumstances mentioned in point 5.2.1.2. in connection with industrial water supply is refer to the industrial wastewater discharge as well.

The wastewater treatment of industrial plant must be gradually solved by the help of suitable financial tax system. The valid regulation promotes only to some extent the necessity to meet the wastewater treatment requirements. In the plants which are being constructed in future only those solutions will get permission which comply with the environmental and water management prescriptions. The pre-treatment of the wastewater discharged to public sewerage must be solved similarly.

At some places the mining operation - where direct contamination is possible - causes water quality problem and similarly, there could be problem at the environment of abandoned mines and with mines being under water - especially with the karst water resources.

The contamination, which occurred and nobody is responsible for causing it, the permanent environment contamination are very big problems. Releasing the damages has social, economical, political and judicial relations. Because of this it became governmental task.

5.2.2.3. Agricultural Wastewater Discharge

The amount of agricultural wastewater comparing to the domestic and industrial wastewater discharge will remain unimportant. Changes in the property form, which happened in agriculture, will result in wastewater discharge increase, but this will be in connection with the public sewerage and wastewater treatment.

In connection with the current and future agricultural wastewater the same regulations are needed as for the industrial wastewater (see previous point)

From water quality protection point of view the dumping of manure from animal husbandry which is an important part of agriculture endangers the water resources. As the result of enforcement of regulation the negative effect will decrease.

5.2.3. Projection of Other Major Impacts

5.2.3.1. Hydro power

In connection with hydro power utilization it can be stated that the current operating power stations will work in future too. New hydro power station will be established only if it is reasonable from environmental and/or water management point of view.

5.2.3.2. River shipping

Developing economy implies the increase in river shipping as well. Preliminary condition of this is executing the river regulation tasks, renewing the old ships and constructing or buying new ships, modernizing and developing of ports and docks (In long range planning the Duna-Tisza canal could be realized, which would give a lift to cheap transport of goods by river shipping).

The most important development tasks of water traffic are determined by 68/1996. (VII.9.) Parliament Decision with the title: "About the Hungarian traffic policy and the most important tasks for realization" as follows:

Urgent task in the direction of the main transit flow:

- on the Danubian waterway must be ensured by the European VI.b. classification parameters
- established the main public ports serving river shipping
- the government must promote (at first with developing and operating subsidies) the realization of combined transportation of goods, which abates the environment contamination, and is used in most of the developed European countries.
- necessary and reasonable development of water traffic on Danube and Tisza, the correction of conditions of shipping possibilities, the establishment of new ports and modernization of ship stock.

The development of ports and preferential program of water transportation is planned to the period of 1998-2005. Authoritative is: Ministry of Transport, Telecommunication and Water Management, Ministry of Finance and Ministry of Environment and Regulation Policy. In 1998 the construction of Gyõr-Gönyü port and the RO-RO terminal at Baja will be continued and the RO-RO and container port at Nagytétény will be prepared. Later the other ports of country importance will be developed (Csepel, Dunaújváros, Baja and in the future Szekszárd and on the Tisza: Szeged).

For development of water tourism there are suggestions stating that the water tourism needs a lot of governmental decisions for starting and running in it as a new branch of tourism. This could be impossible to solve the tasks without governmental subsidies.

6. Relevant Legal and Institutional Framework and its Adequacy for Sound Environmental Management of Water Resources and Ecosystems

6.1. Documentation and Short Analysis of the Relevant Legal Framework

Documentation and short analysis of relevant laws and regulations is in the financial part of the study in B chapter.

6.2. Analysis of Relevant Institutional Framework

6.2.1. General

Until the 1970's the protection of the environment had been basically restricted to the protection of the quality of water resources. The Hungarian Environmental Council, later Environmental Office, commented its activities as an independent organization. Later, having merged with the Hungarian Office of Water Management, the Hungarian Environmental Office continued its activities until 1989 as the Ministry of Environment and Water Management.

In 1990 after the social transition there were new changes in this field. The environment protection and the regional policy were joined in the Ministry of Environmental and Regional Policy and the water management got out of the sphere of activity. The regional authorities were separated to environment protection authorities and water authorities as well. The changes in sphere of activities reduced very much the effectiveness of the institutional system. From this date the environment and nature protection control works in the same structure.

The separation of water management affairs from the Ministry of Environment and Regional Policy seems to be a mistake, because it has resulted in ambiguities with regard to executive activities as well as the distribution of the range of authorities belonging to these two spheres.

Often there are many overlaps and unclarities with respect to ministries and organizations tasks and competencies.

Since 1990 after the establishment of Ministry of Environment and Regional Policy and the separation of environment protection authorities and water authorities the task in connection with service and population activities has got to the authorization of local governments. It was recognized that the most of the environment problems are local or regional

Characteristics, so the local governments must have greater role. In July of 1998 regional policy got out of the responsibility of the Ministry of the Environment (ME).

6.2.2. Central Government Organizations

A number of Ministries within the Government have management and coordinating responsibilities for the environment.

1. ***The Ministry of Environment (ME)***

   The Ministry is responsible for providing central, state control over environmental protection, regional development and the building sector, except for the administrative functions of specific industrial activities. In these spheres it performs the functions of

regulation, legislation, supervision, control, organization and coordination. In controlling and supervising environmental protection the comprehensive strategic objectives of environmental policy are formulated, the quality and state of protection of the environments analyzed and assessed, the monitoring- and observation networks are coordinated and operated, the measurement- and information activities related to the exploitation of natural resources are coordinated, the methodology of environmental impact assessment is established, developments in environmental protection techniques and the introduction of environmental technologies are monitored.

Sectoral professional control covers air pollution control, the protection of the quality of surface- and groundwater, nature conservation, general landscape protection, noise- and vibration control, waste management, protection of the environment against nuclear radiation, forest conservation and wildlife protection. In 1994 there was a small modification in the sphere of activities for harmonizing problem handling. The environment protection and regional policy of Minister's supervision right was enlarged with the protection of soil, mineral resources and flora and fauna.

2. The Ministry of Transport, Communication and Water Management (MTCWM)

The responsibilities include central state control over the various activities involved in transport (rail, road, water and air, services related thereto), water management production and services (water abstractions, supply, sewerage, baths, emergency control, other public water management services), research and experimental development. Setting strategic objectives, formulation of development policies, implementation alternatives and management of development projects. Cooperation is the formulation of development objectives of other ministries and in the preparation of international agreements under specific powers conveyed by the government. Provides technical and public information and performs the functions related to the collection of statistical data for administration purposes.

3. The Ministry of Health (MH)

The responsibilities of the ministry include control over the systems of medical and social care, setting up the systems of professional control and supervision, developing the necessary sets of health criteria and controlling the national institutions of medical care.

The institution's control is comprised of the State Public Health and Medical Officer Service, which discharges the functions of health supervision.

The health and personal safety functions involved in the prevention and moderation of environmental impacts detrimental to human health. The minister is vested with consent and approval powers in the matters of state administration and legislation related to the social and health conditions of the population.

4. The Ministry of Economy (ME)

The ministry cooperates in solving the water management and water pollution control problems associated with industry and tourism. It is responsible for coordinating the establishment of the network of neutralization facilities for hazardous wastes, further for managing the development of the industrial background needed for solving environmental problems. It is involved in the licensing procedure of wastes- and by-produces recycling. It collects and processes the relevant data on industry. It participates in international cooperation on environmental matters. Within the ministry a department deals with the functions related to environmental protection.

5. The Ministry of Agriculture and Country Development (MACD)

The responsibilities include central state control over agriculture, the food industry, forestry and primary timber production, services, research and development, trade in agricultural products, cartography and land management in designated special sectors, enforcement of the Forest Act, soil conservation and land uses, performing the functions of cartography, geodetic surveying, photogrammetry an remote sensing.

It establishes the land use requirements to be observed in property developments, checks compliance with them, takes care of leasing the hunting and fishing rights of the state.

Ensures compliance with the requirements of the agrarian environment and management and performs the control functions of recultivation, reclamation drainage and irrigation, licensing the use of pesticides and other agrochemicals. Provides guidance and financing to research, pilot developments in agriculture and forestry.

6.2.3. Regional Organizations, Agencies performing functions of Authorities

1. Environmental Protection Inspectorates (EPI)

The Environmental Protection Inspectorates [EPI] of the Ministry of Environment and Regional Policy perform in their respective areas of competence the authority functions related air- and water pollution control, harmless disposal of hazardous wastes, noise- and vibration control and protection against nuclear and other harmful radiation.

These functions include monitoring state of the environment, operation of the information- and control networks, regional coordination, laboratory analyses, preventive- and remedial action, in cases of emergency and the imposement of pollution fines in cases of non-compliance with air-, noise-, vibration- and wastewater emission standards.

They issue environmental permits, control the permits.

At the moment there are 12 EPIs and one National Agency for Environmental Protection Authority.

2. District Water Authorities (DWA)

The District Water Authorities (DWA) (12 in the country) functions under the direct supervision of the National Water Authority DWAs are responsible for performing the authority functions arising from the Water Act. These include issuing, refusal, revoking and amendment of preliminary water project permits, permits for the construction and operation of water projects, such as hydraulic structures, water diversions, irrigation, protective zoning, supervision of the water associations.

3. State Public Health and Medical Officer Service (PHMOS)

Through its county and urban institutes it is responsible for monitoring air pollution in the community areas, for checking the hygienic quality of drinking water and for deciding on potential public health hazards of wastewater discharges. It is involved in the identification and prevention of harmful environmental impacts from the viewpoint of public health.

4. The Transport Inspectorates (TI)

The Transport Inspectorates of the Ministry of Transport, Telecommunication and Water Management are responsible for performing the authority functions related to road-, rail- and water transport in matters exceeding the scope of the local governments.

5. The Land Registration Agency (LRA)

The Land Registration Agency discharges its functions related to land ownership, land use, soil protection and conservation, property assessment and geodetic surveying through the local (country and community) offices.

6. National Park Boards, National Conservation Boards (NP, NCB)

The local functions of environmental protection including nature conservation, general protection of landscapes, forest, mineral resources and wildlife are performed by four National Park Boards and four Nature Conservation Boards.

6.2.4. Local government

1. General

The decentralization of environment protection tasks was realized at social transformation. The tasks of local authorities were passed in the LXV. Local law 1990, which prescripts the rights and duties for Local Authorities which were replaced the local councils.

The Local Authority Law differentiates the tasks which must be solved and which can be solved. The tasks of environment protection are not of obligatory characteristics, so the local government can decide what kind of activities in which way will be finished (according to the financing possibilities and the claim of the population).

- tasks must be solved in the area environment and nature conservation
  - ensuring the healthy drinking water
- tasks can be solved in the area of environment and nature conservation
  - regional development
  - regional management
  - protection of constructed and natural environment
  - water management
  - maintaining the local roads and public spaces
  - ensuring the public hygiene and the municipal hygiene (means solid and liquid waste management)

The local government (in Budapest the Capital Government) does for the environment the following:

- ensures the realization of environment protection rules executes the authoritative tasks
- elaborates an individual municipal environment protection programme in compliance with the National Environment Protection Program me and with the regulation policy of the settlement, which will be voted by the representatives.
- issues a local governmental decision for realization of environment protection tasks
- co-operates with the other authorities, local governments, civil societies which execute environment tasks
- analyses and evaluation the state of environment in its own area and in case of emergency - but at least once a year - information for the habitants.
- at development tasks realizes the requirements of environment and helps the remediation of the state of the environment

2. The provisions of water services at municipal level

The water companies providing county, regional or local supply are responsible for operating the water treatment plants, water distribution and sewer networks and the sewage treatment plants in their respective areas of competence.

The functions of collecting, transporting and disposal of garbage, communal solid and liquid wastes are performed by contracted companies in minor districts covering several communities.

For these functions the local governments may found their own companies, or assign these to contractors.

Until 1990 28 municipal or county state owned water works and 5 regional state owned water works provided public water utility services but Act No. LXV of 1990 transferred this responsibility to the municipalities except for five regional water works that remained in state ownership. At the same time ownership of the physical assets was transferred to the municipalities, as a result of which the original 28 water works institutions have been broken up into more then 300 service companies. The new entities exist in a wide variety of legal forms and corporate structures but Act XXXIX of 1992 required that each water utility, whether owned by the state or a municipality, must be operated either by a body specifically set up for the purpose by the owners or by a concession granted to another organization. The partial privatization of local public services is continuously going on.

Certain aspects of the function of the water service utilities, such as effluent standards and drinking water quality, corresponding to the relevant EU directives, are regulated. Others, relating to standards of service, such as reliability, are not. Moreover the new entities, while they are subject to standard Hungarian corporate law, are not otherwise regulated from the financial point of view.

6.2.5. Special Institutes and Organizations

The specialized institutes subordinate to the various ministries perform numerous functions related to environmental protection.

- **Ministry of Economy**
  1. *State Geological Institute (MAFI)*

     Exploration, assessment and registration of the geological, soil and mineralogical parameters of the country.
- **Ministry of Health**
  2. *National Institute of Hygiene (OKI)*

     Involved in the methodological development of (water hygienic and air quality) observations in the domain of the Ministry of Welfare, in the collection and assessment of data.
- **Ministry of the Environment**
  3. *Institute of Environmental Management (KGI)*

     Responsible for managing and assessing the environmental protection database and the data bank of the water quality standard monitoring network.
  4. *National Meteorological Service (OMSZ)*

     Collection, processing and filling the data observed in the meteorological observation networks of the related institutes.

- **Ministry of Transport, Telecommunication and Water Management:**

  5. *Water Resources Research Center (VITUKI)*

     Collects and processes the hydrologic data on surface waters and groundwater, manages pollution exploration projects, performs impact assessment and model studies on pollution propagation. The Research Center became an independent share-holding company in 1993.

6.2.6. Conclusions

Experience shows that the organizational system of environmental protection has always tackled with problems that can be traced back to the lack of certain jurisdiction, limited or missing authority over environmental elements and systems. These concerns will prevail but the majority of the problems can be overcome by suitable institutional system, infrastructure and efficient relationships.

Strengthening the Environmental Institutional System is fundamental for the implementation of the NEP both on the level of the national institutions and regional, local levels. Without them the practical enforcement of the principle of sustainable development, the protection of the public interest and performance of state tasks would be at risk.

The institutional system of environmental protection should be decentralized that is the independence, organizational and financial possibilities of local and regional institutions should be strengthened. The system of horizontal relations and the environmental work of affected sectors, chambers, professional organizations and their units dealing with environmental protection are also to be strengthened.

The above criteria are to be taken into account for the development and operation of the institutional system of environmental protection.

7. Actual Policies and Strategies

7.1. Actual Policies and Strategies

7.1.1. The National Environmental Programme (3)

This programme is actually a sustainable development framework programme. The National Environmental Programme is an intervention plan system for six years (1997-2002), which should result in the solution of the current environmental problems or the beginning the solutions and the prevention of future problems. Following the description of the problems, the general objectives for the given field and the special sector indicate the main direction of problem-solving. The more specific aims and directions mean quantified targets, identifiable tasks for the six year period of the Programme.

Specified aims and tasks in water protection

1. Surface water

a. Decrease of critical water management problems due to water shortage
b. Increase of usable surface water reserves by developing runoff regulation and if it is ecologically sustainable - by reducing surface water in areas with water shortages, primarily in certain regions of the Great Plain.
c. Development of regulation encouraging economical water use.
d. Specific water quality objectives can be set only for the long run. Those are:
   - In case of Danube, water quality should be at least class III regarding micropollutants and microbiological parameters (on the basis of the current five class system);
   - The water quality of the river Tisza should be in general at least of class III;
   - The lakes should be at least of class II, and chlorophyll concentration should exceed 75 mg/m^3 ;
   - The increase in salt and toxic substance concentration of surface water must be stopped, in case of irrigation water aquifers, the salt contents of the recipients should be decreased with further limitation of wastewater and sewage intake of high salt content.
e. To realize the future aim that settlement sewers reach 65%, all wastewater getting to live water from sewers should at least be biologically purified. The nitrate and phosphor load of highly protected water sensitive nutrients (lakes, reservoirs, oxbows, temporary watercourses, low flow recipients) should be decreased; in these areas third degree wastewater purification is also needed. On the basis of EU Guidelines wastewater drainage and purification should be solved at settlements with more than 15,000 inhabitants by 2000 at settlements with more than 2,000 by 2005. Hungary wants to fulfil these tasks by 2010. In the six years of Programme the goal is to reach 60 % sewer supply by developing the wastewater drainage at the highly protected areas, purification of this sewage and beginning development for wastewater purification in county towns is a high priority.
f. A long term aim is that the organic material load into living water should fall below 20% with the possible increase of emitted waste water. Proportional fulfillment is earmarked in the Programme.

g. Wastewater purification of industrial and agricultural plants should be gradually solved by a suitable economic regulation (disincentive, incentive) system. In case of new plants only solution complying with environmental regulations can be permitted. Similarly, pre-treatment of wastewater getting into public sewers must be realized.
h. For suitable wastewater purification composting of wastewater sludge and harmless disposal must be ensured.

2. Ground water

a. Ground water should be used in the area of exploitation to greater extent and proportion, with the on-site disposal and recycling of the purified-wastewater.
b. At the regions endangered by long term water sinking - first of all in the sand tables of the region between Danube and Tisza, the tables of Maros and the mountains in Transdanubia - water management balance should improve.
c. Moderating, then stopping the rate of pressure decrease of ground water, stopping excessive regional use.
d. Stopping water exploitation without permit, then scheduled modification of the ones with permit (until the level given in the environmental load standard taking re-supply into account is reached) - determining priority areas.
e. Scheduled approach to the ground water-quality targets with increased attention to the environment (protection area/structure) of vulnerable water aquifers (existing and prospective).
f. Stopping dangers, elimination of environmental damage by detecting pollution sources threatening ground water, listing and detecting long term environmental damage accumulated in the past decades according to schedule, enforcing legal and financial liability on the identified polluters.
g. Decrease of nitrate load and diffuse micro-pollution of non-natural origin;
h. Identification of the areas and regions where the quality of ground water, due to natural reasons and processes, differs from the limits given by the WHO drinking water standard;
i. Land use changed through river regulation, water settlement, change of cultivation branch, mining activity (e.g. mine lakes) should not decrease the supply quantity and quality of ground water.
j. Water protection Information System should be built, development and installation of the network for the observation of the quality of ground water should begin.

7.1.2. Main Features of the Programmes in the Action Plan of 1998 to NEP

On the base of NEP the Government has adopted the Action Plan of 1998 to NEP. In the Action Plan of 1998 to NEP there are specific programmes.

1. Sewage canalization and treatment programme of Hungary

At the field of water protection the most effective and largest programme is the Sewage Canalization and Treatment Programme of Hungary. The programme is prepared for the period 1996-2010. As a result of development in 2010 the 67% of the population of Hungary will be supplied by sewerage system. This means, that 16,444km canal and 1,181em^3/d wastewater treatment capacity will be constructed and 1,523 em^3/d wastewater treatment plant modernization will be realized. In the settlements or parts of towns, where the canalization wouldn't be economic, or the water must be hold at site - this affect the 23% of the population - for neutralization the wastewater, septic tank system will be established about 300 em^3/d of capacity by 2010. Improvement can be expected in the state of the environment, especially at the area of vulnerable water basis of I and II category, according to the order of priority of the governmental subsidies.

2. Sewage treatment programme of the capital and the cities of county status

The wastewater treatment programme of the capital and the county sites is very high connected to the previous programme, it will be finished in 2010 as well and the circle of authoritative is the same too. In 1998 the investments of wastewater treatment plants of Szolnok, Eger, Szeged, Debrecen is to be continued and there are some preparations (trials for loan) in connection with wastewater treatment plants for Győr, Sopron, Dunaújváros, Székes-fehérvar, Veszprém, Nyíregyháza and Budapest. The direct result of development will be 2,395 km sewerage, 748 em^3/d new wastewater treatment capacity, and 980 em^3/d wastewater treatment intensification.

3. Protection of ecological condition of Lake Balaton and improvement of water quality

The management plan concerning protection of ecological state and improvement of water quality of Balaton form one unit with the Water Management and Development Programme of Balaton and with the research and Regional Development Programme of Balaton. Because of this the management described with these two programmes realizes the aims of the ecological state protection programme. The time horizon of Water Management and Development Programme of Balaton is 1995-2010. As the result of the development in the recreation area will be 150,000m^3/day wastewater treatment capacity and the intensification of the current plants will take place. The II step of Kis-Balaton will be realized too. The water quality of Balaton, especially the Keszthelyi öböl will be improved, the decrease of organic compounds (KOI, BOI) and phosphor will be expected.

4. Programme on protection of drinking water wellfield area

The I phase of the program concerning protection of drinking water wellfield area is in the period of 1996-2004. The II phase starts in 1998. In 1998 about the 26% of the 643 wellfield areas is continuously processed by the I Phase. About 1,600 thousand m^3/d drinking water protection will be solved. Another result is the decreasing of contamination of ground water resources, the safety of water supply is ensured.

5. Programme of future drinking water wellfield area

This programme is very similar to the previous one, as far as the aims are concerned.

The programme refers to 80 drinking water wellfield areas, in the 20% of them the programme is finished and in the 30% it is in progress. The result, the effects and the connections are the same as of the previously mentioned programme.

6. Reduction of Environmental damage of Szigetköz

The abatement of environmental damages of Szigetköz particular actions will be taken.

7. Programme on Great Plain

In this programme planned for 1998 there is a geological mapping, the tasks of water quality control of backwater areas down by Tisza and Körösök, the establishment of the programme for development of the region on ecological basis. The aim of the measures is to maintain the natural resources, which are the economic basis of the Great Plain.

8. Programme on water supplement of the hilly area of Mid-Danube-Tisza region

The duration of this programme is 10 years, between 1997 and 2006. The planned measures for 1998 are the water supplement and monitoring. As a direct result the decreasing of water shortage and positive natural transformation is expected. To stop the

ebbing of subsoil water, to restore the earlier state, to rehabilitate the protected area would be positive transformation of the state of environment. As the result of the programme the ability of population retention and the potential of the region increases.

9. The programme for prevention damages of contaminated areas and the environmental damages of governmental responsibility

The medium range of this programme lasts till 2002 and the long range period starts in 2003. In 1998 the enumerating of contaminated area, continuing of removing old individual damages and starting removing new damages will take place. From the subprograms the following will be started or continued: removing damages of Hungarian Railway, mines, old Soviet objects and problems in connection with privatization. Later new programmes will be started. The direct result of the programme will be cleaning of soil and ground water and the neutralization of hazardous wastes on the area concerned. This areas will be reusable again.

10. Hungarian Environmental Health Action Programme

This programme is prepared for the period 1997-2002 with the direction of MH and ME. On the basis of monitoring arsenic a cleaning conception is prepared and base examination is continued for elimination the secondary water contamination. As the result of the programme the water quality will improve. In 1998 the estimation of risks of cancer originated from employment, the examination of effect related to doses and the supplementation of examination will take place. Moreover the hospital's hazardous waste will be treated in Baranya county. The analysis of soil contamination endangering the human health and the examination of radon-exposition of the population are the parts of the 1998 year activity. With the help of the programme the relation of the environment and the health can be better recognized and better measurements can be taken. In long range period the health condition of the population could be improved.

11. Programme on National Ecological Network and natural areas

This programme is directed by the Nature Conservation Office of the ME. In 1998 the list of natural areas will be ordered by ME-MACD. After a wide range of harmonization the National Ecological Network is established as a part of the Pan European Network.

12. Recultivation programme of abandoned mining areas

This programme is not connected to any time. About 100 objects will be recultivated in 1998 and about further 300 objects are planned to recultivate. As a result of the programme the "landscape wound" will cease, and the protection of soil and groundwater will be promoted.

13. The development programme of settlement waste management

In the frame of this programme is the subsidy of construction of new regional rubbish dump, partly by the help of Central Environmental Fund and partly by aimed subsidies. According to the programme at least 10-15 regional rubbish dump must be constructed, which capacity must reach 2 Million m^3. Another goal is the recycling of 25-30% of the waste. Basic local governmental task is the introduction of selective waste collection systems. Establishment of "waste courts" serves this goal and to select the hazardous waste components of communal waste.

In the frame of subsidization of establishment of neutralization capacity of hazardous wastes the investments of Garé will start in 1998. Solving the problem needs some years, which belongs primarily to industry. The establishment of the incineration plant in Rudabánya had been stopped

because of financial problems. Another task is to subsidy the establishment of incineration plant of hospitals. In case of products being of product charge obligatory the subsidization of programme manager through the subsidy system is in progress.

7.2. Sector Policies

The respective branch policies are well characterized by the contamination abatement programmes being in the management plan of the Hungarian Environment Protection Programme.

1. Energy

The energy sector can be considered as one of the most important branch according to its environmental effects, especially in connection with air pollution control or with using a large amount of water. Because of the high raw water demand and of the heat contamination of the used cooling water in the surface water resources the energy industry is an important environment factor.

Energy industry has no programme for direct protection of water resources. Indirect programmes are the programmes, which help the establishment of energy saving management, modern and environmentally sound energy industry.

These programmes are:

- development of Hungarian power plant system to 2010;
- short and middle range programme for development energy resources;
- Hungarian Energy saving management programme;
- national project for treatment and dumping of radioactive waste of atomenergy plant;
- project for processing of heavy heat-oil.

2. Industry

Due to the changes in economic structure and modernization, closing the less effective, unmodern technologies with high environment load using establishments, the discharge of contamination of the branch decreased. Because of its importance and weight in the economy the production of industry must be monitored, as this branch everywhere (in the developed countries too) is an important factor in air- water- and soil contamination. Its waste- and hazardous waste discharge is of great importance.

The industry has no programme for direct protection of water resources. Indirect programmes are those programmes, which have the aim of establishment of an industry using developed technologies with high responsibility of environment. These can show results from the point of view of water saving or abatement of contamination. (Middle-range industry policy for increasing the competitiveness of industry, etc.)

Industrial environment protection programmes are as follows:

- programmes for abating sulphur content of gasoline and lead content of petrol in oil industry;
- programme for actualization of middle range industry policy for increasing industrial competitiveness;
- chemical risk abatement programme;
- directives for recycling;
- development conception of environment industry;
- recultivation programme of abandoned industrial areas in the inner parts of the settlements.

3. Agriculture, forestry and hunting

Agriculture is a special economic branch because the subject of its management is one of the environmental elements, the soil, the quality of which influence basically the productivity of agriculture. This is why the methods of agricultural activities could be the sources of numerous environmental problems.

Applying industrial type methods in the agricultural branch became a significant environment damage factor, so in Hungary this branch is more or less responsible for developing a lot of environmental problems.

The most harmful environmental effect originates from plantation, because of the unprofessional utilization of chemicals, pesticide, fertilizer

In animal husbandry farming there is a big environmental problem of the animal keeping, especially the dung water technology. The untreated or not properly treated dung water in the soil causes soil contamination and ground water contamination. Getting into surface water could cause significant damages (e.g. eutrofication) too.

Improper fish farming activity could cause the change of horizontal stripes of water banks. The overpopulated Lake Balaton with fishes eating plants caused the destruction of reeds. In the field of agriculture the most important programme is the Programme on water supplement of the hilly area of Mid-Danube-Tisza region described in Chapter 7.1.

Other agricultural environmental protection programmes are as follows:

- programme for establishment of new forests;
- ten years long programme between 1999 and 2009 for long range utilization of wild animals;
- the Agro 21 research programme (for finding modern, environmentally sound agricultural technologies).

4. Traffic, transportation

The environmental effects caused by traffic are the air pollution, noise and vibration. The specialty of problem is at the same time the difficulty of its solution, that the contamination sources are mobile, the effects are dispersed, they are spread on the country. The number of contamination sources is very high.

Environment protection programmes in connection with traffic:

- development programme for public transport (The reconstruction programme of VOLÁN, the programme of middle range operation of MÁV Inc.);
- programme for development of ports, preference of water transport;
- programme for constructing by-pass roads;
- development of bicycle road network;
- programme for spreading combined transportation methods.

Annexes

1. **Bibliography and References on Social and Economic Aspects**
2. **Vulnerable Hungarian Bank Water Resources**

Annex 1. Bibliography and References on Social and Economic Aspects

Bibliography and References on Social and Economic Aspects

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Annex 2. Vulnerable Hungarian Bank Water Resources

Annex 2-1 Operating water basis of vulnerable bank water

Settlement	Water basis	Number of objects	Max. height of bottom	Opened stratum		Permitted Production
				head	Bottom	
		(db)	(m)	(m)	(m)	m^3/d
1.	2.	3.	4.	5.	6.	7.
Right hand side of the Danube						
Above Budapest						
Győr	Révjfalú ww.	20	42.2	16.0	37.5	21536
Győr	Új ww.	35	64.5	15.3	57.0	19675
Komárom	Kopánymonostor ww.	16	19.0	4.0	15.0	4073
Tát	Tát ww.	14	16.0	3.5	11.0	1000
Esztergom	Prímásisle ww.	4	16.7	3.4	7.7	9300
Dömös	Dömös ww.	6	9.1	4.0	7.6	876
Visegrád	Visegrád ww.	6	10.0	3.8	9.5	1041
Dunabogdány	Dunabogdány ww.	4	12.4	4.5	9.2	822
Leányfalú	Leányfalu ww.	22	18.5	3.5	14.0	15000
Szentendre	Papp-isle ww.	1	13.8	-	-	5000
Szentendre	North water work	7	14.0	5.0	11.0	3800
Szentendre	south water work	18	48.0	2.8	41.0	12100
Budakalász	Lupa-isle ww.	1	7.9	1.9	5.9	5.5
Right hand side of the Danubeabove Budapest Total:	Total: 13 db	154	-	-	-	94278
Left hand side of the Danube						
Above Budapest						
Szob	Hidegrét ww.	2	12.5	3.0	8.5	900
Zebegény	Zebegény ww.	3	15.0	3.0	11.0	438
Nagymaros	Nagymaros ww.	10	18.0	4.0	11.0	712
Verőcemaros	Verőce ww.	40	-	-	-	19726
Vác	Buki-isle	10	14.0	2.3	8.0	2926
Göd	Göd ww.	20	20.0	-	15.0	4500
Dunakeszi	Dunakeszi ww.	8	13.0	-	9.0	3151
Left hand side of the Danube above Budapest Total:	Total 8 db	93	-	-	-	32353
Budapest						
Szentendrei isle	Kisoro isle	12	-	-	-	70000
Szentendrei isle	Tahi I-II.	29	-	-	-	80000
Szentendrei isle	Tahitótfalu	8	-	-	-	15000
Szentendrei isle	Pócsmegyer (Surány)	20	-	-	-	75000
Szentendrei isle	Islemonostor (Monostori wwa.)	245	-	-	-	100000
Szentendrei isle	Islemonostor (Pócsmegyei wwa	96	-	-	-	90000
Szentendrei isle	Islemonostor (I-II. wwa.)	41	-	-	-	75000
Budapest III. distr.	Budaujlak wwa.	7	13.0	3.7	12.5	30000
Budapest IV. distr.	Budapest I. wwa.	8	-	-	-	16000
Dunakeszi	Balpart II. wwa.	23	-	-	-	32000
Budapest V. distr.	Kosuth tér (Galéria)	1	-	-	-	2000
Budapest. XIII. distr.	Margit-isle	11	20.4	2.0	20.2	25000
Budapest XIII. distr.	Radnóti út (Galéria) (pause)	1	12.0	3.0	11.0	10000
Csepel isle	Csepel-Halásztelek wwa.	24	19.5	9.0	17.5	50000
Csepel isle	Isleszentmiklós wwa.	7	18.0	11.7	14.7	21000
Csepel isle	Isleújfalu községi mv.	1	15.0	-	13.0	164
Csepel isle	Tököl-Isleújfalu wwa.	99	19.5	-	18.8	60000
Csepel isle	Ráckeve I. wwa.	21	17.5	10.0	16.5	90.0
Csepel isle	Ráckeve II. Wwa.	9	18.3	6.0	16.0	40000
Total of Budapest:	Total: 19 db	663	-	-	-	881164

Settlement	Water basis	Number of objects	Max. height of bottom	Opened stratum		Permitted Production
				head	Bottom	
		(db)	(m)	(m)	(m)	m^3/d
1.	2.	3.	4.	5.	6.	7.
Right hand side of the Danube below Budapest						
Érd	Dunaparti ww.	12	15.6	2.8	11.0	7172
Ercsi	Cukorgyár ww.	9	29.3	10.9	25.3	1488
Ercsi	Százhalombatta regional ww.	8	30.0	8.0	23.0	8219
Ercsi	Ercsi ww.	19	32.0	9.6	24	7671
Dunaújváros	Szaki isle ww.	11	19.0	5.0	16.0	11781
Right hand side of the Danube below Budapest Total:	Total: 5 db	59	-	-	-	36331
Left hand side of the Danube below Budapest:						
Tass	Gudmonfok ww.	42	20.0	5.5	11.5	3562
Foktő	Kalocsa-Baráka	15	40.3	10.1	39.5	6849
Baja	Baja ww.	24	55.0	8.0	52.0	8767
Mohács	Regonal ww.	88	36.5	12.6	36.0	23698
Right hand side of the Danube below Budapest Total:	Total: 4 db	169	-	-	-	42876
Duna partiszűrésű víz összesen:	Total: 49 db	1138	-	-	-	1087002
Bankwater waterworks of other tributariesi:						
Catchment area of the Rába Szombathely	Perenye ww.	22	9.8	2.4	7.6	3400
Catchment area of the Mura : Molnári	Molnári ww.	14	18.1	4.0	15.7	27921
Total of the Danube and of the catchment area:	**Total: 51 db**	**1174**	-	-	-	**1118323**

Annex 2-2 Drinking water basis of bank water in the future

Water basis	Long range production m^3 / d
1.	**2.**
Down by the bank of the Danube:	
Rajka-Dunakuliti	60000
Dunaremete-Lipót	40000
Máriakálnok-Kimle	40000
Nagybajcs Ny	40000
Nagybajcs K	25000
Vének	30000
Ácsi öblözet-Lovasdi rét	40000
Dunaalmás Ny	10000
Táti-Szigetek	10000
Esztergom	8000
Dunabogdányi öblözet	28000
Kismaros-Nagymaros	24500
Lórév	50000
Makád	50000
Vali-víz torkolat	20000
Adony sziget	25000
Adony D	23000
Bölcske	35000
Madocsa	35000
Gerjén É	32000
Gerjén-Dombord	40000
Fadd-Dombori-Bogyiszló	35000
Gebenc-Gereban	35000
Gemenc-Koppány	35000
Gemenc-Cimmerfok	35000
Báta	12000
Dunavecse É	35000
Apostag-Dunaegyháza	22000
Solti-szigetek	20000
Harta-Solt	74000
Ordas-dunapataj	43000
Bátya	27000
Bátya-Fajsz	52000
Fajsz-Dusnok	45000
Sükösd É.	30000
Lemeskert	30000
Bezerédi sziget	30000
Ujmohács D.	30000
Total of bankwater basis in the future down by the bank of the Danube:	**1268500**
Other water resources of the catchment area of the Danube:	
Down by the banks of the Rába:	
Rábapaty-Csönge Ostffyasszonyfa	35000
Malomsok-Árpas	32000
Árpád-Kisbabót	31000
Mérges	23000
Rábapatona	7000
Gyirmót	5000
Csákánydoroszló	6000

Water basis	Long range production m^3 / d
1.	**2.**
Down by the banks of the Dráva:	
Bélavár-Vízvár	20000
Heresznye-Bolhó	15000
Drávasztára-Zaláta	20000
Down by the banks of the Mura and Kerka:	
Lenti – Lentikápolna	15000
Total of the other water resources of the catchment area of the Danube:	**224000**
Total of the Danube:	**1492500**

Remark: At the catchment area of the Tisza there can be utilized 280.000 m^3/d additional bank water in the future

Part B

Financing Mechanisms

Table of Contents

List of Tables

List of Abbreviation

Term	Definition
CEPF	Central Environmental Protection Fund
HDB	Hungarian Development Bank
HNB	Hungarian National Bank
HUF	Hungarian Forint
MTCWM	Ministry of Transport, Communication and Water Management
MERP	Ministry of Environment and Regional Policy *(Note: The name of the Ministry from 01.07.98 has been amended, the new name is Ministry of Environment)*
ME	Ministry of Environment
NEI	National Environmental Inspectorate
NWA	National Water Authority
NEP	National Environmental Program
REI	Regional Environmental Inspectorate
RWA	Regional Water Authority
WMF	Water Management Fund

1. Summary

Hungary is in the process of harmonizing its legislation with EU-normatives. The process already started at the end of 80s. By now the major legal framework and all the institutions protecting the provisions of law have been set up. **The legislation is the main pillar for environmental and water management policy in Hungary.**

The environmental protection and water management permeate all sectors of the national economy, therefore the legislation and mechanisms of their financing are extremely complex. **General rules for environmental protection and water management – including finance – are provided in two framework laws:**

- Act no. LIII of 1995 on general rules of environmental protection.
- Act no. LVII of 1995 on water management.

The objective of **the law on environmental protection** is to harmonize the relationship between Human Being and his environment, to oblige Individual to protect the elements of his environment and to introduce economic and social development that suits to preserve the natural heritage and environmental assets for future generations. The law defines the necessary information, documentation, research and financial basis for environmental protection.

The main argument in favor of **a new act on water management** included the changes in property conditions. The act reduced the role of the State, and gave more power, wider responsibilities and functions to the local self-governments. The new regulation covers all management functions related to water, starting from the comprehensive, complex development of water resources till the control of water related losses. The new law is capable of meeting the expectations of society for water management and offering a wide scope for modernization of market economy. The law is consistent with the Pan-European objectives, fits organically into the Hungarian legal system, while taking the geographical situation into consideration.

In 1997 the Parliament adopted a Decree on **The National Environmental Program (NEP)**. The Program is considered as the national strategy for environmental development, due to the fact that it defines the targets, conditions to be reached, the key area of implementation and the financial sources for accomplishment. The Parliament emphasized the importance of co-operation with local self-governments, the participants of scientific and economic sphere, as well as with the civil organizations during implementation of the Program and made the Government responsible for the execution.

In February 1998 the Government has adopted the **Action Plan to the NEP**. The Action Plan is a 6-year plan of measures, serving the solution of recent environmental problems, or setting up the solution, and prevention of future problems. The major objective of the Program is founding the sustainable growth, therefore not only to identify the environmental problems, but also to offer a comprehensive solution for them.

The national sources for funding of water quality and water management programs and projects are very wide, among them the largest ones are the Central Environmental Protection Fund and the Water Management Fund. They co-finance investment projects of municipalities and commercial organizations. Sources can also be obtained from the ministerial budgets. From the budget of Ministry of Internal Affairs labeled and target-related subsidies are available for water supply and wastewater treatment of municipalities. The budget of Ministry of Environment and Regional Policy provides subsidies for regional development that may serve water sector projects. All of the named sources are available for the organizations in a way of application. Apart from those there are investment projects of water quality and water management development that completely financed by the State, out of the budget of MTCWM and MERP.

The **Central Environmental Protection Fund** is a special state fund established and regulated by law. The minister of Environment and Regional Policy is responsible for administration of the fund. **General objective of the fund is to stimulate of forming an environmentally friendly economic structure, prevent the environmental hazard, reduce the environmental damages, protect and maintain the natural values, support efficient solution of environmental problems and improve the public awareness for the protection of environment and natural values.**

In 1998 the planned revenue of the CEPF is 50 % higher than that of 1997, due to the newly adopted environmental fees. The sum of revenues and expenditures of the fund are 24,660 MHUF, (120 MUSD) and 23,402 MHUF, (114 MUSD respectively).

The **Water Management Fund** is the other designated state fund that can be used for financing of water sector projects. The Minister of Transport, Communication and Water Management is **responsible** for administration of the fund. The **overall purpose and role** of the fund are defined partially in the act on water management, and in the decree of minister of MTCWM on the Water Management Fund, i.e., to **support and finance the water management tasks of public interest. Those tasks are especially the protection against the harm of waters, economical use of water resources of drinking water quality, stimulation of the economical utilization of water resources and protection of the water resources.**

In 1998 the planned revenue of the WMF is 18 % higher than that of 1997, due to the increased unit charges on water abstraction (water users' fee). The value of balanced revenues and expenditures of the fund are 5,225 MHUF, (25,4 MUSD).

A municipal investment on wastewater treatment – usually – might be financed from the following typical sources:

a. non-repayable grants from the national budget (target-related subsidy, up to 40 % of the overall value of investment);
b. subsidies from the Water Management Fund (up to 30 % of the overall value of investment);
c. subsidies from the Central Environmental Protection Fund (up to up to 30 % of the overall value of investment);
d. subsidies from regional development sources (up to up to 30 % of the overall value of investment);
e. loans from Hungarian Development Bank, or loans from international institutions mediated by HDB or other commercial banks;
f. loans from commercial banks;
g. own sources of the municipalities, e.g., 30 % share from the charged wastewater fine, depreciation, etc.

Sources a)–b)–c)–d) considered as governmental (central) sources, cannot surplus 50-100 % of the total investment value, depending on the level of underdevelopment of the settlement (town, village) or other governmental priorities.

Availability of sources e) – f) (i.e., bank loans) assured, but readiness of organizations taking them is highly theoretical. Commercial banks examine the investment projects strictly from point of view of viability. The public utility companies (or their owner the municipalities) cannot generate sufficient sources for development (investment) through the water and sewer service prices. Part of the reason for this is the low depreciation rate, fixed by laws, and the undervalued assets of the companies. Therefore they are not able to produce their own necessary contribution, as own equity. Partially because of this reason those organizations cannot elaborate a financially viable plan for the future operation of the planned infrastructure investment. As a result the commercial banks do not qualify the project as financially viable. It has to be noted that recently any further increase of water prices would cause extreme social stresses.

The other reason of poor loan-taking activity of municipalities is that share of loans in the Balance Sheet Total is limited by law to no more than 15 %.

Prices of drinking water from waterworks and the wastewater treatment services belong to the group of officially fixed/limited prices. The pricing authorities are either the Government (MTCWM) or the municipality, depending on ownership.

Definition of price for drinking water has different procedures for every type of companies. The majority of the existing public water utilities (over 80 %) are owned by the municipalities, a minor part, the regional networks, owned by the State. Where the municipality is the owner of the water work, then the pricing authority is the self-government itself, in case of state-owned waterworks the MTCWM is acting as the pricing authority.

The process of definition of prices is the following: the state-owned waterworks present their price proposals to the MTCWM, according to the guidelines of the ministry. The proposal presents the detailed operational costs (taking into consideration for instance the forecasted energy price for the next year, and the planned inflation rate, etc. The profit cannot be higher than 3 % (over the inflation). After approval by the ministry of the proposal, the guidelines and the whole pricing mechanism and the prices itself (by waterworks) are to be published in the official journal of MTCWM. This procedure is proposed to be followed by the municipalities in their price approval process, but they are not obliged by law to carry out.

Because of the high number of small municipality owned waterworks, the differences among water prices can reach up to 1:10. Considering the social consequences of this situation the Government assures a system of subsidies in order to eliminate the impact of the extremely high prices on the population. The annual amount of the subsidy is not exceeding the 2-3 % of the total income of all of the waterworks in the country.

Pricing for industrial use regulated predominantly by instruments of economic nature. Industrial water use has a major impact on the country's water resources management, in that this amount to around 70 % of the total freshwater use. Water consumption has increased three-fold during a period of 30 years (1960-1990), although the trend has reversed from the early 90s due to economic recession. Further reasons of declining industrial water use are various attempts on water conservation, restructuring of industry and the change to market economy.

Consumers (public utilities, industrial and agricultural users) carrying out water abstracting activities are subject to the water permit and they are obliged to pay a **user charge on water abstraction** to the Water Management Fund.

The existing **sewer fine** and **wastewater fine** are supposed to promote the adoption of polluter pays principal in water pollution control and fining. The recent regulatory instruments include the possibility of levying fines for surpassing the limit values set forth in legal provisions. The operators of industrial and other commercial plants discharging harmful pollutants into the public sewer are obliged to pay a **sewer fine**. The treatment plant operators pay **wastewater fine** for discharging effluents into the surface water.

Both types of fines are defined in terms of pollutant concentration. Progressivity means that in the second year the polluter pays two times more than in the first year unless starting pollution control investments or measures.

The wastewater fine and sewer fine as well are far too low to have any real incentive effects. The amount of fines is far less than the cost of mitigation or elimination.

The ministries concerned are in the process of elaborating more efficient regulatory systems in order to protect the water quality and quantity.

The reform of the banking sector in Hungary started in 1987. From that year the function of central monetary organ (Hungarian National Bank) and the function of commercial banks have been separated.

In the end of 70s the Government already realized the necessity of presence of foreign capital in banking sector, due to opening up the Hungarian economy toward the Western countries. So in Hungary in 1979 the CIB, and in 1985-86 the Citibank and Unicbank with foreign shares were established. However the majority owner of the commercial banks remained the State.

The Act on Financial Institutions of 1991 prescribed to decrease the share of Hungarian Government in the commercial banks to 25 %, but until 1995 no significant move has been made. The intense privatization took place from 1995.

According to the opinion of the BANKWATCH expert, with the last of the state-owned banks to be privatized by the end of 1997, all of Hungary's large banks are either majority or minority foreign-owned. The progress that Hungary has made in privatizing its banks should not diminish the other achievements that have helped to restructure the sector to its present form, currently the most advanced in the region. The financial health of most of the formerly troubled banks has been restored. Legal, accounting and regulatory frameworks to Western standards have been adopted, modern payment system is in place.

The Hungarian banking sector is evolving towards a more universal model. This has also been encouraged by the regulatory framework. The Financial Institutions Act took effect at the beginning of 1997 and harmonized earlier rules of the banking law to EU norms. Among other changes, the minimum capital requirement for universal bank has been doubled to HUF 2,000 Million (USD 10 Million). At the end of 1996 Parliament also approved new legislation on mortgage institutions and mortgages notes. A new securities law allows bank to deal directly in State securities and derivatives, and by 1999 in all securities. Given its OECD membership, Hungary has also agreed to allow foreign banks to open branches as of January 1, 1998.

A new Code of Foreign Exchange provides full convertibility for current account transactions and a growing degree of liberalization of capital movements. All these developments contribute to further reductions of the banks' transaction costs and provide an opportunity to introduce new financial product.

The Hungarian Development Bank started its activity in 1992. The bank is one of the tools in hand of Government to create conditions that promote economic growth and implement tasks related to the **modernization and integration to EU.**

The economic climate for investment and development programs has become more favorable due to the increasing amount of domestic and foreign fund available and the improvement in the terms and conditions offered to fundraisers. The Hungarian Development Bank contributed to the successful achievement of the above objectives by considerably expanding its business and activities, and by generating earnings well ahead of plans. The new Act on Credit Institutions serves as a basis for the transformation of the Bank is a unique credit institution with a special status in the Hungarian banking sector.

The Bank has been very successful in raising fund in international capital markets on favorable terms and in using these to finance projects aimed at the development of the national economy. Under the agreement concluded with Kreditanstalt für Wiederaufbau special banking products have been launched, e.g., a long-term credit facility for financing infrasturctural development projects of municipalities, a novel product in the Hungarian market.

The Hungarian banking sector is entirely prepared to participate in transferring loans of the international financing institutions to the domestic municipal and commercial sector for financing water sector investments projects. It is necessary to emphasize, there is no shortage in credit facilities in the Hungarian banks. The municipalities themselves are not entirely prepared for meeting the financial requirements of the Hungarian and international financial institutions.

2. Legal Basis

2.1. Compilation of Relevant Laws and Regulations with Financial Relevance to Water Quality and Water Management Programs and Projects

Hungary is in the process of harmonizing its legislation with EU-normatives. The process already started at the end of 80s. By this time have already been set up the major legal framework and institutions protecting the provisions of law. The legislation is the main pillar for environmental and water management policy in Hungary.

In Annex B-1 have been collected all the important laws and regulations with water management significance, concerning the different paragraphs of Part B - Financing Mechanisms, as well as the other Parts of this country study. It has to be noted that in Hungary the exclusively official source of legislation is when the law is published in the Official Journal of Hungary. In the column of source (Column # 3) from year 1990 have been named the particular issue of the Official Journal. In case of older laws it is not always referred. Currently an electronic database of Hungarian Legislation in force is available, where on the criteria of number of the law and year (Column # 2) any of the laws can be located and obtained.

There are approximately 130-150 different laws and regulations in force with financial relevance to water quality and water management in Hungary, out of them for this study have been selected 50 as the most important ones and demonstrated in Annex B-1.

Before introducing the particular legal instruments of water management and environmental sector it is inevitable to specify the types of Hungarian legislation:

- Acts can be adopted only by Parliament and are binding and directly applicable for ministries, other institutions, legal persons and individuals. They are published in Official Journal of Hungary.
- Decrees of Government that are directly binding on the persons to whom they are addressed, including ministries, individuals and legal persons. They are published in Official Journal of Hungary.
- Decisions of Government that are directly binding on the members of Government. They are published in Bulletin of Decisions.
- Decrees of Ministers that are directly binding on the persons to whom they are addressed, including individuals and legal persons. They are published in Official Journal of Hungary.

The inventory of relevant laws and regulations with water management significance, demonstrated in Annex B-1, contains general provisions and rules for environment and water management, (References # 1-8) as The Constitution, The Civil Law, mandate of ministries and ministers and other institutions. They are all connected with finance in a way explained in column “Main subjects, contents, particularities” of Annex B-1.

It is important to underline: according to recent legislation in Hungary, the water management functions of the State is the competence of Ministry of Transport, Communication and Water Management (MTCWM) and the agencies reporting to it (regional water authorities), and the protection of volume and quality of water resources are the competence of Ministry on Environment and Regional Policy (MERP) and organs reporting to it (regional environmental inspectorates).

The 12 regional water authorities have been organized on the catchment principle. Their tasks and mandate include:

- co-ordination and supervision in their respective areas of the State, self-governmental, association and private (citizens, farms, industries, etc.) water management activities,
- keeping records on allocation and protection of water resources (for example charging for use of water, generating revenue for Water Management Fund).

The 12 regional environmental inspectorates have been established to perform the functions of regional state administration related to water quality. Their areas of operation are identical with those of the water authorities. The inspectorate operates the water quality laboratories forming the backbone of the water quality-monitoring network and carry out the official analyses (as a basis of levying the wastewater fines, generating income for Central Environmental Protection Fund).

The environment protection and water management permeates all sectors of the national economy, subsequently the legislation of their financing is extremely complex.

General rules for environmental protection and water management – including finance – are provided in two framework laws:

- Act no. LIII of 1995 on general rules of environmental protection (Reference # 9).
- Act no. LVII. of 1995 on water management (Reference # 13).

The objective of law on environmental protection is to harmonize the relationship between Man and his environment, to oblige Man to protect the elements of his environment and to introduce economic and social development suited to preserve the natural heritage and environmental assets for future generations. In the interest thereof the law

- defines the concepts, principles and responsibilities related to the environment,
- addresses the protection of the elements of the environment, the factors endangering these elements (the soil, water, air, life, the built-up environment, the hazardous substances and technologies, wastes, noises and vibrations, radiation),
- establishes the information, documentation, research and economic basis for environmental protection.

Used waters shall be returned to the natural cycle without affecting the natural processes, i.e., the renewal of water quantity and quality. In the interest thereof, as well as for introduction of the polluter pays principle, a system of penalties is introduced. (References # 11, 12).

The main argument in favor of a new act on water management included the changes in property conditions, the reduced role of the State, further the wider responsibilities and functions of the local self-governments. The new regulations cover all management functions related to water, starting from the comprehensive, complex development of water resources till the control of water related losses.

The law is capable of meeting the expectations of society for water management and of attaining the water management goals. The modern philosophy underlying the regulations reflects the changes in property conditions while offering a wide scope for modernization initiatives of market economy. The law is consistent with the Pan-European objectives, fits organically into the Hungarian legal system, while taking the geographical situation into consideration. There are provisions in the law to establish contact points with other domains of legislation (Reference # 14, 15, 25, 26).

After the transition to the market economy one of the first activity of the democratically elected Parliament was the declaration of rights of self-governments (References # 21, 22, 25).

Financial support, and system of subsidies for self-governments are also laid down by law (References # 27, 28, 29).

There is a general legislation for administration of public revenues (Reference # 23), and an act on some special (designated) state funds (Reference # 30), as well as regulation of Central Environmental Protection Fund (References # 31, 32) and regulation of Water Management Fund (Reference # 33).

Prices of public utility services - drinking water supply and wastewater treatment - belong to the officially fixed/maximized prices. Reference # 51 demonstrates the way how the law works.

The Parliament has adopted another tool for regional development and country planing, defining also further financial sources for implementation some water sector projects (References # 16, 17, 18, 19, 41).

A growing attention is given to harmonized, transparent, efficient utilization of central sources for financing infrasturctural investments (References # 34, 35).

Several legal measurers have been taken in order to prepare the integration into European Union (References # 36, 37, 38).

From point of view of financing water sector programs and projects special attention has to be given to the act on Annual Central Budget. In the Budget are declared the annual sum of investment of ministries, municipalities, revenues and expenditures of designated state funds (Reference # 42).

There are general provisions for financing in the bank-law, including the acts on credit institutions and the central bank (References # 49, 50), a fine and transparent regulation of public procurement is given in the act on public procurement (Reference # 48) and regulation of concessions is provided by the concerning act (Reference # 47).

There are decrees of Government regulating and supporting agriculture (References # 39, 40).

2.2. Assessment of Main Deficiencies and Needs for Improvement

Transformation of Hungarian economy into market-economy, as well as adaptation of legal system to EU-conform complex is in the process. The legislation is trying to meet the requirements, but often the adopted laws have to be amended soon after their adoption.

The legal environment is still constantly developing in Hungary that causes frequent changes in the regulatory system, and therefore it results in uncertainty for all the elements of the water management sector.

The existing regulations are not strictly enforced by all the administrative organs concerned, because of the lack of preconditions.

There is a major contradiction in the legislation of water sector. The water management function and the water quality control are divided between two ministries and their regional agencies, causing permanent conflict in the management and control.

Hungarian municipalities are not obliged by law to carry out wastewater treatment.

3. National Policy and Strategy for Funding of Water Sector Programs and Projects

In 1997 the Parliament adopted a Decree on "**The National Environmental Program**" (NEP). (See Annex B-1, Reference # 41) The NEP is considered as the national strategy for environmental development adopted by Parliament, due to the fact that defines the targets, conditions to be reached, the key area of implementation and the sources for implementation. The Parliament considered important for the Government the co-operation with local self-governments, the participants of scientific and economic sphere, and civil organization during implementation of NEP.

On 13 February 1998 the Government has adopted the Action Plan of 1998 to NEP.

The Action Plan is a 6-year plan of measures, serving the solution of recent environmental problems, or setting up the solution, and prevention of future problems. The major objective of the NEP is founding the sustainable growth, and not only identify the environmental problem but offer a solution for them.

The Action Plan of 1998 in certain aspects serves the preparation of measures to be taken in the next years, and partially considers programs have already been started in previous years.

Regarding water management sector the considered programs are listed in Table 3 below. Information regarding national programs has been taken from the Decisions of Government in force, as well as from the acts on annual central budget of the years 1997, 1998.

The planned national programs have been compiled from the motion of Ministry of Finance on the Central Budget of Hungary for 1998. The mentioned material has got a separate book on the 3-year diagnosis on development of Hungary.

The final list of national programs of the water management sector has been agreed with the directors concerned of MTCWM and MERP.

In all chapters of this study for the calculations have been used the average exchange rate published by the Hungarian National Bank on 6th January 1998 1 USD = 205.18 HUF, and 1 USD = 0.92 ECU.

Table 3. National programs of the water management sector

Name of the national program	Period of implementation (years)	Preliminary volume of the program	
		in Million HUF	in Million USD
1	*2*	*3*	*4*
1. Sewage canalization and treatment program of Hungary	1996-2010	603,000.00	2,950.00
2. Sewage treatment program of the capital (Budapest) and the cities of county status	1995-2010	80,000.00	3989.90
3. Protection of ecological condition of Lake Balaton and improvement of water quality	1996-2010	4,000.00 -6,000.00 annually	19.50 -29.24 annually
4. Program on protection of drinking water wellfield areas (Phase I)	1996-2004	9,200.00	44.80
5. Program on protection of drinking water wellfield areas (Phase II)	1998-2010	100,000.00	487.40

1	*2*	*3*	*4*
6. Protection of future drinking water wellfield areas	1994-2003	4,780.00	23.30
7. Program on Great Lowland	1994-2006	200.00 annually	0.90 annually
8. Program on water supplement of the hilly area of Mid-Danube-Tisza region	1998-2006	350.00 annually	1.70 annually
9. Program on improving of conditions for RSDB-Decision of Government (Phase I)	1997 -1999	125.00 for three years	0.61 for three years
10. Program on improving of conditions for RSDB - Decision of Government (Phase II)	2000-2003	1,200.00	5.90
11. Catchment management planning program (integrated land and water management)	1997-2005	100.00 annually	0.50 annually
12. Rehabilitation of oxbow lakes	1998-2006	100.00 annually	0.50 annually
13. National remediation program of contaminated areas	1997-2005	1,000.00 -7,000.00 annually	4.90 -34.00 annually
14. Improvement of the quality of drinking water in Hungary	1998-2010	50,000.00	243.70

Source: Central Budget, 1998.

4. National Sources, Instruments and Mechanisms for Funding of Water Quality and Water Management Programs and Projects

4.1. Relevant Public Funding Sources and Instruments in Use

Description of Central Environmental Protection Fund

(1) Role, Structure and Responsibilities

The Central Environmental Protection Fund has two major characteristic, it is a

- national and
- special state fund,

established and regulated by law. See Annex B-1, References # 23, 30, 31, 42. The definition as a special (designated) state fund means that all the revenue of the fund ought to come from outside of Central Budget (Reference # 23). Overall purpose, ownership of the fund are declared in References # 23, 30, responsibilities and financial management is defined in Reference # 31, and volume of the fund, structure of revenues and expenditures is defined by the Act on Central Budget (as an appendix to it) of the given year (Reference # 42).

The Minister of Environment and Country Planing is responsible for administration of the fund.

The general objective, i.e., the overall purpose of the fund is to stimulate of forming an environmentally friendly economic structure, prevent the environmental hazard, reduce the environmental damages, protect and maintain the natural values, support of efficient solution of environmental problem and improve the public awareness for the protection of environment and natural values.

In 1998 the planned revenue of the CEPF is 50% higher than in 1997, mainly due to the newly introduced product protection fee on crud oil products.

In 1998 the planned expenditures of the CEPF is 30 % higher than in 1997, mainly due to the increased sum of expenditures for country planning and remediation of contaminated areas.

Balance of the CEPF for years 1998 is planned with 5% sufficit.

The total revenue of the CEPF is 0.2586 % of GDP in 1998, and these data for the years 1999 and 2000 are 0.2461 and 0.2358 % respectively.

The total expenditure of the CEPF is 0.2495 % of GDP in 1998, and these data for the years 1999 and 2000 are 0.2836 and 0.2689 % respectively.

The structure of the Central Environmental Protection Fund for 1998 is demonstrated in the Table 4-1 below, in Million HUF and USD.

Table 4.1. The structure of the Central Environmental Protection Fund for 1998

Name of the item	Values in Million HUF	Values in Million USD
1	*2*	*3*
Revenues charged according laws:		
1. Fines charged for protection of environment and nature (air, water pollution, noise, dangerous substances, etc.)	1,060.00	5.17
2. Fees for environmental protection on products (tires, accumulators, cooling equipment, oil, etc.)	18,800.00	91.33
3. Fines charged for protection of architectural values	100.00	0.49
4. Fines charged for improper construction and building	200.00	0.98
5. Revenue from sale of state-owned architectural assets	100.00	0.49
Sundry revenues:		
1. Repayments from subsidies have been paid by fund	2,200.00	10.86
2. Other revenues	1,050.00	5.12
TOTAL REVENUES OF 1998:	**24,660.00**	**120.00**
Expenditures:		
1. Subsidies for investment of direct environmental protection	16,272.00	79,26
2. Public tasks of environmental protection	4,500.00	21.93
3. Prevention of environmental damages	530.00	2.58
4. Payment for caused damages	950.00	4.63
5. Cost of operation and administration		
a) for collection of charges (fees, fines, etc.)	550.00	2.68
b) for administration and controlling of utilization	600.00	2.92
TOTAL EXPENDITURES OF 1998:	**23,402.00**	**114.00**

Source: Central Budget, 1998.

Total revenues: 24,660.00 Million HUF 120.00 Million USD

Total expenditures: 23,402.00 Million HUF 114.00 Million USD

GSF balance: 1.258.00 Million HUF 6.00 Million USD

(2) Financial Management and Administration

Budgeting process and procedures, as well as procedures for collection and handling fund revenues are regulated by law. See Annex-B, Reference # 31.

The minister of Environment and Regional Policy is responsible for handling the Fund via special organization dealing with its operation (tendering, contracting, payments, etc.).

The payments for the bank account of Central Environmental Protection Fund are made by:

- National Office of Tax Revenues
- National Customs Office
- National Office of Mining.

Further payment could be made by private persons, and others. The account number is announced in the relevant law.

The expenditures of the fund can take place according tendering procedure, announced yearly in the Bulletin of Environment and Architecture/Building.

Criteria for expenditure decisions on separate budget lines of the fund are published in announcement of tenders.

Types of financial assistance that can be provided by the fund are the following:

- non-repayable grants;
- repayable subsidies with no interest, or less than the bank-interest rate, i.e., soft loans,
- loan guarantees;
- subsidies on interest.

All types of subsidies can reach the 60 % of overall cost of investment, and the non-repayable grants can not be more than 30 % of the volume of the total investment.

Control of realization of investment both in financial and "on site" sense is provided by the regional environmental inspectorate concerned and by the specialized organization on handling the fund.

(3) Fund Management

Account of Central Environmental Protection Fund is managed by the Treasury. Subsequently no financial operation is allowed with the fund. All the payments out of the fund are made through the organization for handling the fund, on the basis of regular invoices. The law allows establishment of company of public interest on behalf of the sources of the Fund if the protection of environment or financing of development can be provided more efficiently.

The public is informed about the budget of the fund by half-yearly.

Procurement from the fund is made by tendering or according the provisions of act on Public Procurement. See Annex B-1, Reference # 48.

(4) Application for Assistance

Application for Assistance takes place in form of tendering. The Central Environmental Protection Fund announces tender for investment of environmental protection. Applicant ought to be: company founded in Hungary (the seat of the company has to be registered in Hungary), company of non-legal person character, private entrepreneur, and natural person in certain specific cases.

Required information about the applicant is prescribed in law. See Annex B-1, Reference # 35.

The application document has to contain the following:

- Technical specification of the planned project, name, address of implementation,
- Description of environmental problems being addressed,
- Cost analyses of the project, including VAT
- Sum of own equity,
- Sum of subsidies applied from other central sources,
- Cost analysis of the project (both capital and current annual, operational cost),
- Financing plan.

There are permits, and other documents necessary about not having public debts, etc.

(5) Evaluation of Application

Evaluation is made by an Inter-Ministerial Committee, involving all the interested parties in the project.

A special cooperation takes place, when the applicant applied for assistance from several special state funds (most often the environmental and water management funds, as well as grants from Central Budget, e.g., target-related or labeled subsidies, subsidies for regional development).

Criteria of Evaluation are always published in tender announcement:

- Technical feasibility;
- Environmental impact;
- Consistency with the priorities, announced in tender;
- Limit of the fund, for the given target.

(6) Other Relevant Information on the Central Environmental Protection Fund

According to the 3 year prognoses of the Ministry of Finance the Revenues and Expenditures of the CEPF will be as follows :

Table 4.2. Prognosis of the revenues and expenditures of the Central Environmental Fund

NAME/YEARS	1998	1999/1998	2000/1998
Total Revenues %	100.00	108.40	108.10
Total Expenditures %	100.00	129.50	107.00

Source: Motion of the Ministry of Finance on the Central Budget 1998, for the Parliament

Description of water management fund

(1) Role, Structure and Responsibilities

The Water Management Fund has two major characteristics, it is a

- national and
- special state fund,

established and regulated by law. See Annex B-1, References # 23, 30, 13, 24, 33, 42. The terminology as a special state fund means the same as in case of previous fund that all the revenues of the Water Management Fund come from outside of the sphere of Central Budget (Reference # 23). Overall purpose, ownership are declared in References # 30, 24, responsibilities and financial management is defined in Reference # 33, and annual volume of the fund, structure of revenues and expenditures is defined by the Act on Central Budget (as an appendix to it) of the given year (Reference # 42).

The Minister of Transport, Communication and Water Management is responsible for administration of the fund.

The overall purpose and role of the fund are defined partially in the act on water management, and in the decree of minister of MTCWM on the Water Management Fund (References # 13, 24), i.e., the general objective of the Water Management Fund is to fulfill the water management tasks of publish interest, especially the protection against the harm of waters, economical utilization of waters of drinking water quality, stimulates the economical utilization of water resources and protection of water resources.

In 1998 the planned revenue of the WMF is 18 % higher than the fact in 1997, due to the increased charges on water abstraction (water user's fee).

The charges for water abstraction are different for general water users and for industrial ones. In 1997 for general water users the fee was 1.15 HUF/m^3, while in 1998 is 1.35 HUF/m^3, and the plan for 1999 and 2000 is to increase the charge with further 10 % and 8% respectively. For industrial water users the charges are respectively 3. 50 HUF/m^3 and 4.10 HUF/m^3 in 1997 and 1998. The plan of increase resembles the general water users charges growth.

In 1998 the planned expenditures of the WMF are 29 % higher than in 1997, mainly due to the increased sum of expenditures for investment for communal water supply and wastewater treatment.

Revenues and expenditures of the WMF for year 1998 are balanced, but because of the unutilized sources from previous years the expenditures will be higher than revenues. (In 1998 the sum is 2,172,0 million HUF, and in 1999 the sum is 1,086,0 million HUF).

The revenues of the WMF are 0.0555 % of GDP in 1998, and these data for the years 1999 and 2000 are 0.0530 and 0.0506 % respectively.

The expenditures of the WMF are 0.0557 % of GDP in 1998, and these data for the years 1999 and 2000 are 0.0631 and 0.0596 % respectively.

The major form of expenditures is the subsidies for self-governments that have increasing role. In 1998 those were 48,8 % of total expenditures, and planned in 1999 and 2000 57,3 % and 55,9 %. Comparing to the previous years: 1999/1998 that is 153.7 % and 2000/1999 that is 103.9 %.

The structure of the Water Management Fund is demonstrated in Table 4-3.

Table 4.3. The structure of the Water Management Fund for 1998

Name of the items	Values in Million HUF	Values in Million USD
1	***2***	***3***
Revenues:		
1. User charge on water abstraction	5,150.00	25.20
2. Other revenues	60.00	0.30
TOTAL REVENUES OF 1998:	**5,210.00**	**25.50**
Expenditures:		
1. Commodities, services	450.00	2.19
2. Basic water management duties of the State	1,404.00	6.94
3. Interest paid	5.00	0.02
4. Cost of Maintenance of Water Associations	300.00	1.46
5. Prevention of water quality damages through institutions financed from central budget	0.00	0.00
6. Expenditures of operation of the fund	101.00	0.49
7. Research and development	0.00	0.00

1	*2*	*3*
8. Subsidies for investments: industry	100.00	0.49
9. Subsidies for investments: water associations	400.00	1.96
10. Subsidies for investments: water utility associations	100.00	0.49
11. Subsidies for investments: for self-governments	2,336.00	11.39
12. Other expenditures	14.00	0.07
TOTAL EXPENDITURES OF 1998:	**5,225.00**	**25.50**

Source: Act on the Central Budget 1998.

Total revenues:	**5,225.00**	**Million HUF**	**25.50**	**Million USD**
Total expenditures:	**5,225.00**	**Million HUF**	**25.50**	**Million USD**
GSF balance:	**0.00**	**Million HUF**	**0.00**	**Million USD**

(2) Financial Management and Administration

The budgeting process and procedures, as well as procedures for collection and handling fund revenues are regulated by law. See Annex-B-1, References # 24, 33. The decree of the minister of MTCWM defines the function of Committee evaluating the applications for subventions, the control of utilization of subventions, as well as the charging of water resource usage fees.

The annual plan of Water Management Fund (Revenue, Expenditure, Cash Flow) is prepared by Budget Department and Water Management Department of MTCWM. The operational duties of handling the sources are executed by National Water Authority according directives of concerned departments of MTCWM.

Charging and collecting the revenues (user charge on water abstraction) of the fund is executed by regional water authorities.

Criteria for expenditure, i.e., subsidies published in the tender announcement. The regional water authorities will provide the range of applicants, and forward those to the National Water Authority.

Types of financial assistance that can be provided by the fund:

a. For investment of sewage treatment, water supply and protection of drinking water sources:
   - non-repayable grants;
   - repayable subsidies free of interest,
   - soft loans, (lower than the bank-loans' interest rate);

   Maximum share of co-financing by the Fund is 20 or 30 %, for water supply, and sewage treatment respectively, average share of co-financing by the Fund is approximately 10 %.

b. For investment of industrial water management
   - repayable subsidies, with free of interest,
   - soft loans.

   Maximum share of co-financing by the Fund is 50 %, the lump sum in this department of the Fund is not entirely utilized by applicants.

(3) Fund Management

Account of Water Management Fund is managed by the Treasury. Thereafter no financial operation is allowed with the fund. All the payments out of the fund are made through the National Water Authority responsible for operational handling the fund, on the basis of regular invoices from contractors. The relevant law allows to take credit by the Fund or issue bonds.

Procurement from the fund is made by tendering or according the provisions of act on Public Procurement. See Annex B-1, Reference # 48.

(4) Application for Assistance

Application for Assistance takes place in form of tendering. The Water Management Fund announces tender for investment annually. Applicants can be: water management companies (or persons) and municipalities. Required information about the applicant is prescribed in law. See Annex B-1, Reference # 35.

The application document has to contain the following:

- Technical specification of the planned project, name, address of implementation,
- Description of environmental problems being addressed,
- Cost analyses of the project, including VAT
- Sum of own equity,
- Sum of subsidies applied from other central sources, (Central Environmental Protection Fund, or subsidies for Country Planning)
- Cost analysis of the project (both capital and current annual, operational cost),
- Financing plan.

(5) Evaluation of Application

Criteria of Evaluation:

- Consistency with national and local water quality policies;
- Financial viability of applicant;
- Opinion of inter-ministerial Committee.

(6) Other Relevant Information on the Fund

According to the 3 years' prognoses of the Ministry of Finance the Revenues and Expenditures of the WMA will be as follows :

Table 4.4. Prognosis of the revenues and expenditures of the Water Management Fund

NAME/YEARS	1998	1999/1998	2000/1998
Total Revenues %	100.00	108.60	107.80
Total Expenditures %	100.00	129.50	106.50

Source: Motion of the Ministry of Finance on the Central Budget 1998, for the Parliament

4.2. Standardized Funding Mechanisms for Investments in Water Pollution Control

The funding mechanisms for investments in water pollution control – in the Hungarian practice – are described in the following paragraphs. There is a separate mechanism for the municipal investments, and for industrial (that refers to the agricultural and other commercial investments). According to a new Governmental Decree if an organization applies for subsidies from several central sources, all the sources of investment have to be harmonized.

4.2.1. Typical Sources of Investment Money for Municipal Wastewater Treatment Plants

A municipal wastewater treatment plant in form of new investment – **theoretically** – can be financed from the following typical sources:

c. non-repayable grants from the national budget (target-related subsidy, up to 40 % of the overall value of investment);
d. subsidies from the Water Management Fund (up to 30 % of the overall value of investment);
e. subsidies from the Central Environmental Protection Fund (up to up to 30 % of the overall value of investment);
f. subsidies from regional development sources (up to up to 30 % of the overall value of investment);
g. loans from Hungarian Development Bank, or loans from international institutions mediated by HDB;
h. loans from commercial banks;
i. own sources of the municipalities, e.g., 30 % share from the charged wastewater fine, depreciation, etc.

Sources (a)-(d) considered as governmental (central) sources, can not surplus 50-100 % depending on level of underdevelopment of the settlement (town, village).

Availability of sources (e)-(f) – bank loans – is highly theoretical. Commercial banks examine the investment project strictly from point of view of viability. The public utility companies (or their owner the municipalities) cannot generate sufficient sources for development (investment) through the water and sewer service price, because of the low depreciation rate, fixed by laws. Therefore they are not able to make their own necessary contribution, as own equity, so the commercial banks do not qualify their project as financially viable.

The other reason of poor loan-taking activity of municipalities is that share of loans in the Balance Sheet Total is limited by law in not more than 15 %.

HDB has the advantage of offering more favorable conditions comparing with other commercial banks of longer grace period or longer term of return. In practice of commercial banks financing water management project are very rare.

Although municipalities have shares from wastewater fines (30 %) they are not obliged by law to use it for water quality protection, so the source g) is also incidental. It has to be added that the total sum of fine is relatively small. See Table 4-8.

4.2.2. Typical Sources of Investment Money for Industrial and Commercial Wastewater Treatment/Pre-treatment

Industry and commercial sector can get financial support from special state fund in form of soft loans only for investment of water protection industrial pre-treatment plants. The amount of loan (in 1998) can not exceed the

- % from the Central Environmental Protection Fund and
- %, or max. 75 Million HUF from Water Management Fund.

Significance of tax incentives, tax allowances for stimulating producers and consumers for environmental-awareness is decreasing, because of the financial policy of the Government. Financial authorities prefer normativity and sector and competition neutrality of the taxation system. There have been environmental, water protection implications of taxation system until 1995, e.g., corporate income tax allowances for water work enterprises, full refunding of the VAT in case of investments for water quality protection, lower VAT for environmental services, etc. These incentives were far insufficient to stimulate activities of the managers of the companies comprehensively, in order to secure competitiveness in environmental sector, where costs are large, the return period is long and the cost of operation is not negligible. Recently in accordance with the intention of normative regulation of the Government, there is only the more favorable VAT rate in force.

To the availability of loans from commercial banks and international funds refer the same as in case of investment of municipalities.

Effluent charges saved do not occur as a source of investment in case of industrial and commercial wastewater treatment or pre-treatment, mainly because of the lack of forcing by legislation.

4.2.3. Patterns and Procedures for Municipal and Industrial Wastewater Treatment

There are no customary or prescribed financial sources (and proportions of funds) for municipal and industrial wastewater treatment in Hungary. To the pattern and procedures for municipal and industrial wastewater treatment refer that has been described in parts 4.2.1 and 4.2.2.

Procedure to obtain such funds: application, technical and financial evaluation; approvals, conditions, monitoring also unified and have to be executed according the law, see Reference Annex B-1 # 34, 35, 32.

4.2.4. Agricultural Pollution of Ground Water and Surface Water

In Hungary there are no special funds, credit institutions for financing of pollution control measures exclusively in the agricultural sector.

4.3. Private Financing Models in Use

In Hungary the most frequently used financing models are the BOT, or BOO models. The legal environment and the banking sector are capable of handling any type of international co-financing, or to involve international private partners.

4.3.1. BOT (build-operate-transfer)

The typical representative of the BOT-model in use is the OMS Hungarian Kft. The German-Hungarian joint-venture company's field of activity is the building of sewage networks together with sewage treatment works. The company that constructs the treatment work, after completing it will operate the work. According information collected during elaboration of project files, BOT-model will be used by municipalities of Budapest, Gyõr and Dunaujváros in the process of implementation of their wastewater treatment plant.

4.3.2. Private Management of Services

These models became typical due to privatization starting from 1992. The former state-owned water and sewage utility companies have been transformed into limited and public limited companies depending on the decision of the new owner, the self-governments.

4.3.3. Leasing Models

This type of models occurred due to privatization. The Budapest Sewage Utility Plc. in 1997 entered into a concession contract of operation for the next 25 years. The contractor is a German-French consortium.

4.3.4. Other Financing Models

The international co-financing is a possible form from legal point of view. In practice there is no example exists for these financing models.

4.3.5. Licensing and Monitoring of Privately Financed or Operated Services

In Hungary the licensing practice of privately operated services has several contradictions.

In other (Western) countries contracts for the provision of water services are subject to competitive tender and this process involves the assessment of the qualifications of tenderers for providing the service, as well as their price. The contract specifies exactly what standards of service the successful tenderer shall provide.

In Hungary municipalities are not obliged by law to set contracts by competitive tender. In fact the larger ones do, but the smaller municipalities do not have the capacity to set up and manage a competitive tenders.

There is no standard form of contracts between municipalities and water suppliers, particularly foreign companies, and they are often "incomplete".

Currently the water authorities license according to technical criteria, but no commercial criteria are examined.

4.4. Actual Water and Wastewater Tariffs

4.4.1. Actual Tariff Policies and Systems

The price of the water, **named water fee**, is paid by the consumers to the operator of the public utility company for the utility service. The consumers in this case might be either population, or different commercial institutions.

The industrial and agricultural users – purchasing water directly from state owned water sources – pay user charge on water abstraction to the WMF. Those customers supplying only themselves do not transfer any water for other users.

Public utility companies charge **sewer fees** for wastewater collection and treatment both for population and institutions.

(1) Policy of pricing for drinking water

Prices of drinking water from any waterworks belong to the officially fixed/limited prices. The pricing authorities are either the Government (MTCWM) or the municipality, depending on ownership.

The majority of the existing public water utilities (over 80 %) are owned by the municipalities, a minor part, the regional networks, by the State.

Where the municipality is the owner of the water work, there the pricing authority is also the self-government itself. In case of state-owned waterworks the MTCWM is acting as pricing authority.

In the process of preparation of the annual central budget of the state-owned waterworks present their price proposals to the MTCWM, according to the guidelines of the ministry.

Every price proposal includes

- the detailed operational costs (taking into consideration for instance the projected price of energy for the next year, the forecasted inflation rate, etc.), plus
- the costs of maintenance, plus
- the preliminary amount of development (according to the depreciation), plus
- the profit that cannot be higher than 3 % (over the inflation).

After approval of the proposals by the ministry, the guidelines with the whole pricing mechanisms and the prices by waterworks are published in the official journal of MTCWM.

In that way this pricing mechanism can be a good scheme and orientation for the municipalities, but it is not obligatory.

Because of the high number of small municipality-owned waterworks, the differences among water prices can reach up to 1:10, in case of sewer fees 1 : 30 as the information in Table 3-8 shows. Considering the social consequences of this situation the Government provides a system of subsidies in order to eliminate the impact of the extremely high prices on the population. The annual amount of the subsidy is not exceeding 2-3% of the total revenues of all of the waterworks in the country.

Regarding socially compatible tariff system can be added that price support during the last 8 years decreased radically. Since 1993 household tariffs are equal to production charges. This radical subsidy decreasing combined with asset revaluation often led to customer facing substantial price increase. So within a few years significant changes were made, in price policy and household charges increased in average more than ten times. However further increase of household charges might generate serious social stress.

The State provides subsidy for the household users, of highest charges. In 1998 from state sources is separated 3,500.0 Million HUF for support of the highest prices. The support can be obtained by application, which conditions are published in official journal of MTCWM. The limit above that the municipalities can apply in 1998 is 150.00 HUF/m^3 for water supply, 110.00 HUF/m^3 wastewater and 260.00 HUF/m^3 for both water supply and sewage systems.

(2) Policy of pricing for industrial use

The attempts of the 1980s at controlling water management and the water management issues related to the production activities of the major industrial operations (over 10 m^3/h total water use) included direct legal provisions and indirect incentives alike. The present regulatory instruments are predominantly economic in nature. The tools available for enforcing industries to comply with the requirements of water resources management and protection of the recipients are as follows:

- The water permitting/licensing procedure.
- Co-operation with the competent authority.
- The water resources contribution.
- The water price.
- The sewer fee.
- The wastewater fine.
- The sewer fine.

Industrial water uses have a major impact on the country's water resources management, they amount to around 70% of the total freshwater use. Water consumption has increased three-fold during a period of 30 years, though the trend has reversed recently. The probable causes thereof include attempts at water conservation, restructuring of industry and the change to market economy in the early 1990s. (The volume of industrial production has declined by 30-40% in years of early 90s).

The sources of industrial supply include:

- abstraction by the plant (surface- and subsurface water)
- water supplied by a public utility
- water obtained from other sources
- mine drainage.

Around 91-92% of the total industrial water use is abstracted by means of industry-owned waterworks. In view of the quantity and quality demands, a considerable part of the plants has built its own surface water intake works. Most diversions are on Danube, the number of those on Tisza is being far less.

Along with flow-through (straight) water uses supplied from (external) sources of freshwater, repeated (recirculated) water uses are conducive to cost efficiency and water conservation, so that they play also important role in industrial water management. Repeated uses have beneficial impacts on the exploitation of water resources, require less water and reduce the quantity of effluents discharged. The largest consumer is the power industry. By the size of usage the processing industry comes second, in particular metallurgy, the food and chemical industries.

The overwhelming majority of technological water is used for cooling purposes. Roughly one-third of the cooling water is recirculated. The demand for cooling water is greatest in the power industry, most of the water being used in the flow-through system. The magnitude of flow-through and recirculated water uses in Hungary is influenced decisively by the power industry.

(3) Policy of pricing for agricultural use

Irrigation water via the state-owned facilities was provided up to 1990 for an officially fixed, uniform rate in the entire country. In 1990 the water provision rate was transferred in the category of deregulated prices and the revenue is expected to cover all costs of the service – except those of maintenance – for the time being. The water provision rate varies between wide limits by irrigation sections, depending on the particularities of the section. The rates are high in the small sections supplied by pumped diversions or abstractions and are lower in large sections supplied by gravity.

The rates range from 0.50 HUF/m^3 (gravity supply) to 12.00 HUF/m^3 (water supply by hydrants).

The exaggerated functions assumed formerly by the State keep shrinking also in the field of water management, as the regulatory role of the market becomes increasingly stronger also in irrigation farming and water supply. The irrigation farmers are presently required to pay for the full cost of water, because the State has discontinued supporting the operation of irrigation sector. The Ministry of Agriculture grants support to farm irrigation projects (canals, reservoirs, wells) the magnitude of which may be up to 40 % of the construction costs.

In view of the fact that the water norm of field and horticulture crops is 1,500.00-2,000.00 HUF/ha (7.31-9.75 USD/ha) and 2,000.00-2,500.00 HUF/ha (9.75-12.18 USD/ha) respectively, irrigation is a very expensive agrotechnical operation. However in growing water-demanding crops reliable yields and the required high product quality are impossible to be achieve without irrigation. Irrigational farming is an essential prerequisite of intensive farming in the draught-prone regions of Hungary.

4.4.2. Level and Structure of Tariffs

Prices of drinking water (named as water fee) from waterworks and the wastewater treatment services (named as sewer fee) charged to the population belong to the officially fixed/limited prices. The pricing authorities are either the Government (MTCWM) or the municipality, depending on ownership.

In Hungarian practice the **prices charged on services of Public Utility Companies** exist in the four types. This system makes the basis of any statistical report on it :

- **water fee for population (Ft/m^3)**
- **water fee for institutions (Ft/m^3)**
- **sewer fee for population (Ft/m^3)**
- **sewer fee for institutions (Ft/m^3)**

Fees for institutions include all types of non-population users, e.g. industrial, commercial that do not have their own water extracting work.

The following data have been produced from reports of companies that are members of National Association of Public Utility Companies. Number of the member companies is about 100, out of approximately 300 companies, but form point of view of sizes of companies those investigated member companies are the largest. The members of Association include also the 5 (largest) state-owned regional water utility companies.

The charges for water (as water fee) and wastewater (as sewer fee) - according to the Hungarian reporting practice - are demonstrated in Table 4-5. The same Table shows the Fees charged by the public utility companies on 31st December 1997 (minimum and maximum fees all over the country).

The lowest water fee for both population and institutions were in force in the area of operation of Kõrõsvíz Ltd.

The lowest sewer fee for both population and institutions were in force in the area of operation of Dunaqua-Therm Plc., owned by the local self-governments. This company charged the second lowest water fee for both population and institution (53.50 HUF/m^3).

Table 4.5. Fees charged by the public utility companies on 31 December 1997

Type of fees charged by public utility companies	Mini-mum (HUF/ m^3)	Maxi-mum (HUF/ m^3)	Mini-mum (USD/ m^3)	Maxi-mum (USD/ m^3)
1. Water fee for population	53.00	140.00	0.26	0.68
2. Water fee for institutions	53.00	604.00	0.26	2.94
3. Sewer fee for population	26.70	163.00	0.13	0.79
4. Sewer fee for institutions	26.70	866.00	0.13	4.22

Source: Yearbook of National Association of Public Utility Companies

The highest water fee for population was in force in the area of operation of Érd és Térsége Water Utility Ltd. It charged **the highest sewer fee for both populations and institutions** as well.

The highest water fee for institutions was charged in the area of operation of Észak-Zalai Water and Sewer Utility Plc.

Companies with largest revenue from water and/or sewer utility services in 1997 (above 1,000 **Million** HUF) are shown in the Table 4-6 on next page.

The companies No. 1 - 4 are the state-owned regional water utilities companies. (The fifth of them is a smaller size, has revenue below 1,000 Million HUF)

In 1997 out of the total number of Association member companies 11 companies have total revenue below 100 Million HUF. About 50 companies have annual revenue between 100.0 - 1,000.0 Million HUF.

It is and estimation that non-member companies are of small size, with revenues less than 100.0 Million HUF (0.49 Million USD).

The estimated number of small size companies of water and sewer utility services is approximately 200-220.

Table 4.6. Companies with largest revenue from water and/or sewer utility services in 1997 (above 1,000.00 million HUF/4.87 million USD)

No	Name of the Company	Total Revenue in Million HUF	Revenue of Water and/or Sewer Utility in Million HUF	Total Revenue in Million USD	Revenue of Water and/or Sewer Utility in Million USD
1	*2*	*3*	*4*	*5*	*6*
1	Dunántúli Regionális Vízmû Plc.	6,706.00	6,299.00	32.68	30.70
2	Dunamenti Regionális Vízmû Plc.	2,571.00	2,360.00	12.53	11.50
3	Észak - Dunántúli Vízmû Plc.	2,524.00	2,096.00	12.30	11.19
4	Északmagyarországi Reg. Plc.	2,020.00	1,955.00	9.85	9.53
5	Fõvárosi Csatornázási Mûvek Plc.	12,878.00	10,976.00	62.76	53.49
6	Fõvárosi Vízmûvek Plc.	12,069.00	11,417.00	58.82	55.64

1	*2*	*3*	*4*	*5*	*6*
7	Pannonvíz Plc.	2,286.00	2,115.00	11.14	10.31
8	MIVIZ Plc.	2,140.00	2,085.00	10.43	10.16
9	Pécsi Vízmû Plc.	2,091.00	1,854.00	10.19	9.04
10	Fejérvíz Plc.	2,186.00	1,849.00	10.65	9.01
11	Békés Megyei Vízmûvek Vállalat	1,931.00	1,627.00	9.41	7.93
12	Debreceni Vízmû Plc.	1,827.00	1,725.00	8.90	8.41
13	Szegedi Vízmû Ltd.	1,732.00	1,230.00	8.44	5.99
14	Bácsvíz Plc. Kecskemét	1,712.00	1,462.00	8.34	7.13
15	Bakony Víz- és Csatornamû Plc.	1,646.00	1,498.00	8.02	7.30
16	Vasivíz Plc.	1,521.00	1,442.00	7.41	7.03
17	Heves Megyei Vízmû Plc.	1,445.00	1,349.00	7.04	6.57
18	Nyírségvíz Plc.	1,321.00	1,243.00	6.44	6.06
19	Észak-Zalai Víz- és Csatmû Plc.	1,176.00	1,004.00	5.73	4.89

Source: Yearbook of National Association of Public Utility Companies

4.4.3. Level and Structure of Costs

As we pointed out earlier the price of water from public utilities does not belong to the market price category. It is an officially fixed price, determined by the owner: either Government or self-government. As a consequence, the structure of costs is defined and scrutinized by the pricing authority.

Regarding level and structure of cost, what has been said earlier can be repeated. The MTCWM fulfills the role of price authority for state-owned waterworks that is approximately 20 % of all public water service companies. The structure of cost is given in the guidelines of ministry, the profit realized in water and sewer service prices can not be higher 3 % (above annual inflation).

In the process of preparation of the annual central budget of the state-owned waterworks presents their price proposals to the MTCWM, according to the guidelines of the ministry. The structure of cost in the price proposals – as it has been described earlier – contains the following three elements:

- the detailed operational costs (taking into consideration for instance the projected energy-prices' increase for the next year, the forecasted inflation rate, labor costs accordingly, etc.), +
- the costs of maintenance, +
- the preliminary amount of investment development (according to the depreciation).

For the remaining part (80 %) of public utilities – about 300 companies – the self-government fulfills the role of pricing authority. They might have their own price policy or might follow the structure proposed by MTCWM. The MTCWM collects no information about the ranges and structure of prices charged by self-governments. The prices indicated in this study have been collected from the Association of Water Utility Companies.

4.4.4. Level of Actual Cost Coverage

The recent price policy for state-owned waterworks does not allow more than 3 % profit above inflation.

There is no information available about the **level of collection rate for the different categories** of customer. Information could only have been obtained from the owner that is either the utility company itself or from the municipalities one by one, where the latter are the possessor. The frame of this study does not allow investigation in this regard.

The financial weakness of the sector is largely caused by the inability of customers to pay higher fees for water and sewer services. The problem is, however, made worse because of the costs of operation were increased due to the fragmented nature of the sector and could have been reduced if the sector was rationalized.

Budgetary compensation – as it was described above – does exist. There is no other subsidy for prices.

For the budgetary compensation in 1998 is allocated 3,500 Million HUF and to obtain it the municipality has to apply for. The utilization of these subsidies depends on the application activity of municipalities.

4.5. Actual System and Practice of Pollution Charges, Penalties

It might be useful before description of user charge for water abstraction and pollution charges to outline the national policy on those. The major policy element on user charge on water abstraction is that "every user pays", and this principle is realized in national magnitude. The pollution charges try to transfer the "polluter pays principle", but it has not yet realized completely. The water pollution fining consists of two major types of penalization for exceeding certain limit values: the wastewater fine and sewer fine. The beginning of the relevant chapter contains remarks on the particular policy as well.

4.5.1. Charges for Water Abstraction

Consumers carrying out activities subject to a water permit are obliged to pay a **user charge on water abstraction** to **the Water Management Fund** for the water abstracted from the supplies, designated in the permit. Activities subject to water permit might be the following three types:

- service of public utility company,
- industrial use,
- agricultural use.

The public utility company pays user charge for the quantity of water, obtained from state owned water sources. Major policy element is that every user pays (industry, public works, agriculture, etc.). The user charge on water abstraction from point of view of Government is a "tax-type" revenue. For the collection of charges the regional water authorities are responsible.

The magnitude of the user charge is established in the law and in decree of minister depending on the type of the particular water use and of the source of supply, further on the availability of water resources in the particular region. The basic rate of tariff – user charge for water abstraction – is defined and published every year in a law (See Annex B-1, Reference # 30). The annual adjustment is made in accordance with different factors:

- type of water use (population – drinking water, institutions – industrial water, etc.),
- type of water resources (different types and qualities of subsurface water, different categories of surface waters),
- overutilization or underutilization,
- use without permit.

The charges for water abstraction are different for general water users and for industrial ones.

In 1997 for general water users the charge was 1.15 HUF/m^3, while in 1998 is 1.35 HUF/m^3, and the plan for 1999 and 2000 is to increase the charge with further 10 % and 8% respectively.

For industrial water users the charges are respectively 3.50 HUF/m^3 and 4.10 HUF/m^3 in 1997 and 1998. The plan of increase resembles the general water users charges growth.

Agricultural users pay the same charge as the general water users. In these cases the charge is modified by a coefficient "g", below 0.

Overall revenue of Water Management Fund from user charges in 1998 is planned 5,150.00 Million HUF (25.20 Million USD) as Table 4-3 shows in chapter 4.1.

4.5.2. Charges for Wastewater Discharge (exceeding defined quality standards)

As it has been mentioned above in Hungary there are two major types of penalizing of exceeding of defined quality standards: the wastewater fine and the sewer fine.

The recent regulatory instruments include the possibility of levying fines for surpassing the limit values set forth in legal provisions. The operators (usually industrial plants) discharging harmful pollutants into the public sewer are obliged to pay a sewer fine, (Annex B-1, Reference # 12) while the treatment plant (sewer network) operators pay a wastewater fine (Annex B-1, Reference # 11) for discharging effluents containing substances harmful to the recipient, in concentrations surpassing the limit value into the surface water.

(1) The wastewater fine

It is a kind of environmental protection fine. It is levied on point sources, which discharge their wastewater into surface water above effluent standards. Fines are defined in terms of pollutant concentration. The unit fine (HUF/kg, HUF/g) is given for each polluting and toxic material. Fines depend on different factors:

- sensitivity of the area (prominent water quality areas, protection area of the ground water),
- modification of parameters (danger of pollutants, activity of polluter, progressivity, individual multiplication)

Progressivity means that in the second year polluter pays two times more than the first year, and so on, unless starting pollution control investments or measures.

Wastewater fines are far too low to have any real incentive effects. The amount of fines is far less than cost of mitigation or elimination due to regard the loadability of the polluters. In a study from 1992 have been examined some real pollution control investment expenditures in comparison with the fine level. The fine level is approximately 1% of real incentive level. So pollution is much cheaper than taking any preventive measure.

The fines depend on concentrations, while the quantity of emission of wastewater is not a criterion. Many misuses occur. Some real dangerous pollutant parameter is missing from the regulations, dangerous substances are not included (e.g., pesticide, etc.) into it.

In the fining system there are several possibilities for avoiding paying fines. For example there are 3 levels for appealing. Progressivity can be avoided if the polluter always starts to build a new treatment plant. Progressivity can be interrupted by company transformation and/or privatization.

The wastewater fine is handled by Ministry of Environment and Regional Policy, as the responsible organ for water quality. The collected wastewater fines make revenue for the Central Environmental Protection Fund (70%) and for the municipalities (30 %).

The insignificant role of **wastewater fine** is demonstrated by the sum of fine **paid for CEPF** in years 1995-1997. The forecasted amount of it planned by Ministry of Finance for years 1998-2000 shows the unchanged approach of the Government to the subject. Table 4-7 illustrates the described situation.

Table 4.7. Share of the Environmental fines in the budget of the Central Environmental Protection Fund

NAME/YEARS	1995	1996	1997	1998	1999	2000
1. Sum of fine (Million HUF)	305.50	288.00	240.00	300.00	330.00	360.00
2. Sum of fine (Million USD)	1.49	11.44	1.17	1.46	1.61	1.75
3. Percentage of annual GDP	0.0038	0.0035	0.0028	0.0032	0.0031	0.0030

Source: Motion of the Ministry of Finance on the Central Budget 1998, for the Parliament

The role of environmental fines (mainly wastewater fine, but there are others too) in the **budget of the municipalities** can be illustrated with the following data in Table 4-8.

Table 4.8. Shape of the Environmental fines in the budget of the Municipalities

NAME/YEARS	1995	1996	1997	1998	1999	2000
1. Sum of environmental fines (Million HUF)	258.00	364.00	600.00	700.00	800.00	800.00
2. Sum of environmental fines (Million USD)	1.26	1.77	2.92	3.41	3.90	3.90
3. Share in Total Revenues of the municipalities %	3.00	4.00	6.00	6.00	6.00	6.00

Source: Motion of the Ministry of Finance on the Central Budget 1998, for the Parliament

(2) The sewer fine

It is paid for non-compliance with the standard. Sewer fine is levied on users of public sewer network - on non-household point sources.

Sewer fine is calculated on the basis of similar to principles of the wastewater fine. Revenue from fines belongs to the owner of the service company, usually the local self-governments.

Sewer fines are far too low to have any real incentive effect on industrial pre-treatment. The level is too low for covering a substantial part of the extra treatment costs.

The sewer fine is handled by Ministry of Transport, Communication and Water Management, as the responsible organ for water management (water quantity). The elaboration of the new legal regulation of the sewer fine is currently in the process in MTCWM.

4.5.3. Other Relevant Charges, Fees, Penalties

None.

4.5.4. Assessment of Efficiency of Actual Practice

The major change in the Hungarian water tariff system is that the price support during the last 8 years decreased radically. Since 1993 household tariffs are equal to production charges. This radical subsidy decreasing combined with asset revaluation often led to customer facing substantial price increase. The recent price level for water use already does promote the economical utilization of drinking water. The same refers to the sewer fees of households.

Within last few years significant changes were made in price policy and household charges increased in average more than ten times. However further increase of household charges might generate serious social stress. The water fees can exceed in some areas 3 % of the total average income of a household and 6-7 % of household expenditures of the poorest families, which is one of the highest in Europe.

However the water and sewer prices are very high, they cover the operational cost, but do not cover the investment cost, or any share of it. The reason is that the sum of depreciation calculated on the basis of the significantly undervalued assets is not sufficient. In some cases the assets remained in the ownership of municipalities, so the water utility company is not able to calculate depreciation.

Profitability of the water utility companies is usually so low that most of them have little chance of generating investment funds internally.

Only a few large companies have high enough depreciation sum to finance some investment itself.

Water and sewer fees charged for institutions (industrial, agricultural, etc.) are also stimulating economical use of water and sewer services.

The penalties, namely the wastewater fine and sewer fine have no significant impact on stimulating proper (normative) behavior and practice of industrial users.

The water and sewer prices do not realize sufficient funds for investment, because of the contradictional evaluation and ownership of their assets. Therefore, except the largest public utility companies, they have no funds for financing (to provide the required own contribution) investment project in a financially viable way.

The financial management of municipalities and public utility companies is not developed for meeting the strict profitability requirements for financing of their infrasturctural projects by commercial banks.

Activities of municipalities in investment projects are weak that is proved by their low loan-taking activity.

4.6. Economic and Financial Incentives For Pollution Reduction Measures

It has been mentioned earlier that the actual policy of the Hungarian Government (criteria of normativity) does not include significant economic and financial incentives for pollution reduction measures, and the role of existing incentives is also declining.

However a number of tax allowances (faster depreciation, exemption of wastewater collection and treatment operations from corporate tax in certain circumstances) and the more favorable VAT rate (i.e. 12 % after environmental and water services, while the major part of goods and services have 25 % VAT rate) are still in force. Nevertheless these are not sufficient to stimulate and enable investment and development of sewer systems and wastewater treatment because of their intrinsically high costs.

Wastewater fine and sewer fine have been described in paragraph 4.5.2.

Currently the State continues to be the major investor in the area of wastewater treatment investments.

4.7. Quality and Capacity of the National Banking System for Funding of Larger Infrastructure Projects (especially water sector projects)

4.7.1. Introduction of Hungarian Banking System

The reform of banking sector in Hungary started in 1987. From this year the function of central monetary organ (Hungarian National Bank) and the function of commercial banks have been divided. The Government in the end of 70s realized the necessity of presence of foreign capital in banking sector, due to opening up the Hungarian economy toward the western economies. So in Hungary in 1979 the CIB were established, and in 1985-86 the Citibank and Unicbank with foreign shares. But the State remained the majority owner of the commercial banks.

The Act on Financial Institutions of 1991 prescribed to decrease the share of Government in commercial banks to 25 %, until 1995 no significant move has been made. The intense privatization took place from 1995.

According the analysis of BANKWATCH published May 1, 1997, about Hungarian banking system the following have been stated.

Hungary moved closer to integrating with the international banking scene as 1996 closed with one of the most highly publicized bank privatization deals in Central East Europe. In December 1996 Europe's sixth largest bank, ABN-AMRO acquired Magyar Hitel Bank from the Hungarian State. The new investor quickly injected HUF 10,800 Million (USD 63 Million) of fresh capital in the bank with another HUF 11,400 Million (USD 67 Million) to come before 1997.

Similar processes took place since 1995. There are 39 banks in Hungary, 27 of which are wholly or partly foreign-owned. Recently estimated 40 % of the banking sectors' assets and over 50 % of share capital is held by banks with foreign ownership. Moreover the share of these banks in corporate lending exceeds 50 %.

The Table 4-9 below illustrates the structure of Hungarian banking sector as on 31 December 1996 on the basis of share capital (percentage).

Table 4.9. Structure of Hungarian banking sector on 31 December 1996 on the basis of share capital (%)

Name	Large banks	Large middle-size banks	Small middle-size banks	Small banks	Total
State ownership:	28.80	46.60	28.00	27.20	33.00
Other internal/national ownership:	18.10	2.90	13.70	23.90	14.50
National ownership total:	46.90	49.50	41.70	51.10	47.50
Foreign ownership:	48.80	50.50	58.10	40.90	49.30
Other:	4.30	0.00	0.20	8.00	3.20
Banking system total:	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Annual Report of the State Supervisory Board of Banks and Capital Market, 1995

The privatization of the Hungarian banking sector is closing down. On 30 June 1997 the state ownership was 25 %, the private ownership 75 %.

The 95% of the Balance Sheet Totals have been owned by majority private owners, 79 % of that have been produced by majority foreign owners.

The final result of the privatization of banking sector will be, that the share of private capital will be equal or higher, and the share of foreign capital will be higher than in most of the Western developed countries.

The following Table 4-10 demonstrates the market share of Hungarian banks according to Balance Sheet totals (percentage).

Table 4.10. Market share of Hungarian banks on the basis of Balance Sheet total (%) in years 1993-1996

Name	1993	1994	1995	1996
Large banks	78.50	75.70	72.60	68.70
Large middle-size banks	11.40	13.40	15.60	18.40
Small middle-size banks	2.40	3.30	4.70	5.70
Small banks	1.70	1.80	1.90	2.20
Closed down financial institutions	1.00	1.00	0.50	-
Banking system total:	**95.00**	**95.20**	**95.30**	**95.00**
Saving associations:	5.00	4.80	4.70	5.00
Total financial institutions:	**100.00**	**100.00**	**100.00**	**100.00**

Source: Annual Report of the State Supervisory Board of Banks and Capital Market, 1995

According to the opinion of the BANKWATCH expert, with the last of the state-owned banks to be privatized by the end of 1997, all of Hungary's large banks will be either majority or minority foreign-owned. The progress that Hungary has made in privatizing of its banks should not diminish the other achievements that have helped to restructure the sector to its present form, currently the most advanced in the region. The financial health of most of the formerly troubled banks has been restored. Legal, accounting and regulatory frameworks to Western standards have been adopted, modern payment system is in place.

The Hungarian banking sector is evolving towards a more universal model. This has also been encouraged the regulatory framework. The Credit Institutions Act (Annex B-1, Reference # 49.) took effect at the beginning of 1997 and harmonized earlier rules of the banking law to EU norms. Among other changes, the minimum capital requirement for universal bank has been doubled to HUF 2,000 Million (USD 10 Million). At the end of 1996 Parliament also approved new legislation on mortgage institutions and mortgages notes. A new securities law allows bank to deal directly in State securities and derivatives, and by 1999 in all securities. Given its OECD membership, Hungary has also agreed to allow foreign banks to open branches as of January 1, 1998.

A new Code of Foreign Exchange provides full convertibility for current account transactions and a growing degree of liberalization of capital movements. All these developments contribute to further reductions of the banks' transaction costs and provide an opportunity to introduce new financial product.

The new Credit Institutions Act has addressed the areas in which gaps or lax requirements persisted for several years. These areas included:

- Applications of different licensing, capital and management requirements for different classes of institutions as banking evolved towards a more universal model.
- Specific definitions of the powers, responsibilities and required qualifications of bank management and supervisory boards.
- Specific personal penalties for directors, managers and auditors in non-compliance with the laws.
- Definitions of problems at banks and insolvency. Granting authority to the supervisory body to remedy the problems through regulatory tools. Defining responsibility for managing liquidation.
- Adoption of audit regulations to ensure that banks undergo adequate external audits. Specification of an audit coverage and of auditor reporting responsibilities to supervisory authorities so as to ensure the independence of auditors from the bank's senior management.
- Adoption and implementation of a supervision model whereby all banks within a specified period have a full-scope examination, coupled with review of their external audits and discussions with bank management.

The following two Tables 4-11 and 4-12 show the net position of the budget institutions (without Central Budget) against banking system. In this regard budget institutions consist of the local municipalities, special state funds (designated funds), social security funds, foundations and institutions established by ministries and other national organs. Majority of those is the local municipalities.

The Tables 4-11 and 4-12 illustrate that the net position of budget institutions is positive against banking system in total, and against any of the different types of the banks. With other words it means that those institutions deposit more than they get in form of loans from banking sector.

From 1995 to 1996 the deposits of budget institutions increased by 9,3 %, while loans decreased by 16,6 %. Loans toward budget institutions decreased by 50 %, and toward municipalities by 23 %.

Table 4.11. Net position of budget institutions against banking system on 31 December 1996 (million HUF)

Group of Banks	Deposits from budget sector			Loans given for the budget sector		Net position of the budget sector		
	Million HUF	Index 1996 /95	Market share	Million HUF	Index 1996 /95	Mar-ket share	Million HUF	Mar-ket share
Large banks	149,846.00	107.20	85.90	92,786.00	84.70	90.60	57,060.00	79.40
Large middle- size banks	20,668.00	140.60	11.80	8,973.00	82.50	8.70	11,695.00	16.30
Small middle-size banks	1,411.00	132.60	0.80	763.00	35.50	0.70	648.00	0.90
Small banks	2,514.00	61.70	1.40	34.00	9.30	0.00	2,480.00	3.50
Banking system total	**174,439.00**	**109.30**	**100.00**	**102,556.00**	**83.40**	**100.00**	**71,883.00**	**100.00**

Source: Annual Report of the State Supervisory Board of Banks and Capital Market, 1995

Table 4.12. Net position of budget institutions against banking system on 31 December 1996 (million USD)

Group of Banks	Deposits from budget sector			Loans given for budget sector			Net position of budget Sector	
	Million USD	Index 1996 /95	Market share	Million USD	Index 1996 /95	Mar-ket share	Million USD	Mar-ket share
Large banks	730.13	107.20	85.90	452.32	84.70	90.60	277.80	79.40
Large middle- size banks	100.60	140.60	11.80	43.79	82.50	8.70	57.00	16.30
Small middle-size banks	7.02	132.60	0.80	3.72	35.50	0.70	3.16	0.90
Small banks	12.25	61.70	1.40	0.17	9.30	0.00	12.04	3.50
Banking system total	**850.00**	**109.30**	**100.00**	**500.00**	**83.40**	**100.00**	**350.00**	**100.00**

Source: Annual Report of the State Supervisory Board of Banks and Capital Market, 1995

5. International Assistance in Funding of Environmental/Water Sector Programs and Projects

5.1. Documentation of National Policies and Decision Mechanisms for International Co-funding of Environmental and Especially Water Sector Programs and Projects

Information for completing this paragraph has been collected from available official documents of the MTCWM and MERP, as well as from the draft of Central Budget for 1998, prepared by Ministry of Finance. Interviews have been conducted with senior officials of the relevant ministries.

Hungary's first priority among the water sector programs is the Wastewater Treatment Program (See Table 3, Lines # 1 and 2). There has been elaborated a special decision of the Government about the support of mentioned program. The Government support is manifested in form of subsidizing projects from ministerial budget and stimulating and supporting wide involvement of international financial institutions. In financing of water sector projects participate the World Bank, the European Investment Bank, and the EU-PHARE, the negotiations with EBRD have not been successful yet.

5.2. Actual Financial Assistance from Bilateral and/or Multilateral Institutions

Actual financial assistance in water management sector is provided by EU PHARE, the World Bank and EIB. The stages of negotiation and implementation of contracts are different.

(1) EU-PHARE financial assistance

There is only one program in the process of implementation, named COP 95. The contract value is 5 million ECU. The aim of the project is to co-finance the wastewater treatment plants (particularly technological equipment) of four cities: Debrecen, Szolnok, Dunaújváros and Székesfehérvár. Percentage of PHARE co-funding is 25 for Debrecen, Szolnok and Székesfehérvár (since those are extensions of operating ones) and 35 in case of Dunaújváros, because it is implementation of a new one.

(2) The World Bank financial assistance

Negotiations with the World Bank are in the process. No contracts have been signed yet. There are three contracts under preparation. Loan terms: all of the assistance is hard loans, 15 years of loan period, with 5 years of grace period. Particular data are in chapter 6.2.

(3) Assistance of European Investment Bank

According to information provided by senior officials of MTCWM the EIB conducts negotiations on financing of investments of municipal wastewater treatment plant via Hungarian commercial banks. EIB requested governmental guaranties for financing certain municipal projects and the Hungarian Government agreed on. All details of the contract negotiations are qualified as bank secret. It is only known that municipalities of Debrecen, Székesfehérvár and Szolnok are involved.

5.2.1. Completed and Ongoing Projects

(A) The draft motion of the Ministry of Finance on Central Budget for 1998 contains the following information:

Table 5.1. Phare grants for Hungary in 1998/MERP

Name of the Program	Benefi-cary	Planned PHARE Grants		Planned Central Budget Subsidies	
		MHUF	MUSD	MHUF	MUSD
1. PHARE CBC program	MERP	2,088.00	10.18	387.00	1.89
2. PHARE Regional development	MERP	569.40	2.78	3,310.00	16.13

Source: Ministry of Finance

(B) According to the information received from MTCWM the following ongoing PHARE projects exist for water management sector:

Table 5.2. Phare grants for Hungary in 1998/MTCWM

Name of the Program	Beneficiary	Planned PHARE Grants		Planned Central Budget Subsidies	
		MHUF	MUSD	MHUF	MUSD
1. Sewage treatment program of the Capital Budapest) and cities of county status (Implemen-tation)	MTCWM	1,250.00	5.00	0.00	0.00
2. Water Management Development Program of Ráckeve-Soroksár Danube Branch (TAS)	MTCWM	62.00	0.30	0.00	0.00

Source: Ministry of Finance

(C) According to the information received from MERP the following ongoing and completed PHARE projects exist with water management relevance within the Environment Sector Programs:

HU 9402 Environment Sector Program	**Ongoing**
Approval of Financing Memorandum	December 1994
Approval of 1st Work program	November 1995
Expire date of program	December 1997
Completion of program	December 1998

Table 5.3. Financial situation of the Programme HU 9402

Budgeted	Contracted		Spent	
MECU	**MECU**	**%**	**MECU**	**%**
14.50	3.40	25.00	2.60	18.00

Source: Ministry of Environment and Regional Policy

The main components of the program:

- Policy development and harmonization of environmental legislation
- Upgrading of laboratories of the regional environmental inspectorates
- Funding support to local environmental investment needs.

HU 9203 Environment Sector Program	**Ongoing**
Approval of Financing Memorandum	February 1993
Approval of 1st Work program	May 1994
Expire date of program	February 1996
Completion of program	February 1997

TABLE 5.4. Financial situation of the Programme HU 9403

Budgeted	Contracted		Spent	
MECU	**MECU**	**%**	**MECU**	**%**
10.08	10.08	100.00	9.70	96.00

Source: Ministry of Environment and Regional Policy

The main (water management related) components of the program:

- Environmentally friendly cultivating technologies to protect subsurface water resources.
- Active protection of potable water resources under Hungarian hydrological conditions.
- Pre-feasibility study for the uniform water management for the Hortobágy-Berettyó catchment area.

HU 9001 Environment Sector Program	**Completed**
Approval of Financing Memorandum	June 1990
Approval of 1st Work program	September 1991
Expire date of program	December 1994
Completion of program	December 1995

Table 5.5. Financial situation of the Programme HU 9001

Budgeted	Contracted		Spent	
MECU	**MECU**	**%**	**MECU**	**%**
26.52	26.52	100.00	26.52	100.00

Source: Ministry of Environment and Regional Policy

The main (water management related) components of the program:

- The water quality protection project supported the establishment of efficient and up to date monitoring systems, the drafting of strategies for water legislation for sewage treatment and for water quality protection, and also partly in realizing some pilot projects on surface water, groundwater and thermal water protection.

5.2.2. Planned projects

(A) According to the information received from MERP the following planned PHARE projects exist with water management relevance within the Environment Sector Programs:

HU 9513 Environment Sector Program	**Not started yet**
Approval of Financing Memorandum	December 1995
Approval of 1st Work program	-
Expire date of program	December 1998
Completion of program	December 1999

TABLE 5.6. Financial situation of the Programme HU 9513

Budgeted	Contracted		Spent	
MECU	**MECU**	**%**	**MECU**	**%**
7.00	0.00	0.00	0.00	0.00

Source: Ministry of Environment and Regional Policy

The main components of the program:

- Co-financing of environmental investments
- Development of Lake Balaton Catchment Area

(B) According to the information received from MTCWM the following planned World Bank projects exist with water management relevance within the Environment Sector Programs:

Table 5.7. Loans Planned to Provide by World Bank

Name of the project	Period of Implementation	Total value million USD	Share of WB million USD
Wastewater treatment plant of Dunaújváros	1998-2001	10.70	2.40
Wastewater treatment plant of Budapest (North and South Budapest together)	1998-2001	56.50	17.60
Total:	**-**	**67.20**	**20.00**

Source: MTCWM, Department of Development, June 1998.

5.3. Centralized National Institution/Development or Promotion Bank for Handling International Funds

The predecessor of Hungarian Development Bank started its activity in 1992. The bank is one of the tools in hand of Government to create conditions that promote economic growth and implement tasks related to the modernization and integration to EU. HDB participates mainly in financing of

- large infrasturctural project of national importance;
- municipal investments;
- water sector investments.

The economic climate for investment and development programs has become more favorable due to the increasing amount of domestic and foreign fund available and the improvement in the terms and conditions offered to fundraisers. The Hungarian Development Bank contributed to the successful achievement of the above objectives by considerably expanding its business and activities, and by generating earnings well ahead of plans.

The new Act on Credit Institutions serves as a basis for the transformation of the Bank into a unique credit institution with a special status in the Hungarian banking sector.

The Bank has been very successful in raising fund in international capital markets on favorable terms and in using them to finance projects aimed at the development of the national economy. Under the agreement concluded with Kreditanstalt für Wiederaufbau special banking products have been launched, e.g., a long-term credit facility for financing infrasturctural development projects of municipalities, a novel product in the Hungarian market.

In the last year Bank expanded its lending activities by 77 %. Investment loans accounted for 70 % of the loan portfolio. The Bank participated in numerous development projects of national importance, either as a member of the financing consortium or other ways. From 1996 there is a considerable growth in the proportion of infrasturctural investments: telecommunications, transport/national highways, airport and public utilities.

The special loan schemes and the management of designated state funds were directly related to priorities of macroeconomic policy. In addition to managing economic and trade development tender on behalf of the Ministry of Industry, Trade and Tourism, the Bank provided funds to complement the state funds available on favorable terms for financing important development schemes, such as expansion of export capacities, development projects in the field of tourism, or establishment of quality assurance system conforming to the standard of EU.

The **Hungarian Development Bank is an institution for handling international funds**. The Bank has contracts with World Bank, EBRD, for mediation their sources, and as it was mentioned above with KfW. As a usual procedure in similar situations, those institutions scrutinized the whole activity of the HDB and found those favorable to enter into the contract.

5.4. Assessment of Main Weaknesses and Needs for Improvement

There are available sources for financing short, and medium term infrasturctural project, but long term (above 15 years) loans are not available.

There is a lack of available financially viable infrasturctural projects in Hungary because of the poor project preparation.

The project implementation goes slower than scheduled, because of lack of knowledge practice in PHARE procedures.

Project financing of infrasturctural project is not widely practiced in Hungary. For the municipalities the project financing approach is not known, and as a consequence, not welcomed. Municipalities do not plan for long term, i.e. longer than 4 years of their mandate period. The Hungarian tendering/application system for subsidies is not as demanding as the ICIs or banking sectors' procedure.

6. Actual and Planned Public and Private Investment Portfolio for Water Quality and Water Management Programs and Projects

6.1. Compilation of Actual and Planned Investment Portfolio

The information is a compilation of the actual and planned investment portfolios, based on the 3 year prognosis of the Ministry of Finance and covers programs and projects in the following areas:

- Municipal water production/water supply;
- Municipal sewage collection/treatment/discharging;
- Industrial water extraction;
- Industrial sewage treatment/pre-treatment;
- Water quality control programs, etc.;
- Water sector related studies, etc.
- Wetlands and protected areas

It has to be noted that there are no particular projects for

- Agricultural water utilization (irrigation);
- Agricultural pollution reduction;
- Water related recreation;

in the draft on Central Budget in 1998, or planned ones until 2000. However those are included in complex projects of Balaton, Velence and Tisza lakes, etc.

LIST OF THE ACTUAL AND PLANNED INVESTMENT PROGRAMS AND PROJECTS, FINANCED FROM CENTRAL NATIONAL SOURCES

(A) Wastewater treatment of major cities of Hungary

Miskolc Wastewater Treatment Plant II. Phase 1986/98
Gyõr Wastewater Treatment Plant I/A. Phase 1986/98
Szolnok Wastewater Treatment Plant 1995/98
Székesfehérvár Wastewater Treatment Plant 1995/99
Szeged Wastewater Treatment Plant 1995/99
Veszprém Wastewater Treatment Plant 1997/2000
Zalaegerszeg Wastewater Treatment Plant 1996/98
Dunaújváros Wastewater Treatment Plant 1996/99
Budapest North-Pest Wastewater Treatment Plant 1996/98
Budapest South-Pest Wastewater Treatment Plant 1996/99
Gyõr Wastewater Treatment Plant 1996/2000
Eger Wastewater Treatment Plant 1997/99
Debrecen Wastewater Treatment Plant II. Phase 1998/99
Nyíregyháza Wastewater Treatment Plant 1998/99
Starting investment of Wastewater Treatment Plants of other cities 1999/2000

(B) Rehabilitation of oxbow lakes 1998/2000

(C) Water supplement of the hilly area of the Mid-Danube-Tisza region 1998/2000

(D) Other regional canalization and sewerage

Velence Lake canalization and wastewater treatment 1998/2000
Tatabánya Wastewater Treatment Plant 1999/2000
Kis-Balaton canalization and wastewater treatment plant 1999/2000
Miskolc/Borsod Region connecting canal 1998/2000
Dorog Wastewater Treatment Plant 1998/2000
Tisza Lake region canalization 1999/2000

(E) Balaton Region canalization and sewerage

Balatonakarattya canalization and wastewater treatment plant V/I. Phase 1993/98
Balatonmária region canalization and wastewater treatment plant V/I. Phase 1995/99
South-East Balaton canalization and wastewater treatment plant III/B. Phase 1993/98
West-Balaton canalization and wastewater treatment plant V/B. Phase 1996/2000
Keszthely Region canalization and wastewater treatment plant IV/2. Phase 1995/2000
Badacsony Region canalization and wastewater treatment plant II. Phase 1996/99
Balatonfüred Region canalization and wastewater treatment plant VI. region 1998/2000
Balaton Regional Water Supply - Regional Development Plan 1999/2000
Balaton - Fresh water quality development 1998/2000
Technical development of Water Utility of Balatonöszöd 1998/1999
Development of wastewater treatment in Balaton region 1997/2000
Balaton region sludge treatment program 1997/2000

(F) Sundry water quality protection

Velence Lake Action Program 1997/2000
Kisköre water quality development 1997/2000
Fertõ Lake water quality improvement measures 1997/2000
Ráckeve-Soroksár Danube Branch water quality improvement measures 1997/2000
Purchase of water quality labor. equipment 1997/2000
Purchase of water quality protecting equipment 1997/2000

G) Protection of the drinking water wellfield areas

Future drinking water wellfield area Dunaremete - Lipót 1996/1998
Future drinking water wellfield area Rajka - Dunakiliti 1996/1998
Future drinking water wellfield area Lórév - Makád 1996/1999
Future drinking water wellfield area Dunapataj 1996/1999
Future drinking water wellfield area Vásárosnamény 1997/1999
Future drinking water wellfield area Polgár W. 1996/1998
Future drinking water wellfield area Tiszacsege 1997/1999
Future drinking water wellfield area Kisgyõr 1996/1998
Future drinking water wellfield area Szalonna - Alsótelek 1996/1998

Future drinking water wellfield area Csemõ W. 1996/1998
Future drinking water wellfield area Magyardombegyháza 1996/1998
Future drinking water wellfield area Bánkút 1996/1998
Drinking water wellfield area in operation - area of RWA ÉDUVIZIG (4078) 1997/2000
Drinking water wellfield area in operation - area of RWA KDVVIZIG (4077) 1997/2000
Drinking water wellfield area in operation - area of RWA ADUVIZIG (4076) 1997/2000
Drinking water wellfield area in operation - area of RWA KDTVIZIG (4073) 1997/2000
Drinking water wellfield area in operation - area of RWA DÉDUVIZIG (4072) 1997/2000
Drinking water wellfield area in operation - area of RWA NYUDUVIZIG (4075) 1997/2000
Drinking water wellfield area in operation - area of RWA FETIVIZIG (4074) 1997/2000
Drinking water wellfield area in operation - area of RWA TIVIZIG (4071) 1997/2000
Drinking water wellfield area in operation - area of RWA ÉVIZIG (4069) 1997/2000
Drinking water wellfield area in operation - area of RWA KÖTIVIZIG (4068) 1997/2000
Drinking water wellfield area in operation - area of RWA ATIVIZIG (4067) 1997/2000
Drinking water wellfield area in operation - area of RWA KÖVIZIG (4070) 1997/2000
Drinking water wellfield area in operation - area of RWA Starting investment projects 1998/2000

(H) Balaton water quality protection

Kis-Balaton Protecting Zone II. Phase 1984/1999-2004
Keszthely bay silt dredging 1998/2000
Balaton Action Plan 1998/2000

6.2. Inventory of Actual and Planned Investment Portfolio

The inventory of the actual and planned investment portfolio has been carried out in attached Annex B - 2/1 and B - 2/2.

In Annex B-2/1 and B-2/2 the following lines (Programs) are aggregated. The detailed list of projects has been described in Chapter 3. See Table 3-1.

- # 1. Sewage canalization and treatment program of Hungary contains aggregated information of all projects of the country, not including data of line 2 of Sewage treatment program of the capital (Budapest) and cities of county status.
- # 2. Sewage treatment program of the Capital (Budapest) and cities of county status contains the projects listed in paragraph 3.
- # 3. Program on protecting of the ecological conditions of the Lake Balaton contains projects of paragraph 3, points E) and H).
- # 4. and # 5. Program on protection of future and operating drinking water wellfield areas contains projects listed in paragraph 3, point G).

6.3. Assessment of Main Weaknesses, Problems, Delay in Project Implementation

In water sector the dominant investor of pollution reduction programs remained the State inspite of the major changes in economy from the beginning of 90s.

In chapter 3 have been demonstrated the actual and planned national programs, and chapter 6.1 shows in detail the particular projects that are in the process of implementation in 1998, by the State via its organs. Major cause of delays in project implementation of national programs generally is lack of central funds.

The implementation of projects sponsored by international financial institutions has various causes of delays right from the preparation of the loan-contract. One of the most important reason of delays is that the subsidies provided by the State are available for the wide range of municipalities from different central sources, so they are not willing to meet the strict conditions of IFIs hard loan.

The other, not less important reason of delay in IFI's project implementation is that the State subsidies' and the IFI's loans' conditions, requested from the beneficiary, are significantly distinct in pre-conditions. Very often the problem is not the willingness from the beneficiary's side, rather the lack of his knowledge in international financing methods.

The general reason of delay and/or failure of World Bank loans' contracts is that the WB requests "governmental guarantee" for his finances, whilst the Hungarian Government refuses to give one.

7. National Action Plan/Pollution Reduction Program

7.1. Compilation of Adequate "Project Files" on the Basis of "Standardized Formats"

The national financial expert has assisted in preparing adequate "project files", and focused on:

- Socio-economic justification:
  - Economic impacts;
  - Social impacts;
  - Health impacts;
- Consistency with national, regional and local water quality policies;
- Financial viability;
- Potential sources of funding (financing schemes);
- Capability of the executing agency/investor;

The project files have been prepared in separate volume of National Review of Hungary line with the "Format for Project Files" provided.

7.2. Review/Revision of the Elaborated "Project Files" on National Level (after National Planning Workshop)

The National Planning Workshop "agreed" on the list of hot spots as well as the project files prepared in Part C and Part B. There was one new proposal for new project: the rehabilitation of wetland area of Danube-Drava ecoregion.

7.3. Identification of Weaknesses and Proposals for Adequate Completion

The main weakness of implementation of projects is lack of central governmental funding sources and ability of project owners to take domestic or international loans, because of poor financial viability of projects.

8. Investment Portfolio

8.1. Completing and Up-dating of Elaborated "Project Files"

The national financial expert assisted in completing and up-dating the elaborated "Project Files" before and after the National Planning Workshop. The Project Files are attached in separate volume to the National Review.

8.2. Review/Revision of the Elaborated "Investment Portfolio" from a National Point of View

The review of the elaborated Investment Portfolio from financial point of view is summarized in Table 8-1.

From the Table 8-1 can be established the following:

a. There have been proposed 10 projects, as most urgent and viable for implementation: 6 municipal, 3 industrial and 1 agricultural.
b. The requested funding sources for the project portfolio in total is 33,018.00 Million HUF, i.e., 160.94 Million USD.
c. Out of the total sum under point b) secured sources are 13,673.00 Million HUF, i.e., 66.64 Million USD.
d. Out of the total sum under point b) non-secured sources are 19,345.00 Million HUF, i.e., 94.30 Million USD.

Table 8.1. Anticipated/Proposed Funding Scheme of Projects

Name of the project/allocation of capital cost	Equity of project Owner	Central Environmental Fund	Water Management Fund	Public grant Central Budget	International grant/PHARE grant	International loan	Non-secured funding sources	
	Million HUF	Million HUF	Million HUF	Million HUF	Million HUF	Million HUF	Million HUF	Million USD
1	2	3	4	5	6	7	8	9
1. BUDAPEST NORTH Municipal WWTP								
Land	**78.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**1,603.00	0.00	0.00	**706.00	0.00	3,308.00	3,308.00	16.13
Planning & supervision	**921.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-0001.	**2,602.00	0.00	0.00	**706.00	0.00	3,308.00	3,308.00	16.13
2. BUDAPEST SOUTH Municipal WWTP								
Land	**1,294.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**79.00	0.00	0.00	**1,434.00	0.00	2,867.00	2,867.00	13.97
Planning & supervision	**48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-0002.	**1,421.00	0.00	0.00	**1,434.00	0.00	2,867.00	2,867.00	13.97
3. DUNAÚJVÁROS Municipal WWTP								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**426.80	0.00	0.00	**690.00	**387.00	**460.00	0.00	0.00
Planning & supervision	**218.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-003.	**645.00	0.00	0.00	**690.00	**387.00	**460.00	0.00	0.00
4. GYÕR Municipal WWTP								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**503.00	780.00	0.00	**407.00	650.00	0.00	1,430.00	6.97
Planning & supervision	**17.00	0.00	0.00	243.00	0.00	0.00	243.00	1.18
Total for Project H-004.	**520.00	780.00	0.00	***650.00	650.00	0.00	1,673.00	8.15

1	2	3	4	5	6	7	8	9
5. SZEGED Municipal WWTP								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**420.00	227.00	171.00	**203.00	269.00	0.00	667.00	3.25
Planning & supervision	**60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-0005	**480.00	227.00	171.00	**203.00	269.00	0.00	667.00	3.25
6. SZOLNOK Municipal WWTP								
Land	30.00	0.00	0.00	0.00	0.00	0.00	30.00	0.15
Construction & machinery	705.00	210.00	105.00	840.00	0.00	0.00	1,860.00	9.07
Planning & supervision	210.00	0.00	0.00	0.00	0.00	0.00	210.00	1.02
Total for Project H-0006.	945.00	210.00	105.00	840.00	0.00	0.00	2,100.00	10.24
7. BORSODCHEM Industrial WWTP								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**90.00	90.00	60.00	0.00	0.00	300.00	450.00	2.20
Planning & supervision	**60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-0007	**150.00	90.00	60.00	0.00	0.00	300.00	450.00	2.20
8. MOL Plc., Development of the Industrial WWT system								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	**3,000.00	500.00	500.00	0.00	0.00	5,000.00	6000.00	29.24
Planning & supervision	**1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Project H-0008	**4,000.00	500.00	500.00	0.00	0.00	0.00	6000.00	29.24
9. NITROKÉMIA Industrial WWTP								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	60.00	300.00	120.00	0.00	60.00	600.00	1,140.00	5.55
Planning & supervision	60.00	0.00	0.00	0.00	0.00	0.00	60.00	0.30
Total for Project H-0009	120.00	300.00	120.00	0.00	60.00	600.00	1,200.00	5.85

1	2	3	4	5	6	7	8	9
10. WETLAND AREA OF DANUBE-DRAVA OKORE GION								
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction & machinery	0.00	324.00	108.00	21.60	0.00	86.40	972.00	4.74
Planning & supervision	0.00	0.00	0.00	0.00	108.00	0.00	108.00	0.53
Total for Project H-0010	0.00	324.00	108.00	21.60	108.00	86.40	1,080.00	5.27
***** TOTAL FOR PROJECTS # 1 - # 10:**	**10,883.00**	**2,431.00**	**1,064.00**	**4,544.60**	**1,474.00**	**12,621.40**	**19,345.00**	**94.30**

***Secured funding sources*
**** Partly secured funding sources*

Total for Project Portfolio:	**Million HUF**	**33,018.00**
	Million USD	**160.94**
Non-secured:	**Million HUF**	**19,345.00**
	Million USD	**94.30**
Secured:	**Million HUF**	**13,673.00**
	Million USD	**66.64**

Annexes

1. **Relevant laws and regulations with water management relevance**
2. **Compilation of actual investment portfolio**
3. **Compilation of planned investment portfolio**
4. **Bibliography**

Annex 1. Relevant laws and regulations with water management relevance

Relevant laws and regulations with water management relevance

Reference	Title	Source where hard copy can be obtained or published	Authorities responsible For execution, control	Main subjects, contents, particularities
1	2	3	4	5
1	Act No XX. of 1949. on The Constitution of the Republic of Hungary Last amendment: Act No XLIV. of 1995	Corpus of Laws in Force	Parliament, Court of Constitution, Government	Stipulates the right of every person to a healthy environment.
2	Act No IV. of 1959 on Civil Law, as well as the amendments of 1991 and 1995 to the Act.	Corpus of Laws in Force	Parliament, Court of Constitution, Government	Provisions on private property, protection of private properties. Regulation of contracts, form of companies.
3	Act No XXXVIII. of 1989 on State Audit Office	Corpus of Laws in Force	Parliament, Government	Regulates the power, competence and duties of State Audit Office as the major financial-economic controlling organ of the Parliament. Within its competence it controls the expenditures of Central Budget and the operation of the Special State Funds.
4	Act No XXX. of 1990 on List of Ministries of Republic of Hungary	Corpus of Laws in Force	Parliament, Government	Establishes and defines the name and competence of Ministry of Transport, Communication and Water Management, as well as Ministry of Environment and Regional Policy.
5	Description of Duties and Competence of the Minister of Environment and Regional Policy	Government Decree No 43/1990. (IX. 15.) 15 September 1990. Corpus of Laws in Force	Prime Minister, Minister of MERP	Stipulates the participation of Minister in governmental work, defines the governing power of Minister on the different areas of environmental protection and regional development, defines the procedures of executing ministerial duties. Defines that the Minister takes decision on allocation, use of central budget sources and Special State Fund for environment protection. He is responsible for control of their proper utilization.

1	2	3	4	5
6	Description of Duties and Competence of the Minister of Transport, Communication and Water Management	Government Decree No 151/1994. 17 November 1994 Corpus of Laws in Force	Prime Minister, Minister of MTCWM	Stipulates the participation of Minister in governmental work, defines the governing power of Minister on the different areas of transport, communication and water management. Main task of the Ministry is to coordinate water resource management and development, and policy across sectors, performing by the instruments of legal and economic regulation. Defines that the minister takes decision on allocation, use of central budget sources and Special State Fund for water management. He is responsible for control of their proper utilization.
7	Description of Task and Competence of National Water Authority, and regional water authorities	Government Order No 234/1996. 26 December 1996. Official Journal 1996 Issue No 120.	Prime Minister, Minister of MTCWM	Defines the duties, rights and structure of the National Water Authority. NWA fulfills the financial and accounting activities of Water Management Fund. Regional water authorities duty regarding Water Management Fund: evaluate the applications for use, enter into contract with applicants, control of proper utilization of support from Fund. Contains the list of 12 regional water authorities: name, head office, area of operation.
8	Description of Task and Competence of National Environmental Authority, and regional environmental inspectorates	Decree of the Government No 211/1997. 26 November 1997 Official Journal 1997 Issue No 104.	Prime Minister, Minister of MERP	Defines the duties, rights and structure of the National Environmental Inspectorate. NEI participating in fulfillment of duties regarding Central Environmental Fund. Contains the list of 12 regional environmental inspectorates.
9	Act No LIII. of 1995. on General Rules of Environmental Protection	Official Journal 1995 22 June 1995. Issue No 52.	Parliament, Government, Minister of MERP	The objective of the Act is to harmonize the relationship between Man and his environment, to oblige Man to protect the element s of his environment and to introduce economic and social development suited to preserve the natural heritage and environmental assets for future generations. The law defines the concepts, principles and responsibilities related to the environment. Identifies the functions and activities of the state and the self-governments serving environmental protection. Establishes the protection of ground waters and surface waters. Establishes the information, documentation research and economic/financial groundwork of environmental protection. Contains provision for setting up the Central and Self-Governmental Environmental Protection Funds and defines the form of revenues of mentioned funds.

1	2	3	4	5
10	Act No LVI. of 1995 on Environmental Protection Product Fee	Official Journal 1995 23 June 1995 Issue No 53.	Government, Minister of MERP	The objective of the Act is to protect environment and its elements during their production, use or after their utilization, and generate revenue for environmental protection. Defines the circle of products, which are obliged to the payment of environmental protection fee. Establishes the rules of use of generated revenue: 75 % goes for subsidies of environmental tasks (regular and irregular), 25 % goes for subsidies of central measures.
11	Wastewater fine	Order of Minister of MERP 37/1997 8 December 1997 Official Journal Issue No 109, and other earlier issued orders on the given subject	Minister of MERP	Defines the method of calculation of wastewater fines, the definition of damaging pollution, and the procedure of imposing and utilization of wastewater fines. Defines the way of payment for Central Environmental Protection Fund.
12	Sewer fine	Order of National Water Office 4/1984 Official Bulletin of NWO 1984 Corpus of Laws in Force	Minister of MTCWM	Prohibits the emission of harmful wastewater into the sewer system. Regulates the frequency of the samplings, the method of their analysis and also the method for calculating, and the process of paying the charge. Annex A lists all the chemicals in two groups: harmful and toxic chemicals and defines the limit for them. Annex B lists the water quality protection areas. Annex C contains the regional coefficients. Payment of charges is to be transferred for operating organization /municipality. Revision of the law is under way in the MTCWM.

1	2	3	4	5
13	Act No LVII. of 1995 on Water Management	Official Journal 1995 23 June 1995 Issue No 53	Parliament, Government, Minister of MTCWM	Contains the basic rules, function and principles of water management. Defines the obligations to water and water facilities. Contains provisions for properties and for operating of properties. (State and Self-governments). State owned water and water facilities should be maintained – up till the public interest -- from central budget and from special state funds or through water management associations. Waters and water facilities owned by self-governments should be maintained -- up till the public interest -- from central budget, from special state funds or through water management associations. There is a provision on the Water Management Fund and on the sewer fine. The obligation for operating of public utilities (drinking water supply, collection of wastewater, drainage of stormwater) is given to the local self-governments. Defined that for public utility services – above the public interest -- the user obliged to pay fees. State and self-government owned public utilities can be operated by own companies or by transferring the right by concession. The Act establishes the institution of water licenses, water operating licenses and provisional water licenses. Those who have the license to use waters shall keep the water safe and be responsible for collecting, transferring, treating and -- in accordance with the environmental safety measurements discharging -- the used water. The Act lays down the principles of funding, operating and closing down water management associations (both water supply and sewerage canalization).
14	Public water supply and sewerage canalization	Decree of Government 38/1995 15 April 1995 Official Journal 1995 -- Has been amended by the Decree of Government No 8/1997.	Minister of MTCWM	Contains the definition of terms in the water service sector. Prescribes the conditions and the process of contracting for the water services (initiating the connection to the public water utility systems, sharing costs of new constructions, paying the charges, etc.). The supply of drinking water must not be disconnected even if the customer does not pay the bills, but in the case of supplying farming it is allowed. Contains the conditions and responsibility for the service on the side of the drinking water supply service providers: e.g., volume and condition of stored water for emergencies, informing the public about discontinuation and pressure drops for technical reasons, metering the consumption of water etc.). The rules for the service of wastewater collection (and the possibility and condition for constructing individual septic tanks, too) are provided for as well including environmental requirements measuring the volume of wastewater produced, charging system, etc.

1	2	3	4	5
15	Water Management Associations	Decree of Government No 160/1995 26 December 1995 Official Journal 1995	Minister of MTCWM, Regional Water Authorities	Prescribes the special rules for water management associations: their formulation, organizational development and operation. The rights and obligations of members, the business activities, the closing down, the protection of their rights and the system of financial contributions required. In a given geographical territory (region) can be only one public water company operating for one given service.
16	Act No XXI. of 1996. on Regional Development and Country Planning	Official Journal 1996 5 April 1996 Issue No 26.	Parliament, Government, Minister of MERP	Aim of the Act is the regulation of regional development: definition of targets (policy), procedures of cooperation, duties of participants and funding of implementation. Defines the tasks of the Parliament, the Government, the National Council for Regional Development, the minister and other ministers. Lists the duty of regional organs of regional development and country planning. Defines the financial means for regional development: target-related subventions for regional development, financial benefits for enterprises on the particular areas.
17	Regulation on definition of nature protection fine	Decree of Government No 33/1997. 20 February 1997 Official Journal 1997 Issue No 16.	Minister of MERP	Contains the rule of definition of case of fining, method of calculation of its value and the penalty for late-payment.
18	Specified Rules of allocation of target-related subventions for regional development – 1997	Decree of Government No 81/1997. 16 May 1997. Official Journal 1997 Issue No 43.	Government, Minister of MERP	Aim of subventions is to equalize the socio-economical differences in economic, cultural and infrastructure conditions of population and regions. The subvention can be obtained by: legal and non-legal persons of internal (Hungarian) origin (the Seat of the company should be registered in the territory of Hungary), and natural persons. Form of subsidy can be: non-refundable, refundable subvention and subvention to interest payment. Defines the rule of application for subventions.

1	2	3	4	5
19	Specified Rules of allocation of subventions for regional equalization – 1997	Decree Government No 80/1997. 14 May 1997. Official Journal 1997 Issue No 42.	Government, Minister of MERP	Aim of subventions is to equalize the difference of regions in productive infrastructure. The subvention can be obtained by local self-governments. The share of subvention is max. 70 % of investment -- if there is no other central subvention, and max. 40 % -- if other sources are to be applied for. Regulates the system of application, decision making, contracting and controlling of use.
20	List of Recipient Regions of subventions for Regional Development	Decree of Government No 106/1997 18 June 1997 Official Journal 1997 Issue No 52.	Government, Minister of MERP	The list of handy-capped regions from point of view of: socio-economical underdevelopment, permanent unemployment, industrial structure and agricultural underdevelopment. In case of application they will be the beneficiaries of subventions.
21	Act No LXV. of 1990. on local self-government and several amendments to it.	Corpus of Laws in Force	Parliament, Government, Minister of Interior	Declares the right of local society to self-government. Defines the tasks and responsibilities, competence of the self-governments in general, the local self-governments in particular: protection of natural environment, canalization, stormwater drainage, supplying with healthy drinking water. Defines the operation of the body of representatives, the committees, the mayor and other functions within municipalities. Defines the different types of municipalities: the capital, the districts, the cities with counties' rights, the counties, and the associations of municipalities. Introduces the economic/financial basis of municipalities: their equity, revenue and rules of economy. Municipalities can set up funding for public interest, obtain bank loans, issue bonds, decide the use of free financial resources and use any other bank services. Municipalities ought to define their own economic program and budget (according acts of administration of public revenues and annual acts of central budget). Act on self-government contains provision on overall control of their activity.

1	2	3	4	5
22	Act No XX. of 1991. on Duty and Authority of Local Self-Governments and their bodies, as well as of some centrally subordinated agencies	Corpus of Laws in Force	Parliament, Government, Minister of MTCWM, Minister of MERP	Defines in detail the rules of the environmental and country planning administration. The rules on water management administration are provided in the act on water management.
23	Act No XXXVIII. of 1992. on Administration of Public Revenues	Corpus of Laws in Force	Parliament, Government, Minister of Finance	Administration of Public revenues consists of 4 subsystems: Central Budget, Special State Funds, Budgets of Local Self-Governments and Funds of Social Securities. Defines the basic principles of management of public revenues, the tasks of Hungarian Treasury, and revenues and expenditures and balances by the 4 subsystems. Tasks of the Parliament, the Government and the Minister of Finance.
24	Implementation of the Act No XXXVIII. of 1992. on Special State Funds	Decree of MTCWM No 33/1992 31 December 1992 Bulletin of Decisions	Minister of MTCWM	Defines the rules of operation, management of the Water Management Fund. Regarding expenditures: Application for subsidies, decision making Committee and process, and control of their use. Regarding revenues: method of calculation of fee for water resource-usage, and its collection. Published the coefficients of different regions.
25	Act No XXXIII. of 1991. On Transfer of some state-owned assets of public utilities to the local self-governments	Governmental Decree No 201/1997 19 November 1997. Official Journal 1997 Issue No 101.	Government, Minister of MTCWM	Defines the contents of contract on transfer of state-owned public utilities to the municipalities.

1	2	3	4	5
26	Publication of list of exclusively state-owned waters and water works	Decree of the Minister of MTCWM 22/1996.(XI.29) Bulletin of MTCWM Issue No 23.	Minister of MTCWM	Published the list of exclusively state owned waters and water works / facilities.
27	Act No LXXXIX. of 1992. on the System of Labeled and Target-related Subventions for the Self-governments	Corpus of Laws in Force	Parliament, Government, Minister of Interior	Introduces the efficient and transparent rules of subventions for investments of municipalities from central budget. Labeled (or addressed) subventions serve the purposes of water management, healthcare, social, educational and cultural tasks of municipalities. Demands of municipalities can be announced by tenders until given deadline. Application is considered by the ministry professionally related to the tender. Application will be made for the part of investment not covered by own resources. Target-related subventions can be applied for targets, listed in the annex to the law. In water management relation they are: drinking water and sewage canalization, and different types of sewage treatment. To the target-related subvention can be applied subvention from special state funds. The sum of subventions from different sources can not surplus 100 %.
28	Statement of Government about the new target related subventions for municipalities in 1997	Decision of Prime Minister No 16/1997 Official Journal 1997 5 June 1997 Issue No 49.	Government	Announced the list of municipalities supported by subventions, and the sum percentage of subventions by “target."
29	Preparation of labeled (addressed) subventions for municipalities in 1998	Decision of Government No 1095/1997. 29 August 1997 Official Journal 1997, Issue No 75.	Government Minister of Interior	Announced the total sum of subventions by purposes: water management, healthcare, education, social and cultural duties. Defined the deadline of application. Announced the list of proposed subventioned municipalities.

1	2	3	4	5
30	Act No LXXXIII. of 1992. on Some Special State Funds	Corpus of Laws in Force	Parliament, Government, Ministers concerned	Defined five special (separated) state funds. Two of them have relation to pollution control: The Central Environmental Protection Fund and Water Management Fund. The Central Environmental Protection Fund. Listed the forms of revenue, disposal of the fund and expenditures of the fund. Defined in detail the planning activity, and the subventions given by tendering. The Water Management Fund. Defined the annual value of water abstraction charges for public and industrial consumers. Specified by whom can be attained subventions from the fund, list of its revenues, expenditures in detail. Defined the rules of administration of incomes and expenditures. Defined in particular the targets that ought to be supported, and the share of it (60 % of overall sum).
31	Rules of Operation and Allocation of Central Environmental Fund	Decree of MERP No 16/1997. 5 June 1997 Official Journal 1997 Issue No 49.	Minister of MERP	Defined the circle of organizations performing payments for the account of the fund, and the way of publishing for the tendering. Regulated in detail the content of tenders, and the taking of the decision.
32	Specified Rules of Financing of Public Environmental Tasks	Decree of Minister of MERP 6/1997. 31 January 1997. Issue No 10.	Minister of MERP	Defines and announces the % of tasks subventioned from sources of the CEPF.
33	Regulation of Operation and Management of Water Management Fund	Order of MTCWM 4 /1994. Bulletin of MTCWM Issue No 23.	Minister of MTCWM	Contains the rules in detail of generating revenues, fulfilling expenditures from Fund. Defines the duties and competence of participating organizations. (Central and regional). Describes the procedure of tendering.

1	2	3	4	5
34	System of Planning and Financing of Allocation of Sources from Central Budget and from Special State Funds in form of Program-Financing	Decree of Government 262/1997. 21 December 1997. Official Journal 1997 Issue No 117.	Members of the Government	Defines how to handle the sources of Central Budget for different governmental programs, and the rules of financing through Treasury. Regulates the minimum contents of Program Information.
35	Coordinated Allocation of Sources from Central Budget and from Special State Funds for the same investments	Decree of Government 263/1997. 21 December 1997. Official Journal 1997 Issue No 117.	Members of the Government	The major aim of the law is to increase the efficiency of public expenditures from central sources. Defines stricter control on investments financed from central budget, and special state funds. Prescribes the registration of applications in order to exclude double-financing. There is a further regulation of tendering procedure.
36	Acceleration of development of some infrasturctural elements with regard to European Integration	Decision of the Government 1085/1997 27 July 1997 Official Journal 1997 Issue No 67.	Members of the Government	Defines the priority of development of infrasturctural elements: there are 5 particular action named 1-3 priority refers to transport; 4 - protection of drinking water sources, development of flood protection; 5 - expansion of sewage canalization.
37	Implementation of some tasks of program on modernization and preparation for European integration	Decision of the Government No 2159/1996 28 June 1996 Issue No 32. Bulletin of Decisions	Members of the Government	Declares the mid-term strategy of economical development for every segment of national economy with definition of particular duties and deadlines, and financial sources for implementation. With regard to water management infrastructure special emphasis are given to sewage treatment, canalization and safeguarding of drinking water sources.

1	2	3	4	5
38	Tasks serving transformation of Hungarian subsidizing system to EU-conform system	Decision of the Government No 2355/1997 7 November 1997 Issue No 48. Bulletin of Decisions	Members of the Government	Defines the list of tasks (with responsible for implementation, reporting and deadline) that integrates the recent system of subsidies to EU conform system, i.e., more transparent, public, democratic and based on common responsibility and financial participation of interested parties.
39	Agricultural targets subsidized by Central Budget in 1997.	Decree of Minister of Agriculture No 3/1997 18 January 1997 Official Journal 1997 Issue No 6.	Minister of Agriculture	Defines and announces the agricultural targets subsidized from Central Budget 1997, as well as the rules of application for it. There are special part for investments of development of melioration and irrigation. Sum of subsidy can not excess 40% of overall value of investment.
40	Rules of operation of water works for agriculture	Decree of Minister of MTCWM 2/1997 18 February 1997 Official Journal 1997 Issue No 15.	Minister of MTCWM	Regulates the tendering for operation of water work, the tender evaluation, the contract on operation of services, the water demand and water utilization and the limitation of water use.
41	National Program on Environmental Protection and the Action Plan to it	Decision of Parliament 83/1997 26 September 1997 Official Journal 1997 Issue No 82.	Members of the Government	Declares the major targets of environmental protection by environmental element: air, water (surface water, ground water), soil. Defines the tasks to reach the targets (planned and proposed programs). In the Action Plan defines the programs, the termination and the preliminary cost of implementation.

1	2	3	4	5
42	Acts of the given years on the Central Budget.	Corpus of Laws in Force	Members of the Government	Defines the Balance Sheet Totals for Central Budget, the sum of deficit to be financed, the transfers between the subsystems of Administration of State Revenues (ASR), and contacts with organizations outside of ASR, size and subjects of governmental guaranties. Contains the expenditures and revenues by ministries, and the budgets of special state funds. Announces the lump-sums by different targets that municipalities can applied for, and the amount of normative subsidies by every target.
43	Establishment and Operation of Public Baths	Decree of Government 121/1996. 24 July 1996 Official Journal 1996 Issue No 62.	Minister of Welfare	Contains the definition of public bath, namely possibility for bathing in a closed area, or building, or in an artificial or natural water(bed), where the service is provided according regulation. Defined the procedure of establishing of public bathes, and conditions for their continuos operation. Duties are given to different members of Government.
44	Act No XLVIII. of 1993 on Mining, and amendment to it Act No XII. of 1997	Official Journal 1997 26 March 1997 Issue No 27.	Members of the Government	Gives the definition for the mining and specifies the activities related to this act. Specific paragraph is granted to the list of activities, fulfilled on the basis of permit.
45	Act No XLI. of 1997 on Fishing and Angling	Official Journal 1997 28 May 1997 Issue No 46.	Members of the Government	Defines the conditions to fishing and angling, considering the rules of environmental protection and the demands of market economy. Contains the illegal tools and methods for fishing and angling. A separate part is given to the fishing right, fishing management, and the protection of fish and its living environment. Contains the duties and competence of national organs of fishing administration, and the tasks of the State. Defines the financial means for fishing. Lists the targets that can be subsidized.

1	2	3	4	5
46	Rules of implementation of the Act No XLI. of 1997 on Fishing and Angling	78/1997 Ministry of Agriculture 4 November 1997. Official Journal 1997 Issue No 94.	Minister of Agriculture	Contains further clarification in definitions of the Act. Defines the duties regarding paragraphs of the act, contains provisions on information system, procedures of licensing of angling, and methods of angling. Defined specific functions regarding angling and fishing.
47	Act No XVI. of 1991. on Concessions	Corpus of Laws in Force	Parliament, Government	Declares that one of the possible efficient way of operating state, or self-government owned activities and properties to give them into concession. General provisions: list of types of activities and properties (among them: regional public utilities, canals, water supply and wastewater treatment works, local public utilities. Defines the rules of tendering for concession, the content of concessional contract and the association of concession/concessional company.
48	Act No XL. of 1995. on Public Procurement	Official Journal 1995 26 May 1995	Parliament, Government	Defines the rules and procedures of public procurement above certain limits. The limits are established (for purchase of goods, for purchase of services and for purchase of constructions) in the act on annual central budget. These limits for 1998 are: 15 million HUF, 7.5 million HUF and 30 million HUF respectively.
49	Act No CXII. of 1996 on Credit Institutions and Financial Enterprises	Official Journal 1996 12 December 1996	Parliament, Government	Outlines the definitions of financial service and supplementary financial service, as well as financial institutions, financial enterprises and the credit institution. Defines the procedure of licensing of financial institutions, the sum of the minimal basic capital, the ownership of controlling share. Defines the necessary personal and commodity conditions. Declares the procedure of licensing, representation of the banks. Defines the management and control of financial institutions, responsibilities, the bank-secret. Security Fund, and its function, Accounting and auditing of financial institutions. There is a special chapter on Hungarian Development Bank Plc.

1	2	3	4	5
50	Act No LX. of 1991 on Hungarian National Bank	Corpus of Laws in Force	Parliament, Government	Declares the legal basis and the major duties of HNB. The HNB is functioning independently from the Government, the president of HNB reports to the Parliament. The HNB protects the internal and external purchase power of the Hungarian Forint, issues banknotes, with the tools of monetary policy supports the governmental activity, defines the exchange rates.
51	Act No LXXXVII. of 1990 on declaration of prices	Corpus of Laws in Force	Parliament, members of the Government	Defines that in accordance with the principles of market economy and free competition in which cases the Government or self-governments have right to declare the prices of goods and services. In the appendix to the Act regarding water sector are listed the following goods and services: Max. price for drinking water of state-owned public utility; Max. price for drinking water transferred from state-owned to other public utility; Max. price for drinking water supplied by municipal public utility; Max. price of municipality-owned wastewater treatment company for services;

Annex 2. Compilation of actual investment portfolio

Compilation of actual investment portfolio (Million US$ and HUF)

No	Type/name of Project or Programme	Total Capital Requirements 1 US$=205.18HUF		Funding Period	National Funding Sources											International Funding			Remarks
					Equity	Envir. Fund	Water Manag. Fund	Public Loans			Public Grants			Comm. Bank Loans	Others	Organiza-tion	Grant	Loan	
								Central Budget	Reg. Budget	Local Budget	Central Budget	Reg. Budget	Local Budget						
		(MHUF)	(MUS$)		(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)		(MUS$)	(MUS$)	
1	Sewage canalization and treatment program of Hung.	38.186,00 43.000,00	186,11 209,18	~1997 1998	12.000,00 12.400,00	3.700,00 4.300,00	1.511,00 2.300,00				20.975,00 24.000,00								
2	Sewage treatment progr. of the Capital and Cont.st.cities	3.955,00 9.625,00	19,28 46,91	~1997 1998	2.355,00 2.255,00						1.600,00 2.370,00			5.000,00					
2/A	Sewage treatment progr. of the Capital and Cont.st.cities	40,00 1.100,00	0,19 5,36	~1997 1998												EU PHARE EU PHARE	0,19 5,36		Techn. Assist. Service Implementation
3	Protection of ecol. cond. of Lake Balaton and impr.of w.q	2.825,00 5.000,00	13,77 24,37	~1997 1998							2.825,00 5.000,00								
4	Program on protect. of drink. water wellfield areas(Phase I)	350,00 1.050,00	1,71 5,12	~1997 1998							350,00 1.050,00								
5	Protection of future drinking water wellfield areas	350,00 250,00	1,71 1,22	~1997 1998							350,00 250,00								
6	Program on Great Lowland	175,20 200,00	0,85 0,97	~1997 1998							175,20 200,00								
7	Program on water suppl. of hilly area of Mid-Danube-Tisz	0,00 350,00	0,00 1,71	~1997 1998							350,00								
8	Program on impoving of w. qlty cond.of RSDB (Phase I)	23,00 87,00	0,11 0,42	~1997 1998	15,00		3,00				20,00 12,00					EU PHARE	0,29		Techn. Assist. Service
9	Catchment management planning	75,00 100,00	0,37 0,49	~1997 1998			75,00 100,00												
10	Rehabilitation of oxbow lakes	0,00 100,00	0,00 0,49	~1997 1998							100,00								
11	National Remediation Prog-ram of contaminated areas	1.000,00 7.086,00	4,87 34,54	~1997 1998		1.000,00					1.000,00 4.186,00			1.900,00					
	TOTAL of lines 1-11:	**114.927,20**	**559,75**		**29.025,00**	**9.000,00**	**3.989,00**	**0,00**	**0,00**	**0,00**	**64.813,20**	**0,00**	**0,00**	**6.900,00**	**0,00**	**EU PHARE**	**5,84**	**0,00**	

Annex 3. Compilation of planned investment portfolio

Compilation of planned investment portfolio (Million US$ and HUF)

No	Type/name of Project or Programme	Total Capital Requirements 1 US$=205.18HUF		Funding Period	National Funding Sources											International Funding			Remarks
					Equity	Envir. Fund	Water Manag. Fund	Public Loans			Public Grants			Comm. Bank Loans	Others	Organization	Grant	Loan	
								Central Budget	Reg. Budget	Local Budget	Central Budget	Reg. Budget	Local Budget						
		(MHUF)	(MUS$)		(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)	(MHUF)		(MUS$)	(MUS$)	
1	Sewage canalization and Treatment program of Hungary	43.000,00 49.000,00 52.000,00	209,57 238,81 253,44	1998 1999 2000	18.000,00 20.000,00 21.000,00	4.700,00 5.100,00 6.000,00	2.300,00 3.900,00 4.000,00				18.000,00 20.000,00 21.000,00								
2	Sewage treatment program of the Capital and Cities of County Staus	10.725,00 12.102,00 12.167,00	52,27 58,98 59,31	1998 1999 2000	2.255,00 3.202,00 3.167,00						2.370,00 2.900,00 3.000,00			5.000,00 6.000,00 6.000,00		EU Phare	5,36		PHARE GRANT Included
3	Protection of the ecolog. conditions of Lake Balaton and improving of water qty	5.000,00 5.500,00 6.000,00	24,37 26,81 29,24	1998 1999 2000							5.000,00 5.500,00 6.000,00								
4	Program on protect. of drinking water wellfield areas (Phase I)	1.050,00 1.550,00 1.650,00	5,12 7,55 8,04	1998 1999 2000							1.050,00 1.550,00 1.650,00								
5	Program on protect. of drinking water wellfield areas (Phase II)	0,00 150,00 250,00	0,00 0,73 1,22	1998 1999 2000							0,00 150,00 250,00								
6	Protection of future drinking water wellfield areas	250,00 450,00 500,00	1,22 2,19 2,44	1998 1999 2000							250,00 450,00 500,00								
7	Program on Great Lowland	200,00 250,00 250,00	0,97 1,22 1,22	1998 1999 2000		250,00 250,00					200,00								
8	Program on water supplemnt of the hilly area of the Mid-Danube-Tisza region	350,00 600,00 1.000,00	1,71 2,92 4,87	1998 1999 2000							350,00 600,00 1.000,00								
9	Program on Improving of water qlty conditions for RSDB (Phase I)	87,00 30,00 30,00	0,42 0,15 0,15	1998 1999 2000	15,00						12,00 30,00 30,00					EU Phare	0,29		Techn. Assist. Service
10	Program on Improving of water qlty conditions for RSDB (Phase II)	0,00 0,00 400,00	0,00 0,00 1,95	1998 1999 2000							0,00 0,00 400,00								
11	Catchment management planning programme	100,00 120,00 140,00	0,49 0,58 0,68	1998 1999 2000			100,00 120,00 140,00												
12	Rehabilitation of oxbow lakes	100,00 120,00 140,00	0,49 0,58 0,68	1998 1999 2000							100,00 120,00 140,00								
13	National Remediaton Progr. of Contaminated Areas	7.086,00 7.772,00 8.540,00	34,54 37,88 41,62	1998 1999 2000		1.000,00 1.000,00 1.000,00					4.186,00 4.772,00 5.440,00			1.900,00 2.000,00 2.100,00					
14	Improvement of the drinking water quality of Hungary	0,00 50.000,00 55.000,00	0,00 243,69 268,06	1998 1999 2000							50.000,00 55.000,00								
	TOTAL of lines 1-14:	**128.485,00**	**626,21**		**15,00**	**3.000,00**	**0,00**	**0,00**	**0,00**	**0,00**	**119.410,00**	**0,00**	**0,00**	**6.000,00**	**0,00**	**EU Phare**	**0,29**	**0,00**	

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