DANUBE POLLUTION REDUCTION PROGRAMME

NATIONAL REVIEWS 1998
SLOVAKIA

TECHNICAL REPORTS

Part A: Social and Economic Analysis

Part B: Financing Mechanisms

MINISTRY OF ENVIRONMENT

in cooperation with the

Programme Coordination Unit
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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 Reviews data which are 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 Reviews 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 **Slovakian National Reviews** were prepared under the supervision of the National Focal Point Coordinator, **Mr. Boris Minarik**. The authors of the respective parts of the report are:

- Part A: Social and Economic Analysis: **Ms. M. A. Petrikova**
- Part B: Financing Mechanisms: **Mr. David Luptak**
- Part C: Water Quality: **Ms. Anna Zekeova**
- Part D: Water Environmental Engineering: **Mr. Juraj Namer**

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Part A

Social and Economic Analysis in Relation to Impact of Water Pollution

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Glossary

on Social and Economic Aspects

Community	The group of people that occur together in space and time
Carrying capacity	The maximum population size that can be supported indefinitely by a given environment
Drinking water	Water used as “food” (in a broader sense) and fulfilling demand of Directive EEC/80/FF8 of the European Commission
Public participation	Co-operation and joint responsibility between government, citizens, industry and NGOs in solving environmental problems
Population	A group of individuals living in a certain area
Urban population	People living in towns
Rural population	People living in villages
Protected area	An area of land dedicated to the protection and maintenance of biological diversity, of natural and associated cultural resources
Social Impact Assessment	Consequences of new activities in environment and considering their impacts on community and quality of life
Sewerage	Network of pipes which collects and conducts urban waste water to a discharge point (sewer system)

1. Summary

The Danube River basin represents 95,98 % out of the total area of Slovak Republic, which comprises 49.035 km^2. There can be identified nine main basins of the tributaries in the Danube River basin on the territory of the Slovak Republic: Lower Morava and Danube, Váh, Nitra, Hron, Ipeľ, Slaná, Hornád, Bodrog, Bodva.

There were 563 water-pumping stations built in order to bring water and provide irrigation. Building of reservoirs on the majority of rivers with the hydro-energy potential, resulted in reduction of the fluctuation of flows, mostly by providing minimal flow during the dry periods. Impact of the construction of different multipurpose reservoirs and ponds is manifested in flow regulation, and recently only 15% of flows has natural unregulated regime. About 202 weirs were built for discharge regulations, utilization of hydro-energy potentials and for ground water regime in the adjacent areas.

Deterioration of water quality is limiting for the use of the surface water resources in the country. In the Slovak territory of the Danube River basin, the ground water is the main source supplying citizens, industry and agriculture with drinking water. Utilization of the groundwater resources of Slovakia is proportionally high, and at present covers about 85% of drinking water needs. The investigated utilized quantity of groundwater along with assumed quantities reaches 74 m^3/sec for the whole territory of Slovakia, out of which the utilized quantity for the Danube River basin is 72 m^3/sec, which makes up 97,6 % of the total utilized quantity of groundwater in Slovakia.

The territory of the landlocked Slovak Republic with its 5,36 million inhabitants has an area of 49 thousand km^2. There are 5 National Parks in Slovakia with an area of 199.724 ha (4,077 % of the territory of Slovakia), 16 Wildlife Preserves with an area of 660.493 ha (13,47 % of the territory of Slovakia), 559 Nature Reserves with an area of 92.674 ha and 420 other preserved territories including 4 biospheric reserves and 7 Ramsar locations. Out of the total area of the Slovak Republic the agricultural land is 24.456 km^2, which is approximately 50,2 % (30,8% classified as arable land), the forested area represents 19.878 km^2, which is 39,9 %, other areas are 4.655 km^2, which makes up 9,5 % - the waters constitute 1,9 %, built areas 2,6 % and the rest are other areas.

In 1997 in the territory of the Slovak Republic there were 5.387.650 inhabitants living in 2.908 municipalities with an average density of 109 people per km^2. According to the last Census in 1991 there was 5.274.300 people living in the territory of Slovakia. In 1996 it was 5.378.900, which represents an increase of 104,6 thousand people in five years (1,9 %). It means that an increase of population in a year was only 20,9 thousand people when compared to the intercensus period of 1980-1991, is a two third increase and compared to intercensus period of 1970-1980 is less than half. It shows that demographic development in the Slovak Republic has slowed down as a result of a new demographic model in the life cycle of the population, this model appeared after 1990 when more difficult and uncertain economic conditions and an insufficient social welfare system became more evident. The official prognosis for the planning horizon of the year 2010 is approximately 5.430.000 inhabitants.

Since 1996 there has been a new administrative division of the Slovak Republic. There are now 8 regions divided into 79 districts, out of which 9 constitute the two largest cities, Bratislava and Košice.

1.344.000 people, 25 % of the whole population, live in municipalities with more than 50.000 citizens. In the municipalities with more than 5000 citizens, 57 % of the whole population is found, which is statistically a relatively high rate of urbanization. Since 1994 the degree of urbanization of the country has not changed. It rapidly grew in the seventies and eighties, but this stabilized at the beginning of the nineties.

Sections of economic activity in the Slovak Republic are represented by a high rate of employment in the secondary and primary sections and by a lower rate of the employment in the tertiary section. In the structure according to the size of enterprises, large enterprises still prevail, giving a monostructural base of the regions' economies, and at the same time bringing heavy pollution and negative impacts to the living environment in the regions. Public amenities in the regions remain insufficient in levels of quantity, but primarily there are problems in the qualitative standards of the road, railway and telecommunication network of the regions. Currently, in the process of economic transformations, the ecological criteria concerning production and economy of the regions are missing.

The heaviest source of air pollution in the Slovak Republic is the use of low quality brown coal for energy. The biggest consumers of heat and electricity are sections of metallurgy, chemistry and industry of building materials, which are the base of the economy and employment in the Slovak Republic.

The most serious problem of the present situation is the water quality. The current water quality does not satisfy the requirements of users and the environment. A further increase in pollution or occasional accidents could totally ban the use of water for given purposes, namely the drinking water supply.

Among the watercourses with very heavily polluted water the worst situation is in the Nitra River (category V, with the exception of very short sections with category IV below the town of Nováky and by the Nitrica tributary), then Trnávka, Dolný Dudváh and Čierna Voda. Category V is prevailing in the polluted sections of the river Váh below the towns of Žilina and Trenčín, in the next section up to Šaľa the Váh is changed to category IV. The monitored watercourses of the river basin of Morava are of categories III-V. Improvement to category III is in the Lower Danube and good oxygen balance of the category II is in the Danube. Besides the upper sections of the rivers Váh, Hron, Ipeľ, Slaná and their less polluted tributaries, the monitored Slovak water-courses are of the categories IV and V. In the supplementary chemical indicators, which are only monitored in a limited way, there is about 50 % of monitored water-courses in categories IV and V. Heavy metals are monitored only in 34 % of the controlled stations with focus on zinc, cadmium and arsenic and with a lesser focus on mercury and total chromium. Characteristic concentrations mostly fulfil category I-III, but in some parts, also category IV and V. In the category of biological and microbiological indicators, 92% of the monitored Slovak watercourses are in categories IV-V, which is caused by microbiological pollution. The Slovak part of the Danube River basin contributes to its pollution by the nutrients with 208 ktons/year for N and 11 ktons/year for P.

The key issues of environmental degradation may be characterized by a territorial system of stress factors, which is an antipode of the system of ecological stability. The ecological problems forming the territorial system of stress factors can by divided in principle into 3 basic groups:

- damaging the total ecological quality of the landscape structure
- threatening important natural resources
- threatening the immediate environment of man

The problems of nature protection areas harmed by emissions, heavy traffic through protected areas, the threat of protected areas by recreation, the deposition of large volumes of wastes, the decrease of the ecological stability of large areas through agricultural activities and the deposition of toxic and hazardous waste and municipal waste belong to the first group.

The second group includes problems such as the threat of the water resources by overdosing of agrochemicals and by cattle breeding, the danger of pollution of groundwater sources from highly polluted rivers, erosion and sediment accumulation, water salinization in agriculturally used areas, occupation of high quality soils for different purposes and contamination of soils.

The third group consists of problems concerning the contact of the stress factors areas and living areas. Some examples are high air pollution in densely inhabited areas, damages in recreation areas and worsening of their functions from emissions, high levels of noise in the vicinity of heavy traffic and airports near settlements, especially in spa areas.

The unfavorable situation is also in the field of potential pollution of the surface and ground water caused by insufficient waste disposal of municipal and industrial waste. In 1995 there was 25,7 mill. tons of waste, out of it 6,2 mill. tons were special waste (1,6 mill. tons is municipal waste and 2,5 mill. tons is hazardous waste) and 19,5 mill. tons of other waste. Comparing the amounts of waste in the last few years, we can see a decrease of 10 % of the total amount of waste between 1996 and 1997. The largest amount of waste (85 % of municipal waste and 34 % of industrial waste) is stored in the landfills, only a small number of the landfills meet the conditions of the licensed, safe and controlled landfills, this is a particular danger for the surface and groundwater pollution. Out of the total amount of 5530 registered landfills only 538 are controlled and only 114 of them are in compliance with generally binding provisions.

Consumption of water has decreased dramatically since 1989 as a consequence of restructuralization and pressure to economize. If one of the goals of the Strategy of Water Management Policy of the Slovak Republic was to diminish the specific water consumption in the year of 2000 to 270 l/capita/day, this goal was fulfilled already in the year 1995 when the average water consumption dropped down to 226 l/capita/day and in households to 140 l/capita/day, though the original goal was 167 l/capita/day.

In 1996 the number of citizens supplied with drinking water from the public water supply system reached 4.288.000 citizens, 79,7 % of the total population. Public water supply systems have been built in 1876 municipalities, which is 64,5 % of the total number of municipalities in the Slovak Republic. Production of drinking water in the year 1996 was 461 mill.m^3 - which is the raw water demand. Water charged to customers reached 354 mill.m^3, the losses in the water supply systems were 107 mil.m^3 (23,2%).

In the planning horizon of 2010 the share of population connected to public water supply system should increase from 79,4 % to 91-92 %, which will lead to a slight increase in water withdrawals compared to the present state. The withdrawals of water for industry and agriculture are also expected to rise, after overcoming a 3-year drop from 1990 - 1993 in production. This was followed by an increase of water consumption in these sectors but in the planning horizon of 2010 it still will not reach the volume of water consumption that was used before 1989.

Increase in public sewerage systems is behind the public water supply systems. In 1995 more than one quarter of the population used centralized water supply systems without putting generated wastewater into public sewerage systems for purification in Wastewater Treatment Plants. Only 53% of the Slovak municipalities are connected to public sewerage systems. The worst situations are in the river basins of Morava, Danube and Nitra and along the rivers in Eastern Slovakia where the share of population connected to public sewerage system is lower than 30 %, and also in the Hornad River basin and in the vicinity of Košice where it is only 18 %. In the dwellings and houses connected to public sewerage systems, the expected increase in the planning horizon of 2005 is from 53 to 57 %.

In the territory of Slovakia water transport is only found in the Danube River basin. The Danube River is the main water route in Slovakia. In 1997 the Tisa River was also open to shipping. As a consequence of national economy restructuralization after 1989, the volume of goods delivered in all transport systems dropped down. In water transport, it was a decrease by 65 %.

The significance of tourism bound to water areas and watercourses is of local and national importance. It does not represent any particular attractions of international tourism, except for health and spa resorts. The actual water course of the Danube is not utilized for bathing due to the

quality of surface water, but it is used for water sports, particularly the section of the Lower Danube and also for the hydro-electric power station of Gabčíkovo - dam Čuňovo. Water tourism is growing by creating the new water areas - mainly, through the water reservoirs and man-made lakes made from gravel pits. Their utilization is connected with criteria assessing environmental values and location towards the cities and towns. Besides that, an important water source is thermal water and swimming pools with thermal water. Currently, there are 35 thermal swimming pools in Slovakia.

In order to protect the quality of surface and ground water, the 1993 Water Act amendment prescribes the required conditions for discharging wastewater and other contaminated water into the public sewerage system and other waters. These conditions are laid down in Governmental Order No. 242/1993, which gives data on the admissible degree of water pollution and Public Notices No. 154/1978 and No.15/1989 on public water supply and public sewerage systems. In the frame of the Slovak Act on Environmental Impact Assessment No. 127/1994 Z.z. the construction of new hydro-electric power stations must undergo the procedure of environmental impact assessment where public participation and social impact assessment are obligatory part of the whole process.

The most pressing issues related to social and economic impacts have been identified as the following:

- pollution of surface water by discharge of industrial and municipal wastewater
- pollution of surface and ground water by agriculture (polluted soil and local wastewater discharge)
- decrease of natural ability of land-surfaces to accumulate rainwater and to stabilize discharges.

Another problem is disparity between the number of municipalities supplied by drinking water pipeline systems and the number of municipalities with public sewerage systems and WWTP. The Slovak municipalities are incapable to resolve the lack of these facilities due to their limited budgets in the current economic situation.

2. State of the Danube Environment

2.1. Water Resources

The territory of Slovakia is drained by eleven major rivers, out of which nine belong to the Danube River basin. Only the rivers Poprad and Dunajec flow to the Baltic Sea (1972 km^2 of river basins). The Danube River basin represents 96% out of the total area of the Slovak Republic, which comprises 49.014 km2. (Source: Statistical Yearbook of the Slovak Republic 1997). There can be identified nine main basins of the tributaries in the Danube River basin on the territory of the Slovak Republic: Lower Morava and Danube, Váh, Nitra, Hron, Ipeľ, Slaná, Hornád, Bodrog, Bodva.

The total length of natural watercourses in the territory of Slovakia is 49.774,8 km, out of which the total length of the Danube River basin is 47.770 km. Most of the watercourses are under the management of the state river basin enterprises - 62,1 %, out of this the length of upgraded watercourses represents 25,7 %.

For the purpose of drainage, there were 6021 km of the channels built and for the purpose of irrigation, 228 km of pipelines were constructed. The other watercourses, mostly small ones, are managed by the forest management bodies and only 2,6 % are managed by other bodies.

The density of the river network in the Danube River basin ranges from 0,1 in the karst plains to 3,4 km/km^2 on the palaeogenic rocks. The average density of the river network is 1,1 km/km^2.

The state borders of the Slovak Republic with its five neighboring countries do not follow the boundaries of the hydrological areas, which cause problems in the hydrological assessment of the flows from our territory. Besides the Danube, there are some tributaries like Tisa (flowing from Hungary) and Morava (flowing from the Czech Republic) in the exterior border contact with our territory. In total the average annual flows in the Danube-River basin are 3276,17 m^3/sec (including the flows from the neighboring states, out of it 369,66 m^3/sec springs from our territory). Division of these long-term average annual flows in all tributaries is given in the following table:

Table 2.1. Average annual flows in the Danube River subbasins and SR (1997, SR)

River-Basin -tributary	River-Basin area (km^2)	Average annual flow (m^3/sec.)	River-Basin area in the SR (km^2)	Average annual flow in SR (m^3/sec)
Dunajec and Poprad	3 377	51,94	1 950	28,24
Lower Morava	26 580	118,7	2 282	8,95
Danube	177 903	2348,00	1 138	4,78
Váh and Nitra	16 800	179,55	18 769	167,8
Hron	5 465	55,2	5 465	55,2
Ipel	5 151	21,57	3 649	18,51
Bodrog and Tisa	44 395	493,34	7 272	54,89
Slaná	3 196	21,62	3 217	21,60
Bodva	902	5,83	858	5,76
Hornád	4 467	32,36	4 414	32,17
SR		3328,11	49 014	397,9
River-Basin of Danube and its tributaries		3276,17	47 064	369,66

Upgrading of the rivers in order to prevent big flows across the inner areas of the cities and the intensive agricultural areas was built according to the 100 year old (Q 100) and 1000 year old (Q 1000) high water floods. The smaller flows have been upgraded to 5 year old and 20 year old floods.

There were 563 water-pumping stations built in order to bring water and provide irrigation. Also 202 weirs were built for discharge regulations, utilization of hydro-energy potentials and for ground water regime in the adjacent areas.

In the majority of the Danube River basin territory there is natural unregulated flow regime, which is along with the unstable flows limiting for utilization of the surface water resources, in the months between March - June the runoffs are high, but in the summer months, the runoffs are on a minimum level which must, from an ecological standpoint, be preserved in the rivers. From the point of view of withdrawals for agricultural utilization during the vegetation period, it is clear that without the water reservoirs it would not be possible to supply surface water, particularly for industry and agriculture. With the built water reservoirs, it is possible to raise the discharges by 53,5 m^3/sec. It is possible to reach an increase of 140 %.

In the Slovak territory of the Danube River basin the groundwater is the main source supplying citizens, industry and agriculture with drinking water. Utilization of the groundwater resources of Slovakia is proportionally high, and at present covers about 85 % of the drinking water needs. The importance of the groundwater data is given by the degree of hydrogeological survey and by utilization of the groundwaters. The most explored areas are those formed by the Quaternary and Mesozoic periods. The categories and degrees on quantities of utilized yields of the ground water are given in respect to the methodology of the Commission for Storage Classification. The investigated utilized quantity of the groundwaters along with the assumed quantities reaches 74 m^3/sec for the whole territory of Slovakia, out of which the utilized quantity for the Danube River basin is 72 m^3/sec, which makes up 97,6 % of the total utilized quantity of the groundwaters in Slovakia.

The highest quantity of the groundwater (56 %) is in West Slovakia and mostly in the Danube Lowlands and the Lower Váh. Approximately 27 % of utilized groundwater is in Central Slovakia, near Banská Bystrica, Liptovský Mikuláš, Martin and Považská Bystrica. In East Slovakia there is about 17 % of the utilized groundwaters.

Utilization of the groundwater resources in South and South-East Slovakia is so high that by the long-term decrease in the yield of groundwater, the public water supply must be limited. On the other hand, the groundwater resources in the Danube Lowlands in West Slovakia are not fully utilized. As a consequence of polluting the groundwater, some of the groundwater resources are excluded from public water supply system. Their capacity is estimated to no more than 2 m^3/sec.

Table 2.2. Ground water sources in the Danube River subbasins and SR (1997, SR)

River-basin – tributary	yield - quantity of the ground water categorized (l/sec.)	yield - quantity of the ground water uncategorized and estimated (l/sec.)	utilized yield - quantity of the ground water sources (l/sec.)
Morava	1410	1271	334,3
Dunaj	20400	880	6742,1
Váh	6593	13488,1	6663,2
Nitra	750	2857	1543,8
Hron	2314	3817	2206,9
Ipel	221	888	286,8
Slaná	455,5	1240	685,4
Bodva	1041	103	374,2
Hornád	1801	2317,9	1426
Poprad	358	1385	310,6
Bodrog	1791	4247	1191
SR	37135	36991	21764,3
River-basin of Danube and its tributaries	36777	35606	21453,7

2.2. Biological Resources and Eco-systems

The territory of the landlocked Slovak Republic with its 5,36 million inhabitants, has an area of 49 thousand km^2, out of which 19.878km^2=39,9% area forests and 50,2% agricultural land (30,8% is classified as arable land). The geological basis is formed by the Carpathian Mountains, exceeding in its central part in the High Tatras with the altitudes over 2500 m above the sea level. Two lowland areas are in the southern part of territory. The Rye Island along the Danube River and the East Slovakian Lowlands in the Bodrog River basin. The climate is generally continental. Location of Slovakia on the top of "European roof" is emphasizing the role of precipitation in formation of the water resources. The average annual runoff is 12,6 billions m^3, which represents about 261 mm of runoff from the whole area of the country, without taking into account the Danube and the Tisa River flows.

Slovakia is a country with high nature diversity. Except for the Mediterranean and nival degree there are developed all the other vegetative degrees of the mild climate. There are about 2500 kinds of the native flora and about 50.000 kinds of animals, including soil microorganisms. Many kinds are precious or endangered (in the red list of flora from 1993 there are 939 kinds according to the IUCN criteria, which is 37,56 %).

There are 7 National Parks declared in Slovakia with the area of 243.219 ha, 16 Protected Landscape Areas with the area of 598.585 ha, 576 Nature Reserves with the area of 96.008 ha and 433 other preserved territories including 4 biospheric reserves and 7 Ramsar locations. The total network of preserve areas including buffer zones covers more than 22 % of the Slovak territory. One national park and three protected areas belong to the World Network of Biosphere Reserves within the UNESCO Man and Biosphere programme.

2.3. Human Impact

Out of the total area of the Slovak Republic the agricultural land is 24.456 km^2, which is 49,9%, the forested area is 19.922 km^2, which is 40,6 %, other areas are 4655 km^2, which is 9,5 %, waters are 1,9 %, built areas are 2,6 % and others.

On the territory of the Slovak Republic there live 5.367.790 inhabitants in 2908 municipalities with average density of 109 people per km^2. In the municipalities with more than 50.000 citizens there live 1.344.000 people which is 25 % of the whole population. In the municipalities with more than 5000 citizens live 57 % of the whole population, which means statistically relatively high rate of urbanization. Sections of economic activity of the Slovak Republic are represented by a high rate of employment in the secondary and primary sections and by a lower rate of the employment in the tertiary section. In the structure according to the size of enterprises there are still prevailing big enterprises, giving the base to monostructure of the regions economy and at the same time bringing heavy pollution and negative impacts to living environment in the regions. Public amenities in the regions are still insufficient as to the quantity but primarily as to the qualitative standards of the road, railway and telecommunication network of the regions. Currently in the process of economic transformation, the ecological criteria concerning production and economy of the regions are missing.

Slovak Republic lies at the edge of the area with the most polluted air in Europe. The heaviest source of air pollution in the Slovak Republic is energy, using low quality brown coal. The biggest consumers of heat and electricity are metallurgy, chemistry and industry of building materials, which are the base of the economy and employment in the Slovak Republic. Production of SO2 is 236.400 t/year, Nox 180 900 t/year, particulates 89.000 t/year, CO 403.900 t/year, hydrocarbons - CxHz 66.100 t/year. Damage to the forests caused by immissions impact the area of 292,09 km^2, which represents 1,58 % of the total forest area.

Unfavorable water quality in watercourses in river basins in Slovakia is illustrated by the data on monitored watercourses of the category 4 and 5. Categorization into individual quality categories by five groups of indicators is done by the valid STN 75 7221 Classification of the Surface Water Quality. In the 5 categories of surface water quality there were classified in the category 4 and 5 /heavily and very heavily polluted water/, 719km classified according to the A set of indicators - oxygen balance /19,2 %/, 2097,7 km classified according to the B set of indicators - basic chemical and physical indicators /56,1%/, 1528,3 km classified according to the C set of indicators - supplementary chemical indicators /40,9 %/ and according to the D set of indicators - heavy metals - 45,2 % of the monitored water courses. The heaviest source of the area pollution in the Slovak Republic is agriculture. In 1995 the total volume of the discharged wastewater was 908.200.000 m^3. In this wastewater the content of BSK was 531.200t, CHSK 86.400t, NL 38.100t.

The total volume of waste in the year 1995 was 24.296.831 tons, out of which the used waste was 17.023.213 tons, the stored waste was 937.835 tons and the disposed waste was 6.245.783 tons. Out of this total volume the municipal volume made 2 459 872 tons which is 10,16 %.

2.4. Key Issues of Environmental Degradation

The key issues of environmental degradation may be characterized by a territorial system of stress factors, which is an antipode of the system of ecological stability. The ecological problems forming the territorial system of stress factors can by divided in principle into 3 basic groups:

- damaging the total ecological quality of the landscape structure,
- threatening important natural sources,
- threatening the immediate environment of man.

To the first group belong the problems of nature protection areas harmed by emissions, heavy traffic through the protected areas, the threat of protected areas by recreation, the deposition of large volumes of waste, the decrease of the ecological stability of large areas through agricultural activities, the deposition of toxic and dangerous wastes and municipal wastes.

The second group includes problems such as the threat of the water sources by overdosing of agrochemicals and by cattle breeding, the danger of pollution of the groundwater sources from the highly polluted rivers, erosion and sediment accumulation, water salinization in agriculturally used areas, occupation of high quality soils for different purposes and contamination of soils.

The third group consists of problems concerning the contact of the stress factors areas and living areas. Some examples are high air pollution in densely inhabited areas, damages in recreation areas and worsening of their function from emissions, high levels of noise in the vicinity of heavy traffic and airports near settlements and the airports, especially in spa areas.

Water quality of surface waters has been systematically monitored since 1963. Up to 1981 it was monitored by the river-basin companies and the methodic was elaborated by the Research Institute of Water Management. Since 1981 the guarantor of surface water quality monitoring is the Slovak Hydrometeorological Institute /SHMÚ/, the field and analytical works are provided by the river-basin companies. In 1996 the water quality in watercourses was monitored in 232 basic control stations and 7 special control stations. The number of monitored indicators is between 70-30.

The results of regular monitoring of surface water quality enable to present qualitative balance of approximately 3600 km of watercourses, which represents 8% of the total length of the Slovak river network, which is 44.666 km but the main watercourses are about 8437km /18,9%/.

Surface water is categorized into 5 categories by water quality:

- category I - very pure water
- category II - pure water
- category III - polluted water
- category IV - heavily polluted water
- category V - very heavily polluted water

Among the watercourses with very heavily polluted water the worst situation is in the river of Nitra (category V, with the exception of very short parts with category IV under the town of Nováky and by tributary of Nitrica, then Trnávka, Dolný Dudváh and Čierna Voda. Category V is prevailing in the polluted parts of the river Váh under the towns of Žilina and Trenčín, in the next part up to Šaľa it is changed to category IV. The monitored watercourses of the river basin of Morava are of category III-V. Improvement to category III is in the Lesser Danube and good oxygen balance of category II is in the Danube. Besides the upper parts of the rivers Váh, Hron, Ipeľ, Slaná and their less polluted tributaries, the monitored Slovak watercourses are of the categories IV and V.

In the supplementary chemical indicators, which are only monitored in the limited way, there is about 50 % of monitored water-courses in the category IV and V. Heavy metals are monitored only in 34 % of the controlled stations with focus on zinc, cadmium and arsenic and with a lesser focus on mercury and total chromium. Characteristic concentrations mostly fulfil category I-III, but in some parts also category IV and V.

In the category of biological and microbiological indicators 92 % of the monitored Slovak watercourses are in the category IV-V, which is caused by microbiological pollution. Quality of surface water in the watercourses is as follows:

Table 2.3. Quality of surface water (1997, SR)

Water course	Set of indicators the worst category	The least favorable indicator	Source of pollution
Morava	A : III. – IV. B : V. C : III. – IV. D : II. – III. E : V.	BSK_5 $N\text{-}NO_2$ NEL, phenols zinc psychrophile and coliphorm bacteria, enterococs	bigger tributaries and wastewater discharged into water courses
Dunaj	A : II. – III. B : V. C : II. – IV. D : II. E : IV. – V.	 $N\text{-}NO_2$ phenols, NEL zinc bacterial pollution	public sewerage of Bratislava, wastewater from WWTP, Istrochem, Slovnaft, Petržalka, public sewerage Hanuliakovo, Šamorín, Váhostav Gabčíkovo, JCP and food companies Štúrovo, agricultural areas sources
Váh	A : V. B : V. C : D : E : V.	$N\text{-}NO_2$, S_2^- psychrophil bacteria	deterioration mainly from Ružomberok, Žilina, confluence with Nosice channel, public sewerage from Trenčín, Hlohove and Sered, confluence with Dudváh (recipient Biopo Leopoldov)
Nitra	A, B, C, D, E : V.		mouth of Handlovka (wastewater by manufacture of chemicals in Handlová – Prievidza), Nováky, Novácke chemické závody, ENO Zemianske Kostoľany, Koželužne Bošany, Cukrovar Nitra, VK Topoľčany, Partizánske, Nitra, Nové Zámky
Hron	A : B : IV. – V. C : IV. – V. D : IV. E : V.	 $N\text{-}NH_4$, $N\text{-}NO_3$, P_{celk} NEL zinc	Biotika Slovenská Lupča, Rudlovský stream, WWTP Banská Bystrica, WWTP Zvolen, manufacture in Žiar nad Hronom, Levice
Ipeľ	A : B : IV. – V. C : IV. – V. D : E : V.	 NL, forms N, P_{celk} NEL psychrophile and coliform bacteria	Krivánsky stream (recipient of Meat Industry and VK Lučenec, SMZ Lovinobaňa a Podrečany, textile manufacture Poľana Opatová), Krtíšsky stream (VK Krtíš, Tesla Preseľany)
Slaná	A : IV. B : V. C : IV. – V. D : III. E : V.	 NL, P_{celk} NEL zinc psychrophile bacteria	deterioration under Rožňava, municipal waste, food industry, meat industry
Bodva	A : IV. B : IV. – V. C : III. D : IV. E : III.	 NL, $N\text{-}NO_2$ NEL, phenols	deterioration of quality under the municipal WWTP in Moldava nad Bodvou
Bodrog	A, B, C, D, E : V.	bacteria, Mn_{celk}, phenols, $N\text{-}NO_2$, NL	confluence of Latorica and Ondava belongs to the most polluted courses due to discharge of wastewater from public sewerage and industry in water basin (Hron, Strážske, Michalovce, Vranov nad Topľou, Trebišov)
Hornád	A : V. B : V. C : IV. D : III., V. E : IV.	 mercury, zinc, arsenium	Deterioration of quality under WWTP Spišská Nová Ves, Slovinský stream, stream Svinka, city of Košice, agricultural production

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

3.1. Present Situation

Since the Act No. 221/1996 Z.z. on Territorial and Administrative Division of the Slovak Republic has come into effect, there has been a new administrative division of the Slovak Republic. Instead of former 38 districts divided into 121 divisions there are now 8 regions divided into 79 districts, out of which 9 constitute the two largest cities, Bratislava and Košice. The Act No. 222/1996 Z.z. on Organization of Local State Administration has established new structure and new competence of the state administration authorities in the newly established regions and districts.

From the point of view of collected statistical data bound to the territorial division, it is not possible any more to compare the districts. It is only possible to compare the statistical data for the whole country or for the municipalities. Therefore, it is inevitable to analyze the present situation of population within the boundaries of the new regions.

According to the last Census 1991 there was 5.274.300 people living in the territory of Slovakia. In 1996 it was 5.378.900 which represents the increase of 104,6 thousand people in five years (1,9 %). It means that an increase of population in a year was only 20,9 thousand people, which compared to the intercensus period of 1980-1991 is two thirds and compared to intercensus period of 1970-1980 less than a half. It shows that demographic development in the Slovak Republic has been slowed down as a result of a new demographic model in the life cycle of the population, following from a more difficult and uncertain economic situation and insufficient social welfare system. The official prognosis for the planning horizon of the year 2010 is approximately 5.430.000 inhabitants.

Table 3.1. Territorial and administrative structure of the regions in Slovakia (31.12.1996, SR)

Territory	Number of districts	Number of municipalities	Number of towns	Number of population
Slovak Republic	79	2908	135	5 378 932
Region of Bratislava	8	88	7	618 904
Region of Trnava	7	249	15	548 898
Region of Trenčín	9	275	18	610 135
Region of Nitra	7	345	15	717 585
Region of Žilina	11	313	17	687 771
Region of Banská Bystrica	13	514	24	664 024
Region of Prešov	13	665	23	768 719
Region of Košice	11	459	17	758 494

(See map No. 2 in annexes)

Sections of economic activity in the Slovak Republic are represented by a high rate of employment in the secondary and primary sections and by a lower rate of the employment in the tertiary section. Except for the region of Bratislava all other regions have 10-20 % of people employed in the primary sector, 30-50 % in the secondary sector and 30-50 % in the tertiary sector. The region in Bratislava has 69,7 % of employees in the tertiary sector, 27,5 % in the secondary sector and 2,8 % in the primary sector. In the development process in the planning horizon of 2000 it is expected that there will be an increase in the number of employees in the tertiary sector. In the structure according to the size of enterprises, large enterprises still prevail, giving a monostructural base of the regions' economies, and at the same time bringing heavy pollution and negative impacts to the living environment in the regions.

3.1.1. Population

Table 3.2. Split by Urban/Rural Population (1994, 1995, 1996, 1997, SR)

	Number of population			
	1994	1995	1996	1997
Slovak Republic	5 356 200	5 367 800	5 378 900	5 387 650
Towns abs (over 5000 inh.)	3 054 400	3 060 400	3 064 400	3 070 960
Towns in %	57,0	57,0	57,0	57,0
Villages abs.	2 301 800	2 307 400	2 314 600	2 316 690
Villages in %	43,0	43,0	43,0	43,0

Since 1994 the degree of urbanization of the country has not been changed. It was rapidly growing in seventies and eighties, but it was stopped at the beginning of nineties.

Urban population of the SR

Settlement-units
with over 5000 inhabitants ..... 135 towns ..... 3.064.400 inhabitants = 57% of total population
with over 10000 inhabitants ..... 72 towns ..... 2.669.800 inhabitants = 49,7% of total population

Rural population of the SR

Settlement-units
with 1-2000 inhabitants ..... 2530 units ..... 1.598.600 inhab. =30%
with 2000-4999 inhabitants ..... 243 units ..... 716.000 inhab. =13%
total 1-4999inhabitans ..... 2773 units ..... 2.314.600 inhab. =43%

Table 3.3. Population (total, urban, rural) in the Danube River Basin and Its Division in the River-basins (1997, SR)

river-basin	total population	rural population total	urban population settled in the towns over 10000 inhab. total	urban population settled in the towns over 10 000 inhabitants in per cent
Danube and Lower Morava	872865	357875	514990	59
Váh	152873	642064	886659	58
Nitra	653526	339834	313692	48
Hron	476809	252709	224100	47
Ipel	210732	145406	65326	31
Bodrog and Tisa	535338	342617	192721	36
Slaná	182485	124090	58395	32
Bodva	50700	50700	0	0
Hornád	655000	275100	379900	58
River-basin of the Danube and its tributaries on the territory of SR	5166178	2598588	2567590	49,7

3.1.2. Area

Table 3.4. Area and borders of the Slovak Republic (1997, SR)

Indicator	in absolute numbers	in per cent
Area as of 11.1.1997	49 014 km^2	-
Population density per km^2	110	-
Perimeter in km	1672	100
Length of the borders in km with the Czech Republic	252	15
Length of the borders in km with Hungary	669	40
Length of the borders in km with Poland	547	33
Length of the border in km on Austria	106	6
Length of the borders in km with Ukraine	99	6

Table 3.5. Area of the Danube and Danube tributaries basins (1997, SR)

River-basin-tributary	River-basin area (km^2)	River-basin area in the SR (km^2)
Lower Morava	26 580	2257
Danube	177 903	1138
Váh and Nitra	16800	16005
Hron	5465	5465
Ipel	5151	3647
Bodrog and Tisa	44395	7329
Slaná	3196	3191
Bodva	902	893
Hornád	4467	4427
River-basin of Danube and its tributaries		47064
Dunajec and Poprad	3377	1972
SR		49014

3.1.3. Per Capita Income

Table 3.6. Gross domestic product and gross money incomes

Indicator	Value
Gross domestic product per capita in SKK in prices of 1993	82.490.- SKK = 2357.- USD
Gross domestic product per capita in USD in current prices	3535 USD
Gross domestic product per capita in USD in prices of 1993	2695 USD
Gross money incomes, total in SKK - yearly per capita average	64.464 SKK = 1842.- USD
Gross income from employment	75,3% of gross money incomes
Receipts from sale of agricultural products	0,1% of gross money incomes
Social income (social welfare paid in financial means)	8,3% of gross money incomes (1,4 pensions, 4,1 children allowances)

Money income: volume of financial means per capita received by citizens without those social services that are free of charge. Division according to the tributaries is not available.

Minimum monthly wage is 3000.- Sk which is approximately 87.- USD (May 1998).

(In May 1998 the rate of exchange was 1USD - 34,4 Sk)

3.1.4. Domestic Water Demand

Number of citizens supplied by drinking water from the public water supply system reached in 1996 4.288.000 citizens, which is 79,7 % of the total population. Public water supply system has been built in 1876 municipalities, which is 64,5 % of the total number of municipalities in the Slovak Republic. Production of drinking water in the year 1996 was 461 mill.m^3 - which is the raw water demand. Water charged to customers reached 354 mill.m^3, the losses in the water supply systems were 107 mil.m^3 =23,2%.

Table 3.7. Drinking water demand/Charged supplied water (1997, SR)

Tributary river-sub-basin	drinking water demand/charged supplied water in thousand m^3/year			mean water consumption per capita			raw water in thousand m^3/year		
	House-hold	Agricul-ture	Industry	others	total	m^3/year	liter/day	Raw water demand total	Losses in pipelines
Danube and lower Morava	65 012	1849	17455	25669	109 985	77,12	2112	140554	27 440
Váh	65848	3480	16653	21990	107971	59,86	1640	143535	30939
Nitra	30144	1204	7387	10891	49626	63,55	1741	62477	10690
Hron	26781	1565	9896	8717	46959	65,7	1800	71503	21269
Ipeľ	7890	666	2348	1802	12706	62,78	1720	18704	5612
Slaná	8671	818	2852	2896	15239	71,14	1949	21398	4401
Hornád	43618	3602	25586	1640	74446	89,56	2453	10424	29798
Bodrog	56416	11047	425563	2010	495036	145,00	3972		
Bodva	37585	645	847	148	39225	112	3068		
Total Danube river-basin	276953	24876	508587	50094	884193	64,59	1769		

Table 3.8. Share of Population Connected to Centralized Water Supply Systems – Approximation (1997, SR)

Tributary river-sub-basin	Population connected to centralized water supply systems total	Share of population connected to centralized water supply systems in per cent
Danube and lower Morava	770 420	88,26
Váh	1200800	78,15
Nitra	496060	76,10
Hron	435070	86,90
Ipeľ	132 770	64,01
Slaná	132320	71,30
Hornád	544720	79,35
Bodrog	357640	64,56
Bodva	33540	72,51
total Danube river-basin	4 103 340	78,28

(See map No. 3a in Annexes)

3.1.5. Domestic Wastewater Production

Table 3.9. Total domestic wastewater production and share of population connected to centralized sewerage systems (1997, SR)

Tributary river-sub-basin	Mean water consump-tion per capita in m^3/year	Mean water consump-tion per capita in liter/day	Total population in the river-basin	Estimated waste water production in thousand m^3/year	Share of population connected to public sewerage in per cent	Volume of waste water cleaned on municipal treatment plants from the households	Volume of waste water cleaned on municipal treatment plants from Industry
Danube and low. Morava	77,12	2112	872 865	77584	59,8	51819	44700
Váh	59,86	1640	1 528 723	83538	46,2	43676	93924
Nitra	63,55	1741	653 526	41531	45,7	17145	9855
Hron	65,7	1800	476 809	31326	55,2	16994	1496
Ipeľ	62,78	1720	210 732	13233	38,16	3350	2076
Slaná	71,14	1949	182 485	12981	39,14	6435	3671
Hornád	89,56	2453	655 000	49862	52,9	79900	
Bodrog	145,00	3972	535 338	65981	38,6	36365	
Bodva	112	3068	50 700	4826	32,7	3197	
total Danube river-basin	64,59	1769	5 166 178	380862	2561749 inhab. =49,59%		

(See map No. 3b in Annexes)

3.2. Projection for Planning Horizons 2000 and 2010

3.2.1. Population

Table 3.10. Present and expected population (1997, 2000, 2010, SR)

Tributary river-sub-basin	Total population in the river-basin - present time	Expected population to the horizon 2000	Expected population to the horizon 2010 (projection for 2020 not available)
Danube and Lower Morava	872 865	877 229	883 998
Váh	1 528 723	1 536 366	1 547 120
Nitra	653 526	656 793	661 564
Hron	476 809	479 193	482 673
Ipeľ	210 732	211 785	213 324
Slaná	182 485	183 397	184 729
Hornád	655 000	658 275	663 056
Bodrog	535 338	537 970	541 922
Bodva	50 700	51 000	51 476
total Danube river-basin	5 166 178	5 192 008	5 229 862

3.2.2. Domestic Water Demand

Table 3.11. Present and Expected Water Demand (2000, 2010, SR)

Tributary river-sub-basin	Volume of water demand in 1000 m^3/year for the horizon 2000	Volume of water demand in 1000 m^3/year for the horizon 2010	Expected water consumption in households per capita - 2000 in liters/day	Expected water consumption in households per capita - 2010 in liters/day	Expected water losses in centralized water supply system - 2000 in liters/day	Expected water losses in centralized water supply system - 2010 in liters/day
Danube and Lower Morava	67880	72280	212	224	876	906
Váh	94780	88690	169	172	931	1035
Nitra	40750	44190	170	173	356	410
Hron	30130	31360	172	178	578	599
Ipeľ	12290	13160	159	169	148	155
Slaná	10910	11660	163	173	139	144
Hornád	39160	41870	163	173	531	572
Bodrog	31610	33820	161	171	366	388
Bodva	2980	3190	160	170	39	43
total Danube river-basin	330490	340220	169	178	3964	4252

3.2.3. Domestic Wastewater Production

Table 3.12. Domestic Wastewater Production/Expected Development (2000, 2010, 2020, SR)

Tributary river-sub-basin	Expected share of population connected to centralized sewerage systems with treatment plants-2000	Expected share of population connected to centralized sewerage systems with treatment plants-2010	Expected total waste water production per capita - 2010 in m^3/year	Expected total waste water production per capita - 2020 in m^3/year	Expected total waste water production – 2010 in 1000 m^3/year	Expected total waste water production - 2020 in 1000 m^3/year
Danube and lower Morava	272200	330 400	62	67	16876	22137
Váh	1177000	1387000	51	51	60027	70737
Nitra	350100	396000	51	52	17855	20592
Hron	355400	372300	51	53	18125	19732
Ipeľ	85000	109400	46	49	3910	5360
Slaná	90900	117100	47	50	4272	5855
Hornád	479700	549800	47	50	22546	27490
Bodrog	242800	296400	47	50	11412	14820
Bodva	23400	28800	46	49	1076	1411
total Danube river-basin	3076500	3587200	49	52	150748	186534

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

Out of the total length of the watercourses in the Slovak Republic, which is 49.774,8 km, there is 3665,9 km (8%) monitored according to the quality of surface water. There are 262 control stations on 99 watercourses. The data on population potentially affected by health hazards through raw water quality of rivers exceeding defined quality standards for drinking water are not relevant with respect to the fact that it is not possible to show, which municipalities belong to the water-courses that do not exceed the standards of drinking water, since only 8 % of the water-courses are monitored. Such data would be misleading also from the point of view that appr. 75% of inhabitants are supplied from the groundwater sources and not from surface waters.

The river stretches that are suitable for public water supply withdrawals are defined and protected by legislation. Such stretches are usually the upper sections of the watercourses in the countryside with the scattered settlements. These can be used for public water supply, providing water to distant settlements by pipeline. This also brings into doubt collecting accurate data on inhabitants living along these river stretches.

A survey on these river stretches based on the data from control stations is given in the following table:

Table 4.1. River stretches with water quality for drinking water purposes (1997, SR)

River basin	Area of the river basin	Area of the sub-basin of the river stretch with raw water quality for drinking water purposes	Share in % from the area of the river basin	Length of stretch with raw water quality for drinking water	Number of stretches and tributaries with raw water quality for drinking water purposes
Danube	2257	0	0	0	0
Low Morava	1116	0	0	0	0
Váh	14314	1476	10	259	14
Nitra	4501	326	7	57	5
Hron	5465	312	6	76	6
Ipeľ	3688	227	6	52	2
Slaná	3193	190	6	51	4
Bodrog	7210	2085	29	245	11
Hornád	4427	967	22	167	9
Bodva	890	167	19	43	3
Danube River basin total	47061	5750	105	950	54

Out of the total length of watercourses in Slovakia 98% of watercourses exceed acceptable standards for drinking water.

To solve the conflicts in exploitation of utilized water sources requires before all quantification of the impacts of exploited ground waters on hydrological situation of the territory, which makes the infiltrating, accumulating and out-coming area of its groundwaters. At the same time there are impacts on the territory, which is affected by such excessive utilization. The second big problem in the situation in Slovakia is the conflict of surface water withdrawals for various purposes (industry, agriculture, potable water).

As a consequence of the Danube River pollution is the state of water quality in its watercourses ecosystems and in the Black Sea as the recipient of the polluted waters. In the Strategic Action Plan there were identified three main problems, which primarily impact the quality and the development of the water ecosystems. These are as follows:

- high pollution by nutrients N and P and eutrophication,
- changes in balance of discharges and transport of sediments,
- contamination by pollutants, including oil substances.

Impact of High Pollution by Nutrients and Eutrophication

The natural processes of eutrophication in surface waters, known from the past, are being accelerated by high contamination of these waters by the nutrients, mainly nitrogen and phosphorus. Until they are not exceeding some limits of concentration, they support enormous growth of phytoplankton. At that stage the compounds of nitrogen and phosphorus are inevitable for the sound development of the river ecosystem and its biodiversity. However, their large volume and favorable conditions in the slow watercourses (temperature, photosysnthetic active radiation, CO2 and other) cause a high production of the green biomass in the systems of “standing” waters. This leads not only to decrease in the quality of water but to the change in the structure of ecosystem species, which negatively impacts its biodiversity. In some extreme cases during the vegetation period the ultimate damage of the ecosystem can happen.

Share of Pollution by N and P in the Slovak Watercourses

In the chapter 2.1.3. it was stated that the biggest N and P nutrient producers in Slovakia are agriculture and population. From the data of the national surface water quality monitoring in Slovakia the values of pollution by inorganic compounds have been calculated for the main Danube tributaries in the Slovak section of the Danube River basin. The results are given in the following table. The Slovak section of the Danube River basin contributes to its pollution by nutrients with 208 ktons/year for N and 11 ktons/year for P. These numbers are not so precise as they have been calculated from the average values of concentrations of the individual indicators. Moreover, contribution of these substances is the highest during precipitation in the soluble as well as in the adsorbent form on the sediments (mainly for P).

Table 4.2. Pollution by N, P a BSK_5 in selected water-courses in Slovakia (1995, SR)

Water-course Quality Profile	N inorganic tons/years	P total tons/year	BSK_5 tons/year	Area of river basins	Number of population
Dunaj - Radvaň	239200	10600	168300	-	808748
Morava - Devínska Nová Ves	15200	1000	13700	2 282	196830
Váh - Komárno	21900	1000	14200	18 769	2048 228
Hron - Kamenín	3500	250	5000	5 465	476568
Ipeľ - Ipeľský Sokolec	1800	110	2000	3 649	209830
Hornád - Horná Ždaňa	2700	170	520	4 414	655000
Bodrog - Streda nad Bodrogom	790	40	1300	7 272	33437
Total	247990	11170	177120		

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

Categorization into individual quality categories by five groups of indicators has been done by the valid STN 75 7221 Classification of the Surface Water Quality.

A set of indicators - oxygen balance

B set of indicators - basic chemical and physical indicators

C set of indicators - supplementary chemical indicators

D set of indicators - heavy metals

E set of indicators - biological and microbiological indicators.

Surface water is categorized into the following 5 categories by water quality:

- Category 1 - very pure water, suitable for all kinds of utilization in water management food production and recreation
- Category 2- pure water, suitable for most kinds of utilization in water management, recreation, fish breeding
- Category 3 - polluted water, suitable only for supply for industry, in water management utilized only after purification
- Category 4 - heavily polluted water, suitable only for very limited kinds of utilization
- Category 5 - very heavily polluted water, not suitable for any use.

Based on the values of the surface water pollution there have been selected the following sections of the water courses in the Danube River basin and its tributaries that **do not exceed** EU-standards for bathing water quality (all others exceed EU-standards for bathing water quality).

Table 4.3. Danube River Basin and Its Tributaries that Do Not Exceed EU-standards for Bathing Water Quality (1997, 2010, SR)

Danube - River-Sub-basin	Identified river stretch which *do not* exceed EU-standards or comparable national standards for "bathing water quality"	Communities directly at both sides of identified river stretch	Number of population actually living directly at both sides of the identified river stretch	Number of population actually living along river stretches which exceed acceptable standards for bathing water quality	Number of projected population living directly at both sides of the identified river stretch
Danube and lower Morava	0	0	0	872 865	883998
Váh	river Váh and Black Váh from source up to Lipt. Teplá	Lipt.Teplička, Vyš.Šuňava, Kráľová Lehota, Hybe, Dovalovo, Lipt.Hrádok, Lipt.Peter, Malé Borové, L.Porúbka, Jamník, Podtureň, Uhorská Ves, L.Ján, Beňadiková, Závažná Poruba Trstené, Liptovský Mikuláš, , Pavlova Vec, Ižipovce, Borovník, Malatíny, Vlachy, Bešeňová, Liptovský Michal, Ivachnová	56 586	1 075 113 (for whole area of Vah sub-basin)	57 151
	river Kysuca - source up to Čadca	Truzovka, Olešná, Staškov, Rakové, Svrčinovec, Čierne, Čadce,. Podvysoká, Vysoká n.Kysucou	293 098		296 028
	riiverRajec - source up to Žilina	Žilina, Lietavská Lúčka, Turie, Liet. Svinná, Poluvsie, Raj.Teplice, Zbyňov, Kľace, Jasenové, Rajec, Šuja, Raj.Lesná	103 926		104 965
Nitra	river Nitra - source up to Prievidza	Kľačno,Tužina, Nitr.Pravno, Poluvsie, Pravenec, Nedožery-Brezany, Lazany, Prievidza	64 716	585 985 (for whole area of Nitra sub-basin)	65 363
	river Žitava - source up to Zlaté Moravce	Obyce, Machulince, Žitavce	2 825		2 853
Hron	river Hron source up to B.Bystrica	Banská Bystrica, Sl.ľupča, Lučatín, Medzibrod, Brusno, Ráztoka, Nemecká, Zámostie, Predajná, Podbrezová, Valaská, Bacúch, Beňuš, Braväcovo, Brezno, Polomka, Závadka n.Hronom, Heľpa, Pohorelá, Vaľkovňa, Šumiac, Švermovo	142 506	334 402	143 931

Table 4.3. continued

Danube - River-Sub-basin	Identified river stretch which *do not* exceed EU-standards or comparable national standards for "bathing water quality"	Communities directly at both sides of identified river stretch	Number of population actually living directly at both sides of the identified river stretch	Number of population actually living along river stretches which exceed acceptable standards for bathing water quality	Number of projected population living directly at both sides of the identified river stretch
Slaná	river Muráň - Jelšava up to the mouth of Slaná	Gemerské Teplice, Šivetice, Hucín, Licince, Gem.Hôrka,Meliata, Dobšiná	8 330	174 155	8 413
Hornád	Hornád - prameň až Markušovce	Marekušovce, Lieskovany, Teplička, Sp.N.Ves, Smižany, Sp.Tomášovce, Letanovce, Hrabušice, Betlanovce, Vydrník, Hôrka, Sp.Štiavnik, Švábovce, Hozelec, Gánovce, Hranovnica, Sp.Bystré, Vikartovce	68 128	555 664 (for whole area of Hornad sub-basin)	68 809
	Hnilec - source up to Helcmanovce	Mlynky, Hnilec, Hnilčík, Nálepkovo, Závadka, Švedlár, Mníšek nad Hnilcom, Helcamnovce	9 589		9 684
	Hornád - mouth of the river Hnilec up to Košice	Margecany, Jaklovce, Košická Belá, Malá Lodina, V.Lodina, Kysak, Trebejov, Sokoľ, Družstevná pri Hornáde, Kavečany	10 489		10 593
	Torysa - source up to Lipany	Krivany, Dačov, Lipany, Torysa, Brezovica,tichý Potok	11 130		11 241
Bodva	Bodva the whole water-course and its tributaries		50 700	0	51 476
Bodrog	Topľa - source up to Bardejov	Gerlachov, Mokroluh., Rokytov, Tročany, Kružilov, Malcov	3 417	495393 (for all Bodrog sub-basin)	3 451
	Ondava - Domaša - Vranov n.T.	Bžany, Turany nad Ondavou, Nová kelča, Holčíkovce, Kvykovce, Giglovce, Malá Domaša, Sl.Kajňa, Benkovce, Ondavské Matiašovce, Sedliská, Tovarné, Továrňanská Polianka, Kladzany	7 630		7 706

Table 4.3. continued

Danube - River-Sub-basin	Identified river stretch which *do not* exceed EU-standards or comparable national standards for "bathing water quality"	Communities directly at both sides of identified river stretch	Number of population actually living directly at both sides of the identified river stretch	Number of population actually living along river stretches which exceed acceptable standards for bathing water quality	Number of projected population living directly at both sides of the identified river stretch
	Laborec - source - Humenné	Krásny Brod, Čabiny, Volica, Radvaň n. Laborcom, Brestov n.Lab. Zbudské Dlhé, Hrabovec n L., Jabloň, Koškovce, Dedačov, Hankovce, Veľkopolie, Lubiša, Lackovce, Kochanovce	6 907		6 976
	Cirocha - source up to Snina	Dara, Starina, Stakčianska Roztoka, Stakčín, Snina	21 991		22 210
Ipeľ	Bebrava - Plášťovce - mouth	Plášťovce, Horná Turovce, Tupá, Veľké Turovce, Hrkovce, Preseľany n.Ipľom, Šahy	13 014	197718	13 144
Total			911 331	4254847	920 444

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

The primary pollution problem in surface water and groundwater is nitrate contamination from agricultural activities. In the northern Váh Basin approximately 50 % of the wells exceed existing drinking water quality standards with respect to nitrate because of large concentration of livestock and inadequate storing capacity for manure. In the southern Váh Basin 10 to 30 % of the wells exceed the Slovak drinking water quality standards with respect to nitrate, mainly because of the increased use of mineral fertilizers. Further important pollution sources in the Váh River catchment area are discharges from industries and municipalities, leaching from sediments and waste deposits. Health risks are serious even though the public water supply relies almost totally on ground water, this in turn is dependent on riverbank infiltration, which cannot guarantee elimination of all of the pollutants. Moreover, about 90 % of irrigation water is surface water, so pollutants are transferred to the crops.

In the Hornad Basin mining has been going on for more than 400 years. Mining waste, especially mercury, have severely deteriorated water quality. Moreover, contamination caused by poor state of municipal wastewater treatment in every major town and city of the basin are threatening the quality of bank filtrate. Though some highly productive bank filtering wells are situated in the area, 40 % of the drinking water used in the Hornad Basin is imported from outside, as far as the Starina Reservoir /140 km/. This makes drinking water in this region extremely costly.

Table 4.4. Overview of the occurred diseases caused by water in the years 1988-1997 in the Danube River basin (1988-1997, SR)

River basin	Location	Diseases	year	epid.	Numb. of diseases	Numb. of dead	Way of water supply
Danube and lower Morava	Dunajská Streda	Intestinal Infections	1992	1	24	0	unknown
Váh	Trenčianska Turá	Intestinal Infections	1990	1	159	0	public water supply
	Trenčín	Intestinal Infections	1992	1	27	0	public water supply
	Trenčín	Rotavirosis	1992	1	195	0	public water supply
	Žilina	Dysentery	1988	1	183	0	public water supply
	Dol.Kubín	Dysentery	1989	1	125	0	public water supply
	Lipt. Mikuláš	Dysentery	1990	1	160	0	public water supply
	Dol.Kubín	Dysentery	1994	1	159	0	public water supply
	Dol.Kubín	Dysentery	1995	1	98	0	public water supply
	Žilina	Viral Hepatitis	1992	1	97	0	public water supply
	Dol.Kubín	Intestinal Infections	1996	1	25	0	public water supply
Bodrog	Vranov n.Topľou	Dysentery	1988	1	225	0	mineral source
	Bardejov	Dysentery	1990	1	26	0	unknown
	Humenné	Dysentery	1993	1	7	0	well in Romany village
	Bardejov	Dysentery	1994	1	100	0	public water supply
	Vranov n. Topľou	Viral Hepatitis	1996	1	15	0	public water supply
	Stropkov	Viral Hepatitis	1996	1	13	0	public water supply
	Bardejov	Viral Hepatitis	1996	1	10	0	public water supply
	Michalovce	Intestinal Infections	1990	1	8	0	individual source Zemplinska Sirava
	Svidník	Intestinal Infections	1992	1	577	0	public water supply
	Svidník - Domaša	Intestinal Infections	1992	1	18	0	individual source
	Michalovce	Intestinal Infections	1995	1	22	0	public water supply
Hornád	Košice	Dysentery	1990	1	82	0	public water supply
	Košice	Dysentery	1997	1	61	0	water from lake
	Sp.N.Ves	Viral Hepatitis	1991	1	4	0	well in Romany village
	Sp.N.Ves	Viral Hepatitis	1992	1	7	0	well in Romany village
	Sp.N.Ves	Viral Hepatitis	1992	1	11	0	well in Romany village
	Košice	Viral Hepatitis	1993	1	13	0	public water supply
	Sp.N.Ves	Typhoid fever	1988	1	4	0	public water supply
total				30	2457	0	-

As the table shows the health hazards through drinking water pollution do not represent a particular problem. Occurrence of diseases caused by the hygienic quality of potable water is not so frequent and only in the exceptional cases it has come to epidemics. In the last years no cases of death occurred that would be caused by contamination of drinking water. 76 % of all deaths in the Slovak Republic are caused by heart-vein diseases and tumors, the next causes are injuries and infections. However, there is a significant occurrence of respiratory diseases and allergies that are caused by living environment pollution.

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

5.1. Actual Situation

Currently there is a more favorable development in the economy of the Slovak Republic where it was an economic decrease after 1990 but since 1994 the statistical data show better macro-economic tendencies. The decrease in economic production along with introduction of market economy and restructuralization of production sectors brought relevant impacts to water management. The development of the Slovak economy is now in the state of prosperity yet it is utilized only up to one third of its potential.

5.1.1. Abstraction of Raw Water from the Danube River System

5.1.1.1. Domestic Raw Water Demand from the Danube River System (only surface water withdrawals)

Table 5.1. Domestic raw water demand from the Danube River system (1997, SR)

Tributary river-sub-basin	Total population in the river-basin - present situation	Domestic raw water demand covered from the river system		Share of total domestic raw water demand	Total domestic raw water demand	Expected develop-ment (increase, decrease, stable)
		m^3/s	$1000m^3/year$	%	$1000m^3$	
Danube and lower Morava	872 865	-	-	0	65 012	stable
Váh	1 528 723	0,273	8609	13	65848	stable
Nitra	653 526	-	-	0	30144	stable
Hron	476 809	0,231	7285	27	26781	stable
Ipeľ	210 732	-	-	0	7890	stable
Slaná	182 485	0,231	7285	84	8671	stable
Hornád	655 000	0,332	105	24	43618	stable
Bodrog	535 338	0,236	7442	13	56416	stable
Bodva	50700	0,239	7537	20	37585	stable
total Danube River-basin	5 166 178	1,542	48617	18	276953	stable

Consumption of water has decreased dramatically since 1989 as a consequence of restructuralization and pressure to economize. If one of the goals of the Strategy of Water Management Policy of the Slovak Republic was to diminish the specific water consumption in the year of 2000 to 270l/capita/day, this goal was fulfilled already in the year 1995 when the average water consumption dropped down to 226 l/capita/day and in the households to 140l/capita/day though the original goal was 167l/capita/day.

5.1.1.2. Industrial/Mining/Energy Raw Water Demand from the Danube River System (withdrawals from surface water)

Table 5.2. Industrial/mining/energy raw water demand from the Danube River system (1997-, SR)

Tributary river-sub-basin	Industrial/Mining raw water demand covered from the river system		Share of total water demand %	Total water demand volume (1000 m^3/year)	Expected development (increase, decrease, stable)
	discharge (m^3/s)	volume (1000 m^3/year)			
Danube and lower Morava	3,852	121761	20	609528	increase
Váh	4,950	156103	33	468969	increase
Nitra	0,839	26459	47	56556	decrease
Hron	1,183	32907	4	813401	increase
Ipeľ	0,033	1041	25	4109	stable
Slaná	0,188	5929	34	17342	increase
Hornád	1,815	66807	16	430941	decrease
Bodrog	10,655	336016	93	360897	increase
Bodva	0,009	284	68	420	stable
total Danube River-basin	23.524	747307	27	2762163	increase

Note: after the period of decrease in water demands connected to decrease in production in the years 1990 - 1993, a new increase is being expected.

5.1.1.3. Agricultural Raw Water Demand (withdrawals from surface water)

Table 5.3. Agricultural raw water demand (1997-, SR)

Tributary river-sub-basin	Agricultural raw water demand covered from the river system		Share of total water demand	Total water demand	Expected development (increase, decrease, stable)
	discharge m^3/s	volume 1000m^3/ year	%	volume (1000 m^3/year)	
Danube and lower Morava	0,169	5330	1	609528	increase
Váh	1,367	43111	9	468969	increase
Nitra	0,035	1104	2	56556	increase
Hron	0,324	10218	1	813401	increase
Ipeľ	0,039	1230	30	4109	increase
Slaná	0,015	4473	26	17342	increase
Hornád	0,44	11021	3	430941	increase
Bodrog	0,217	6843	2	360897	increase
Bodva	0,001	32	8	420	increase
total Danube River-basin	2,607	83360	3	2762163	increase

Note: after the period of decrease in water demands connected to decrease in production in the years 1990 - 1993, a new increase is being expected.

5.1.2. Wastewater Discharge to the Danube River System

5.1.2.1. Municipal Discharge

Table 5.4. Municipal discharge to the Danube River system (1997, SR)

Tributary river-sub-basin	Total municipal wastewater discharge m^3/day	Share of total municipal wastewater discharge for non-treated wastewater,		Share of total municipal wastewater discharge for biologically treated wastewater		Share of total municipal wastewater discharge for advanced treated wastewater
		m^3/day	%	m^3/day	%	
Danube and lower Morava	132720	7 963	6	118 103	93	negligible
Váh	481556	28 893	6	428 584	90	negligible
Nitra	100191	6 011	6	89 089	90	negligible
Hron	121005	7 260	6	107 690	90	negligible
Ipeľ	21452	1 284	10	19 046	90	negligible
Slaná	32737	1 962	5	29 103	88	negligible
Hornád	196485	11 784	6	174 796	88	negligible
Bodrog	79753	4 782	5	70 933	89	negligible
Bodva	6874	408	6	6 052	88	negligible
total Danube River-basin	1172773	70 362	6	104 396	89	negligible

Note: Approximately 5 % of municipal discharge is treated mechanically.

5.1.2.2. Industrial/Mining/Shipping Discharge Directly Discharging to the Rivers

Table 5.5. Industrial/mining/shipping discharge directly discharging to the rivers (1997, SR)

Tributary river-sub-basin	Total industrial/mining/shipping wastewater discharge m^3/day	Share of total i/m/s wastewater discharge for non-treated wastewater m^3/day	Share of total i/m/s wastewater discharge for biologically treated wastewater m^3/day	Share of total i/m/s wastewater discharge for advanced treated wastewater m^3/day
Danube and lower Morava	231 094	n. a.	n. a.	negligible
Váh	71 050	n. a.	n. a.	negligible
Nitra	26 364	n. a.	n. a.	negligible
Hron	48 786	n. a.	n. a.	negligible
Ipeľ	3 185	n. a.	n. a.	negligible
Slaná	6 307	n. a.	n. a.	negligible
Hornád	24 156	n. a.	n. a.	negligible
Bodrog	326 618	n. a.	n. a.	negligible
Bodva	220	n. a.	n. a.	negligible
total Danube River-basin	737 780	n. a.	n. a.	

n. a. - not available

5.1.2.3. Agricultural Discharge (major point sources)

Table 5.6. Agricultural discharge (major point sources) (1997, SR)

Tributary river-sub-basin	Total agricultural wastewater discharge	Share of total agricultural wastewater discharge for non-treated wastewater		Share of total agricultural wastewater discharge for biologically treated wastewater		Share of total agricultural wastewater discharge for advanced treated wastewater	
	m^3/day	m^3/day	%	m^3/day	%	m^3/day	%
Danube and lower Morava	194 200	1942	1	192 258	99	negligible	
Váh	350 799	3507	1	347 292	99	negligible	
Nitra	107 337	1073	1	106 264	99	negligible	
Hron	228 167	2281	1	225 886	99	negligible	
Ipeľ							
Slaná							
Hornád	251 457	2514	1	248 943	99	negligible	
Bodrog	19 000	190	1	18 810	99	negligible	
Bodva							
total Danube River-basin	1 150 960	11509	1	1139451	99	negligible	

The total amount in this table includes also the data that are for particular agricultural discharges not given (not available). The total amounts given here come from other official sources of the SR than the partial data that are nor available for all the sub-basins.

5.1.3. Pollution of Aquatic Systems through Potential Soil and Ground Water Contamination

5.1.3.1. Municipal Solid Waste Disposal

In 1995 there was 25,7 mill. tons of waste generated in the Slovak Republic, out of which 6,2 mill. tons of special waste (1,6 mill. tons of municipal waste and 2,5 mill. tons of hazardous waste) and 19,5 mill. tons of other waste. Comparing the amounts of the waste generated in recent years we can see the decrease of 10 % of the total volume of waste between 1996 and 1997. The largest amount of waste (85 % of municipal waste and 34 % of industrial waste) is stored in the landfills.

Out of the total volume of the municipal waste, only 2 % have been recycled, 0,04 % have been disposed in physical or chemical way, 1,57 % disposed in biological way and 85 % have been stored. As it is written lower down there is a problem with the landfills. Only a small number of the landfills fulfil the requirements of the licensed and controlled landfill.

(1) Lower Morava and Danube

It was estimated that here are 346 solid waste deposits in the Lower Morava and the Danube basin, with approximately 4,9mil.m^3 of deposited waste material on 114 ha,. There are only 13 landfills officially licensed. As risk deposits with municipal solid waste are characterized the following deposits: Most pri Bratislave, Kalinkovo, Miloslavov, Topolovec, Hviezdoslavov, Nová Lipnica, Nová Lipnica-cint. Dunajská Lužná, Trnávka, Lehnice - kolónia, Alžbetin Dvor, Jastr.kračany, Hamuliakovo, Bendov Majer- Vrakuňa Trstená na ostrove, Mad, Veľké Úľany, Hurbanova Vec, Jelka za záhradami, Hubice-Borovicový lesík, Mierovo, Kvetoslavov-Jozefov Majer, Michal na ostrove, Orechová Pôtoň, Veľké Blahovo, Šuľany, Gabčíkovo, Dolný Bar.

(2) Váh basin

There are around 1610 waste deposits in the territory of the Váh basin. Approximately 392 of them serve for the mixed municipal waste, 549 are wild dumps. Only 63 solid waste landfills are licensed with the total area 2,7623 km^2. For liquidation of waste serve 12 incinerators. As main risk deposits are characterized the following deposits: Veterná Poruba, Široké, Istebné, Horevážie, Lanopás, Trenčín Zlatovce.

(3) Nitra basin

There are 1084 waste deposits estimated in the Nitra basin. From this number only 28 landfills are officially licensed, 288 landfills are used for the municipal and mixed waste.

(4) Hron basin

It was estimated that in the Hron catchment there are 480 solid waste deposits. 110 of them serve for the municipal and mixed waste, 330 are wild landfills. As the risk deposits with the municipal solid waste are characterized: Driekyňa-Povrazník, Heľpa, Horná Šarcha, Levice, Ľubietová, Rohožná Mrchapotok, Vajsková.

(5) Slaná basin

There are 558 solid waste deposits in Slaná basin. 15 of them are for the municipal waste, 213 wild dumps. There are no classified deposits of municipal solid waste including risk waste.

(6) Ipeľ

The number of solid waste deposits in Ipeľ basin was estimated to be 165. Out of this number 13 are the deposits with the mixed municipal waste and 136 wild dumps. As risk municipal waste deposits were characterized: Fiľakovo, Mucin, Poltár.

(7) Hornád

The number of solid waste deposits in Hornád basin was estimated to be 416. There are 37 of them municipal waste dumps and 90 of them are considered to be wild dumps. Only 24 landfills are licensed. There are no municipal deposits characterized as hazardous waste deposits.

(8) Bodrog

It was estimated, that in the Bodrog catchment there are 1064 solid waste deposits. 25 of them serve for the municipal and mixed waste, 565 are wild landfills. As the hazardous deposits with the municipal solid waste are characterized: Kamenica, Snina, Ulíč, Čemerné.

(9) Bodva

There are 41 registered deposits - out of them 7 are controlled, 31 are wild dumps and only 2 are officially licensed. The solid municipal waste has a share of 90%.

5.1.3.2. Industrial/Mining/Hazardous Solid Waste Disposal

Out of the total volume of waste generated in industry which in 1995 made 4 816 000 tons, 38 % have been from food industry, 16 % from manufacturing of wood and wood products, 18 % from metalurgy, 13 % from manufacturing of machinery, 12 % from chemical industry, 3 % from other industry.

Out of the total volume of waste 13 % have been disposed in physical-chemical way, 28 % in biological way, 4 % in incinerators, 34 % disposed in landfills, 5 % stored for 1 year.

(1) Lower Morava and Danube

Location and brief characteristic of critical solid waste disposal sites along the Danube and Lower Morava shows the following table:

Table 5.7. Location and brief characteristics of critical solid waste disposal sites (1997, SR)

Location/no. of dump	Type of waste - risk deposit
Bratislava – Istorochem/1	Mn,Fe
Bratislava Slovnaft/1P	VSBPDR
Bratisalava Slovnaft/D	CVSBE
Bratislava Slovnaft, Cesta	VSBR
Bratislava Matador, Kopčany	rubber waste
Most pri Bratislave	AMINEX, PUR, SULFEN
Kalinkovo	DVS
Miloslavov/6	DVS
Dunajská Lučná-Jánošíková	NO3,SO4
Topolovec	DVS
Hviezdoslavov	DVS
Nová Lipnica-Cint./Dunajská Lužná	VSDR
Trnávka	DVBR
Nová Lipnica/10	DBV
Alžbetin Dvor, Miloslavov	DVS
Jastr. Kračany/Kr.Krač	VSD
Hamuliakovo/12	DVS
Bendov Majer, Vrakun	SVBD
Malacky areál závodu	Slag
Trstená na ostrove	VSDR
Pezinok-Cajla	sludge, fields, flotation waste, Sb
Kablo Malacky	slag, rubber, flass tissue, fenol
Mad	DR
Veľké Úľany	DVS
Hurbanova Ves, Zlaté Klasy	VSBPD
Jelka za záhradami	SDVR
Hubice, Borovicový lesík	DVSBPR
Mierovo	DVSB
Kvetoslavov-Joz.Majer	DVSBP
Michal na ostrove	VSBDPR
Orechová Pôtoň	VSBDPR
Veľké Blahovo	VSBDPR
Šuľany	TKO, organic matter
Gabčíkovo	DVSPR
Dolný Bar	DVSBPR
Kúty	earth, sandy clay
Šmorín pri štadióne	metals, rubber, asbestos
Myjava	KO
Maslovce	NH4, Mr, Fe, NO2,NO3
Skalica	harden salt
ZŤS Komárno-lodenice	industry waste, chemical waste
Jpôočpv vrcj-Slov.armat.Myjava	galvanising sludge
Senica - Slov.hodváb-Nemček	oils, slag, tissues, cellulose, lirne
Rohožník	Cl, Cu
Kúty	COD, Mn, HN4

(2) Váh basin

An overview about the special and hazardous waste in the Váh basin shows the table:

Table 5.8. An overview of the special and hazardous waste in the Váh basin (1997, SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous t/year	Bulk of total waste in thous. t/year
3	Pezinok	1	0,017	0	0,017
5	Trnava	12	20,62	0,118	20,738
6	Dunajská Streda	0	0	0	0
7	Galanta	5	6,576	5,782	12,358
8	Trenčín	7	0,357	0	0,357
13	Považská Bystrica	4	8,091	0	8,091
16	Žilina	17	2,478	0	2,478
17	Čadca	5	0,578	0,500	1,078
19	Martin	10	0,393	0	0,393
22	Dolný Kubín	7	8,488	1	8,489
23	Liptovský Mikuláš	6	2,723	0,112	2,835
together		74	50,321	6,513	56,834

The main risk industrial waste deposits are: Liptovský Hrádok, Veterná Poruba, Široké, Istebné, Námestovo, Sučany, Púchov-Stráženice, Stará Turá, Horné Orešany, Trnovec n.Váhom, Sereď,.

(3) Nitra basin

An overview of the special and hazardous waste in the Nitra basin shows the following table:

Table 5.9. An overview of the special and hazardous waste in the Nitra basin (1997,SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
9	Nitra	5	0,748	0,005	0,753
11	Nové Zámky	7	3,537	0,01	3,547
12	Topoľčany	6	19,638	0,01	19,648
15	Prievidza	7	77,538	2,417	79,955
together			101,461	2,442	103,903

The main risk industrial waste deposits are: Babica, Badok, Bojná, Bošany, Calex Zlaté Moravce, Horná Naštice, Chynorany, Komjatice, Partizánske, Ruskovce-Veronika, Veľký Cetin, Volkovce, ZŤS Komárno-lodenice.

(4) Hron basin

An overview of the special and hazardous waste in the Hron basin shows the following table:

Table 5.10. An overview of the special and hazardous waste in the Hron basin (1997, SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
14	Levice	5	0,119	0	0,119
18	Žiar n.Hronom	7	5,584	0	5,584
20	Zvolen	10	16,227	0,350	16,577
21	Banská Bystrica	10	9,753	27,325	37,078
total		32	31,683	27,675	59,358

The main risk industrial waste deposits are: Banská Bystrica- letecké opravovne, Driekyňa, Dubová-petrochema, Dubová-Petrochema A,B a C., Heľpa, Horná Šarcha, Kremica, Levice, Ľubietová, Malachov, Mochovce, Podbrezhová, Podbrezová za Siklovom, Pohorelá, Pohorelská Maša, Predajná I a II., Rohožná, Rumovisko pod Šumiacom, Stará Kremnica-Jelšový potok, Stará Kremica- starý lom, Špania Dolina, Tlmače-areál SRS, Vajsková, Vajsková-Dolná Lehota, Zvolan-tepláreň, Žiar nad Hronom - kalové pole.

(5) Slaná basin

An overview of the special and hazardous waste in the Slaná basin shows the following table:

Table 5.11. Overview of the special and hazardous waste in the Slaná basin (1997, SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
25	Rimavská Sobota	2	1,00	0	1,00
27	Rožňava	2	0,007	0	0,007
together		4	1,007	0	1,007

The main risk industrial waste deposits are: Kokava. Kokava-Choropa. Ľubeník- SMZ, Mútnik-Rimavská Sobota, Rožňava, Slavošovce-Hlboký Jarok.

(6) Ipeľ basin

An overview of the special and hazardous waste in the Ipeľ basin shows the following table:

Table 5.12. Overview of the special and hazardous waste in the Ipeľ basin (1997, SR)

Number of deposits	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
24	Lučenec	1	0,201	0	0,201
together		1	0,201	0	0,201

The main risk industrial waste deposits are: Antol, Banská Belá, Fiľakovo, Banská Štiavnica, Horná Semerovce, Mucín, Poltár-Hanová, Šahy, Točnica-Halier.

(7) Hornád basin

An overview of the special and hazardous waste in the Hornád basin shows the table:

Table 5.13. Overview of the special and hazardous waste in the Hornád basin (1997, SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
28	Spišská Nová Ves	6	610	180	790
30	Prešov	9	1,278	0	1,278
31	Košice	15	5,718	10,450	16,168
together		30	7,606	10,630	18,236

The main risk industrial waste deposits are: VSŽ Košice - Bakša, Solivary Prešov, Rudňany, Slovinky, SEZ Krompachy, SEZ Krompachy - Halnái, SEZ Krompachy II., ZTS Prakovce, Spišská Nová Ves, VZŽ Košice.

(8) Bodrog basin

An overview of the special and hazardous waste in the Bodrog basin shows the following table:

Table 5.14. Overview of the special and hazardous waste in the Bodrog basin (1997, SR)

Group number	Location - region	Number of sources in the region	Bulk of hazardous wastes in thous. t/year	Bulk of special wastes in thous. t/year	Bulk of total waste in thous. t/year
32	Bardejov	1	0,000	0	0,000
33	Svidník	1	108	0	108
34	Vranov n.Topľou	2	144	0	144
35	Trebišov	1	140	1000	1140
36	Humenné	3	5880	0	5880
37	Michalovce	5	80 963	37 626	118 589
together		13	87 235	38 626	125 861

The main risk industrial waste deposits are: Snina, Udavské, Poša, Strážske, Poša II., Vojany, Čičarovce.

(9) Bodva

There are no special and hazardous waste deposits registered in the Bodva basin.

5.1.4. Hydropower

Out of the total amount (27324 GWh) of the consumed electrical energy in 1995 19% was generated in the hydroelectric power stations (cca 25% of the electrical energy production). Currently, the degree of utilization of the primary hydropower potential is 52,6 %. The increase between the years 1994 - 1995 was 8,4 % recorded for the first time after overcoming a 3 year economic drop.

Table 5.15. Hydro-electric power stations (1995, SR)

River basin	Reservoir	Kind of using	Power capacity installed MW	mean annual electricity production GWh	Share in total country electricity production in %	Locks and fish pass
Danube	Gabčíkovo	continuously	720	2200	8,05	x
	Der.pr.kanál	contin.	1	4		-
	Buková	contin.	0,041	0,.112		x
	Kunov	contin.	0,15	0,012		x
	Other small hydro power plants		0,022			
Váh	Lipt.Mara	pumped, peak	98	77	0,2	x
	Bešeňová	contin.	4,8	20,5		x
	Čierny Váh	pumped, peak				x
	Orava	peak	21,75	31		x
	Tvrdošín	contin.	6,2	11,4		x
	Nová Bystrica	contin.	0,04	0,344		x
	Hričov	peak	31,5	56,2		x
	Nosice	peak	67,5	150,33	0,55	x
	Kráľová	peak	44,8	114,8	0,42	x
	other small hydro power plants	peak	424,55			
Nitra	Nitrianske Rudno	contin.	0,216	0,58		x
	other small hydro power plants	peak	2,16			
Hron	Môťová	contin.	1,08	1,5		x
	other small hydro power plants		19,399			
Ipeľ	Malé Kosihy	peak	0,117			x
Slaná	Dobšiná	contin.	1,0	2,5		x
	Dobšiná	pumped,peak	21,6	27		
	small power plants		0,12			
Hornád	Ružín II.		1,9	8,56		x
	Ružín I.		60	136	0,5	x
	other small hydro power plants		1,376			
Bodrog	V.Domaša		12,8	12		x
	Sečov. Polinka		0,15	0,92		x
	Vyšná Rybnica		0,03	0,08		x
Bodva	--		0			
Total			1542,301	6831	25%	

The total amount in this table includes also the data that are for particular water energy sources not given (not available). The total amounts given here come from other official sources of the SR than the partial data that are nor available for all the reservoirs.

The small hydroelectric power stations generate yearly 136,7 GWh of electrical energy, which represents 11,2 % of the assumed potential of the river system in Slovakia for small hydropower stations. Current capacity is 36,8 MW. According to the water management companies all dams are provided with locks and fish passes, yet their actual functioning is questionable.

5.1.5. River Fisheries

There is no relevant branch of river fisheries on the Slovak territory of the Danube River basin.

Fishing in ponds, water reservoirs, rivers and streams show the following table:

Table 5.16. Fishing in ponds, water reservoirs, rivers and streams (1997, SR)

	Fishing		Use	
	Fishing total	Share of fishing Slovak Fishing Union from total	Use – economic	Use - sport
Fish total in tons	2840	1950	870	1970
Jobs related to river fishery	data not available			

5.1.6. River Shipping

In the territory of Slovakia water transport is only found in the Danube River basin. The Danube River is the main water route in Slovakia and it is navigable along the whole Slovak section. In 1997 the Tisa River was opened to shipping. In June 1998 the lower section of the Váh River from Komárno up to Selice was opened to shipping too.

As a consequence of national economy restructuralization after 1989, the volume of goods delivered in all transport systems dropped down. In water transport, it was a decrease by 65 %, which means from 371 500 t to 166 100 t in 1995.

An overview of water transport data is given in the following table:

Table 5.17. Water Transport Data (1991, 1995, 1997, 1998, SR)

Indicator	1991	1995	1997	1 quarter 1998
Freight transport				
Good traffic in total (thous.t)	1946	1661	987	326
Performacnces (mill.tkm)	2384	1468	472	177
Average transport distance (km)	1225	883	not available	not available
Goods traffic in total transit excluded (thous.t)		1371	not available	not available
Goods transit traffic (thous.t)		290	not available	not available
Passenger transport				
Person transported (thous.)	168	138	99	not available
Performances (mill.pass.km)	11	7	not available	not available
Performances of the harbor Bratislava (shippers from the harbor)	not available	not available	4201	not available
Performances of the harbor Komárno (shippers from the harbor)	not available	not available	4433	not available

5.1.7. Water Related Recreation/Tourism

- The significance of tourism bound to water areas and watercourses is of local and national importance. It does not represent any particular attractions of international tourism, except for health and spa resorts. Practically all numbers on transported persons are related to tourists.
- The Danube watercourse is not utilized for bathing due to its quality of surface water but it is utilized for water sports, particularly the section of the Lower Danube and also the hydroelectric power station of Gabčíkovo dam Čuňovo.
- This kind of tourism is growing by creating the new water areas - mainly, through the water reservoirs and man made lakes made from gravel pits. Their utilization is connected with criteria assessing environmental values and location towards the cities and towns. The most important water areas are Orava, Liptovká Mara, Domaša, Zemplínska Šírava, group of lakes near Banská Štiavnica, Sĺňava, Sun Lakes near Senec, Nosice, Ružín, Čuňovo near hydroelectric power station Gabčíkovo. Besides that, an important water source is thermal water and swimming pools with thermal water. Currently, there are 35 thermal swimming pools in Slovakia.

Table 5.18. Overview of the number of water areas and their tourism (1997, SR)

	Water reservoirs used for tourism		Water-courses sections used for tourism		Man made lakes made from gravel pits used for tourism	
	Reservoirs	Tourists	Water-courses	Tourists	Made lakes	Tourists
Bratislava	-	-	4	3200	6	20000
Western Slovakia	50	53650	29	18300	28	55560
Central Slovakia	62	71750	25	11300	3	2300
Eastern Slovakia	29	47350	36	19900	4	13000
Total	141	172750	94	52700	41	90860

In the region of Bratislava there are these spots of water recreation: man made lakes in Záhorie made from gravel pits, water dam Čuňovo, thermal swimming pool Kráľová near Senec, Sun lakes near Senec, man made lakes near Bratislava made from gravel pits excavations.

In the region of Trnava: Sĺňava near Piešťany, Kráľová, Dunaj - Hrušov, Dunajská Streda, Galanta, Hlohovec, Piešťany. Malý Dunaj - water tourism.

In the region of Nitra: Duchonka near Topoľčany, Dunaj, Malý Dunaj a Hron - water tourism, thermal swimming pools Nové Zámky, Komárno, Levice, Šaľa, Nitra.

In the region of Banská Bystrica the situation for water tourism is limited. There are four water reservoirs Ružiná, Teplý vrch, Kurinec, Môťová near Zvolen and the lakes near Banská Štiavnica. The Hron watercourse is good for water tourism, there are the spas Kováčová, Dundince, Sklenné Teplice and Číž and the thermal swimming pools.

In the region of Trenčín there are three spas of international importance and with thermal water. There are also some other thermal swimming pools. The water reservoirs and man made lakes made from gravel pits Dubník, Nosice, Rudno and Zelená voda are used for water recreation.

In the region of Žilina there are water reservoirs Orava, Liptovská Mara and Hričov and Žilina dams. There are important spa resorts: Rajecké kúpele s Kunerádom, Turčianske Teplice, Lubochňa, Korytnica, Lúčky and 6 thermal swimming pools, mainly Oravica, Rajec, Bešeňová and Liptovský Ján.

In the region of Košice there are water reservoirs used for water tourism: Dedinky, Ružín pod Bukovcom, Zemplínska Šírava, man made lakes made from gravel pits Čaňa, Geča. The section of the Tisa River near Malé Trakany is used for water tourism too.

In the region of Prešov there are water reservoirs Domaša, Rybníky near Snina, the rivers Poprad and Dunajec used for water sports and the spa resorts in Bardejov and Vyšné Ružbachy based on mineral waters and the thermal swimming pools Vrbov and Gánovce as well as newly built health resort Tatra-thermal in Stará Lesná in the High Tatras.

5.2. Projection of Economic Significance/Impacts

5.1.2. Projection of Abstraction of Raw Water

(1) Domestic Raw Water Demand

Consumption of water in the households has been diminishing since 1990 what can be seen in the decrease of potable water withdrawals. The main cause of this decrease is the increase in prices for water consumption. To supply citizens by drinking water the ground water resources are mainly utilized. 86,5 % of consumed water comes from ground water resources. **The objective is to reach the share of 83 % of the inhabitants supplied by public water systems up to 2000 and 91-92 % up to 2010, which will lead to a certain increase in water consumption compared to the present state**.

Table 5.19. Projected domestic raw water demand (2000,2010, SR)

Tributary river-sub-basin	Expected domestic raw water demand in 2000 (from river system + ground water)	Expected domestic raw water demand in 2010 (from river system + ground water)	Expected development (increase, decrease, stable)
	m^3/s	m^3/s	
Danube and lower Morava	4033	4382	increase
Váh	4576	5209	increase
Nitra	1972	2243	increase
Hron	2017	2169	increase
Ipeľ	531	606	increase
Slaná	597	663	increase
Hornád	2266	2585	increase
Bodrog	1532	1862	increase
Bodva	117	133	increase
total Danube River-basin	17641	19853	increase

(2) Industrial/Mining Raw Water Demand from the Danube River System

According to the analyses of water management, the industry withdrawals have overcome the boom and decrease, yet the increase for other activities has been recorded. The needs of industry have not been stabilized yet due to national macroeconomic changes and with respect to new technologies and rationalization of water withdrawals. The requirements for water in the mines have not been summarized because they use mining waters as a water source, which is then discharged into watercourses without measuring.

In the water management an important role has energy. The classical power stations are expected to be updated with the steam-gas co-generating sources, which are demanding as to the water withdrawals. There are two nuclear power stations AE Jaslovské Bohunice and AE Mochovce.

Table 5.20. Expected industrial/mining raw water demand (2000,2010, SR)

Tributary river-sub-basin	Expected Industrial/Mining raw water demand in 2000	Expected Industrial/Mining raw water demand in 2010	Expected development (increase, decrease, stable)
	Volume (1000m^3/year)	Volume (1000m^3/year)	
Danube and lower Morava	612383	606883	decrease
Váh	447080	485310	increase
Nitra	52474	49364	decrease
Hron	2933309	2935871	increase
Ipeľ	4101	4101	stable
Slaná	19873	21383	increase
Hornád	418163	417993	decrease
Bodrog	388604	486954	increase
Bodva	420	420	stable
total Danube river-basin	4876407	5008279	increase

(3) Agricultural Raw Water Demand

Agricultural production in the whole territory of Slovakia has been in depression, which is due to economic transformation. This has been reflected in the decrease in consumption of agricultural products as well as in the decrease of water withdrawals for agriculture. The prognosis of water consumption for agriculture is based on the model of optimal satiation of the territory by agricultural production, which is then projected into the optimal needs of water for the planning horizon of 2010.

Table 5.21. Expected agricultural raw water demand (2000,2010, SR)

Tributary river-subbasin	Expected agricultural raw water demand in 2000		Expected agricultural raw water demand in 2010		Expected development (increase, decrease, stable)
	Volume in 1000m^3/year for irrigation	Volume in 1000 m^3/ year for other purpose	Volume in 1000m^3/year for irrigation	Volume in 1000 m^3/year for other purpose	
Danube and lower Morava	79237	7453	86041	7432	increase
Váh	192644	23075	206850	23794	increase
Nitra	28532	11328	33398	11640	increase
Hron	38815	7737	41279	7875	increase
Ipeľ	17850	5727	19565	6060	increase
Slaná	16137	3746	19255	4039	increase
Hornád	6069	5813	9193	6101	increase
Bodrog	38461	8667	47960	8960	increase
Bodva	1210	1382	1540	1413	increase
total Danube river-basin	418300	74928	465081	77314	increase

5.2.2. Projection of Wastewater Discharge

(1) Municipal Discharge

Public sewerage is far behind the public water supply and this trend is continuing. In 1995 more than 1/4 of inhabitants have been using the water supply system without putting the wastewater in public sewerage and then to WWTPs. In the planning horizon of 2005 there is an objective to increase number of citizens connected to sewerage system from 52,5 % to 57%.

Table 5.22. Expected municipal wastewater discharge (2000,2010, SR)

Tributary river-sub-basin	Expected total municipal waste water discharge in 2000 in m^3/day	Expected total municipal waste water discharge in 2010 in m^3/day
Danube and lower Morava	154443	185541
Váh	641019	814980
Nitra	120353	146314
Hron	139372	162226
Ipeľ	25893	34736
Slaná	49506	465827
Hornád	218647	243226
Bodrog	100333	134024
Bodva	9099	11369
total Danube River-basin	1458665	1798243

(2) Industrial/Mining/Shipping Discharge Directly Discharging to the Rivers

Table 5.23. Expected total industrial/mining/shipping wastewater discharge (2000, 2010, SR)

Tributary river-sub-basin	Expected total industrial/mining/shipping waste water discharge in thous. m^3/year
Danube and lower Morava	n. a
Váh	n. a.
Nitra	n. a.
Hron	n. a.
Ipeľ	n. a.
Slaná	n. a.
Hornád	n. a.
Bodrog	n. a.
Bodva	n. a.
total Danube river-basin	n. a.
SR	n. a.

Note: It is not possible to predict expected total industrial wastewater discharge due to the expected changes in privatization of industry and WWTPs and changes in prices.

(3) Agricultural Discharge (major point sources)

Table 5.24. Expected total agricultural wastewater discharge (2000,2010, SR)

Tributary river-subbasin	Expected total agricultural wastewater discharge in thous. m^3/year/ m^3/sec
Danube and lower Morava	n. a.
Váh	n. a.
Nitra	n. a.
Hron	n. a.
Ipeľ	n. a.
Slaná	n. a.
Hornád	n. a.
Bodrog	n. a.
Bodva	n. a.
total Danube river-basin	n. a.
SR	

Note: It is not possible to predict total agriculture wastewater discharges due to overall changes in agriculture, but in general it is not expected to increase.

5.2.3. Projection of Other Major Impacts

Constructions for improvement of the surface and groundwater quality.

In the years 1997-1999 the following constructions of the Wastewater Treatment Plants should be realized in the frame of the public investments programmes for healthy environment in order to diminish polluted substances of the municipal wastewater.

Table 5.25. Wastewater treatment plants planned in the years 1997-1999 (1997-, SR)

Title of construction	Years of construction	[mil. Sk]	
		Total costs	Volume 97-99
Košice, 2nd stage of WWTP	1988-99	873,5	318,1
Prešov - Sekčov, sewerage (4th stage)	1989-98	444,0	106,6
Krompachy, sewerage and WWTP	1990-98	246,0	153,5
Svidník, sewage and WWTP	1989-98	304,0	121,6
Intensification WWTP Michalovce	1993-99	104,0	83,9
Humenné, enlargement of WWTP	1989-99	524,0	310,8
Čadca, sewerage and WWTP	1991-98	179,0	92,8
B.Štiavnica, sewerage and WWTP	1990-99	339,2	196,1
Šafárikovo, sewerage and WWTP	1990-98	72,0	50,7
Nitra, WWTP	1991-2001	548,0	168,0[1]
B. Bystrica, reconstruction and enlargement of WWTP	1988-98	593,0	243,4
B. Bystrica, sewerage pipe "A"	1998-2002	940,0	370,0[2]
Zvolen, enlargement of WWTP	1998-2000	300,0	230,0[3]
Kováčová, sewerage pipe	1996-97	9,3	4,1

Note: The volume of investments after 1990 is:[1] - 207,7 mill. Sk; [2] - 570,0 mill. Sk; [3] - 70,0 mill. Sk

Accomplishment of the above mentioned investments depends on the state subsidies because their financial means contribute with the highest share. The costs will be partly paid from the state funds and partly from the companies.

In the years 1997 - 1999 there are the following constructions planned in the selected companies. The financial sources will come from the companies' sources and from the domestic and foreign loans.

Table 5.26. Selected companies' investments planned till 2002 (1997- 2002, SR)

Company - investment	Date of realization	Costs [mill Sk]	
		1997-99	[Total]
NCHZ Nováky			
Pumping Station for Sewage Waters	1997	1,1	1,1
Diminishing production of wastewater from VC/EDC	1996-1998	1,85	2,55
Diminishing salinization of wastewater from soda lye production	1999	18	18
Solving wastewater from propylenoxid production. (Advancement of propylenoxid production.)	1997-starting 1998-2002		cca 350
	total	20,95	371,65

Table 2.26. continued

Company - investment	Date of realization	Costs [mill Sk]	
		1997-99	[Total]
Bukóza Vranov			
Implementation of ECF a TCF pulp production	1995-1997	9	36,7
Installation of oxygen delignification	1999	150	150
Reconstruction of mechanical WWTP	2000-2001		150
	total	159	336,7
Istrochem Bratislava			
Construction of biological WWTP	1996-1999	315	350
	total	315	350
Slovhodváb Senica nad Myjavou			
Diminishing of generated wastewater	1997	0,8	0,8
Advance technology for cultivation of viscose fiber	1997		
Diminishing of losses in pipelines	1997-1998	3,61	3,61
Increasing efficiency of chemical degree of WWTP	1998-1999	25	25
Changes in technology of purification to biological WWTP	1999-2000		25
	total	29,41	54,41
Chemko Strážske			
Solving of processing of alcalic waters from boiling of appliances in cyclohexanon production	1997	6	6
Building of a new coiling place for fenocol production - fenol, NaOH	1997-98	16	16
Adaptation of production of collecting centers for bound formaldehyd for winter period	1997-99	11	11
Reconstruction of storing of formaldehyd	1997-2002		12
Reconstruction of storing of raw materials for neuttralisation (CHÚV II.)	1998-1999	17	17
New filling of glues to metal tanks	1999	12	12
New filling of formaldehyd to metal tanks	1999	15	15
General reconstruction of A1 a A2 activisations	1999-2000		16
Increase in capacity in dumping place Poša	2000		40
	total	77	145
ZVL Skalica*			
Construction of WWTP - pilot run	1997		
	total	0	75
JCP Štúrovo			
Ecological prog. (EP) r. 1995 - 2002 : Reconstruction of coiling station of primary asphalt	1995-2002	15,4	15,4
EP: Reconstruction and modernization of production of NSSC		697,7	697,7
EP: Reconstruction and enlargement of WWTP	after 1999	-	300
	total	713,1	1013,1
VSŽ Košice			
Rationing of lime milk in WWTP Sokoľany	1997-98	13	13
II. stage of continual monitoring of wastewater	1997-98	20	20
Supplementary building of biological WWTP			295
	total	33	328

The costs to build the WWTP are 75 mill. Sk till 1996. There are no further investment costs expected in 1997.

The most important investments, which are financially demanding, but improving the air quality and the impacts of economic activities on the river system environment are as follows:

Table 5.27. Most important investments (2000, 2010, SR)

Investments	Assumed time of realization	mill. Sk
desulphurization of the blocks K1-K2 ENO B Zemianske Kostoľany	do r. 1998	2 702
Change in boilers ENO A Zemianske Kostoľany for fluid ones: 2nd building	do r. 1998	1 180
Realization of steam-gas cycle in heating plant II. Bratislava	do r. 1998	3 400
Steam-gas cycle Prešov	do r. 2000	1 600
Steam-gas cycle in heating plant Košice	do r. 2000	3 400
Gasification of central source in sugar factory Rimavská Sobota	do r. 2000	950
Implementation of incinerator of heating oil with content of sulphur to 1 % in Slovnaft, a.s., Bratislava	do r. 2000	7 000

Further water management impacts in the field of public water supply system in the near future are to accomplish:

1. Public water supply from Žitný ostrov to Nitra, Vráble, Zlaté Moravce
2. Water supply from Starina in the section Vranov - Trebišov
3. Doubling of water supply from Starina to Humenné and Michalovce
4. Higher utilization of water sources Ostrovné Lúčky - Mokraď for Bratislava
5. Construction works connected with water reservoir Málinec for the district of Lučenec in order to release the capacity of the water reservoir Klenovec for the district of Rimavská Sobota
6. Construction works to utilize the water reservoir Turček in order to supply Prievidza, Handlová, Žiar nad Hronom
7. Public water supply in the municipalities in the vicinity of nuclear power station Mochovce
8. Water supply from Starina to Hanušovce to Svidník
9. Enlargement of public water supply from Nová Bystrica to Turzovka, Skalité and Bytča
10. Public water supply Jesenské - Nová Bašta and Rimavská Sobota - Tornaľa
11. Preparation of the water reservoir Hronček in order to supply Banská Bystrica - Zvolen

In the planning horizon of 2005 it will be important to complete:

1. The source of water for the upper Váh region (Dolný Kubín-Ružomberok) and the water reservoir Oravská Polhora
2. The source of water for lower Spiš (the Hnilec River basin) - the water reservoir Šopy for Stará Ľubovňa and the water reservoirs Jakubianka and Lukov
3. Enlargement of the water reservoir Starina - 3rd stage
4. Enlargement of the water sources from Žitný Ostrov to Záhorie and central Váh area
5. The source of water for Muráň - Rožňava water system (water reservoir Rejdová)

6. Preparation for construction of water reservoir Garajky for Poprad, Spiš and Liptovský Mikuláš
7. Construction of the water reservoir Tichý Potok on Torysa for supplying the region of Prešov and Košice.

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

General background to environmental legislation is formed by three main acts: Act on the Natural Environment No. 17/1991, the Act on Nature and Countryside Protection No. 287/1994 and the Environmental Impact Assessment Act No. 127/1994, which has a preventive character.

The 1991 Natural Environment Act has been one of the first acts prepared after the political events of 1989 and it has been connected with great hopes to reverse the disastrous long-term impacts on our environment of past actions. However, these hopes have not been completely fulfilled because, as it is written, the Act is more or less a theoretical explanation of environmental issues and of the ideal state of the environment, without giving legislative measures to improve their current state.

The main objective of this Act is to define the basic concepts and principles of environmental protection; and to set down the responsibilities of legal and physical entities when using natural resources, so as to protect and improve the environment. It originates in the concept of sustainable development.

The definition of the natural environment, according to this Act, is everything, which creates the natural conditions for the existence of all organisms, including humankind, and at the same time is the precondition for their reproduction. Its components are the air, water, minerals, the soil, organisms, ecosystems and energy.

The human and social aspects of the environment are still missing from this legislation, as well as concrete ways on how to implement change. One could say that the 1991 Act is more or less a codex of principles, creating the context, within which further legislation can operate.

One commitment of the Act was to legislation in respect of environmental impact assessment and this led to the Environmental Impact Assessment Act No.127/1994. The need for the law is set out in articles 17-18 and 20-26. It brings a new quality into the process of environmental protection, which is enriched in two ways. One is the exact and expert assessment of the impact of proposed activities on the natural environment; the other is the democratic form of assessment and decision-making, with an important role for public participation.

There are five phases in the EIA procedure: notification, screening, scoping, the environmental impact statement (EIS), and the final record. In the notification phase, the proposed activity or development is submitted to the Ministry of the Environment, which sends it to all the involved bodies, including the public, for open display and comment. In the screening phase, the proponent of the development and the MoE decide within one month whether the activity will or will not be assessed on the basis of the 1994 Act. This decision is then communicated to a variety of bodies as well as the general public. In the scoping phase, the Ministry determines the scope of the assessment, in co-operation with the other involved bodies and taking account of formal written comments prepared within the framework of the Act. In the phase of the EIS preparation, the basic work of assessment is carried through. In the final record phase, the EIS is submitted to the MoE and by the Ministry to all appropriate bodies, including the affected municipality. This arranges a public hearing on the proposal and its likely impacts, and from this hearing a record is prepared for the MoE, which also is required to accept separate, written submissions from a wide group of defined parties. This leads the MoE to preparation of a final record. This is not binding on the body legally responsible for the final decision, such as the municipality or the regional and district

authorities - departments of creation and protection of the environment, but without that final record, no go-ahead is lawful. According to this act the EIA procedure is obligatory for all major investments in water management.

On January 1st, 1995, the Act on Nature and Countryside Protection No. 287/1994 also came into force. This Act brings in a complex system of nature and countryside protection, which unites the existing dispersed legislation on the one hand, and at the same time amends the 40-year old Act No.1/1955 on the State Protection of Nature.

The 1994 Act emphasizes the duty of all legal and physical entities to protect nature against real or threatened damage or destruction. It also stresses the need for coordinated activity of administrative bodies with the nature protection authorities in the decision-making process. The Act also sets out differentiated conditions for protection according to the different categories of protected areas. These areas have a new system of categorization. New forms of animal species protection and tree protection are also introduced. The Act permits competent authorities to determine mitigation measures for negative impacts and to levy fines. The income from these fines goes to the State Fund for the Environment. In the drawn-out process of preparation and drafting of this law, actual practice on the ground signaled its controversial character and this would require fresh legislation in the form of public notices.

The Water Act

In order to protect the quality of surface and groundwater, the 1973 Water Act prescribes the required conditions for discharging wastewater and other contaminated water into the public sewerage system and other waters. These conditions are laid down in Governmental Order No.242/1993, which gives data on the admissible degree of water pollution and Public Notices No.154/1978 and No.15/1989 on public water supply and public sewerage systems. These public notices are particularly important, given that of 2834 municipalities in Slovakia, only 283 are connected to the public sewerage system, and 1680 to the public water supply system. The Water Act also defines the administration of river systems. Special authorities deal with the Danube, the Váh, the Hron, the Bodrog and the Hornád river basins, whilst smaller catchments are administered by local environmental offices. Public Notice No.6/1978 stipulates the duties of these water administration authorities. The Water Act also defines water works such as reservoirs, hydroelectric power stations and dams, and Public Notice No.169/1975 deals with their management and security control.

The 1973 Act also sets out fees for the use of water to produce electrical energy and for discharges of wastewater. This is covered in detail in Public Notices No.35/1979, No.2/1989 and in government order No.91/1988. Those organizations which breach the terms of the Water Act can be fined by the water management authorities. Fines exist for the unlicensed extraction of water, unlicensed discharges, contamination of surface or ground water by pollutants, damaging the public water supply or the public sewerage supply, and breaching other duties set out in the Act. Up to recent times, fines were taken directly into the state budget, without determining the purpose of their further use. Currently, there are new regulations requiring the use of this income for ecological purposes, an interesting example of environmental hypothecation.

The 1973 Water Act and the Act on State Administration in Water Management No.135/1974 have been amended by Act No. 238/1993 and have brought in changes in the responsibilities of various bodies. The Water Management Inspectorate has been abolished and a new Slovak Inspectorate of the Environment, with district and sub-district offices, has been established. The central authority in water management is shared between two ministries. The Ministry of the Environment is responsible for environmental protection of the water medium and the Ministry of Land and Agriculture for water utility functions. There are no supervision possibilities through the state administration. This is often criticized and there are proposals for change under the new Water Act that is in preparation.

A new Water Management Strategy has been approved by the National Parliament of the Slovak Republic on June 2nd 1994. Because the environmental aspects of water management are only declared, but not integrated into this strategy, which remains centralized, three NGOs submitted an alternative approach to water management in their document Water for the Third Millenium. These NGOs are the Slovak River Network, the Slovak Union of Nature and Country Protectors and the Society for Sustainable Development in Slovakia.

Public participation in environmental protection

A democratic society is based on public participation in the processes of government. Legislation can provide crucial procedures through which this takes place and must clearly formulate citizens' rights and duties. Only by this means is it possible for control by the people to be exercised over the functioning of state power.

In Slovakia the relationship of people to their municipality and to public issues was for a long time shaped by institutional bureaucracy and by the forced reduction in personal and private property ownership. This created apathy and a lack of involvement in public affairs as well as passiveness with respect to environmental change.

Today, once again, there are gaps in respect of public participation, mainly with respect to environmental legislation.

The new acts which deal with public participation are the Act on Rights of Petition No. 85/1990; the Act on the Right of Assembly No. 84/1990; the Act on the Rights of Association No.83/1990; the Municipality Act, No.369/1991; the Act of Basic Rights and Freedoms, No. 23/1991; and the Referendum Act, No. 564/1992. All of them are derived from new changes in the Constitution.

While the basic laws that recognize civic principles respected in western democracies have already been updated, the majority of environmental laws have not been amended in this sense. Even updated environmental laws do not recognize the scientific understanding which the public and NGOs can contribute.

However, in this context, a new approach is to be found in the 1994 Environmental Impact Assessment Act. It recognizes the value of active public participation, of the public as a source of information as well as a recipient there of, and of the public as a source of critiques of official information. At the same time, it creates a new situation in relation to other legal norms as it is cross-referenced to the Municipality Act, to the Building Code, and to the Environment Act.

The essential requirements for effective public participation are the availability of information, two-way open communication between central government and the municipalities, and between the municipality and citizens, and the transparency of decision-making procedures.

What is certainly apparent is the low level of public awareness of local affairs, local development plans and rehabilitation programmes - major areas of potential public involvement. An encouraging result from polling surveys is that the better informed were the respondents, the more they were convinced of the necessity for participation and the greater their willingness to become involved at the community level.

Public involvement assists local government in making informed decisions, reducing the likelihood of unexpected environmental and social impacts of policies. Public participation benefits the entire society by reinforcing the basic principles and practices of democracy. Accepting the public as a valued partner in decision-making means self-governance based on joint responsibility, trust and co-operation towards a healthier environment. Effective public participation is essential because positive outcomes from legislative practice will not happen without it. Communication from the state to citizens and from citizens to the state and space for public participation in environmental decision-making is still not satisfactory.

6.2. Analysis of Relevant Institutional Framework

6.2.1. State Administration

Central Authority of the State Administration

The central authority in water management is shared between two ministries. The Ministry of the Environment SR is responsible for the environmental protection of the water medium and the Ministry of Soil Management SR for water utility functions.

Authorities of Local State Administration

According to the Act No. 222/1996 on the local state administration organization the regional and district environmental offices were cancelled and new territorial-administrative division of the Slovak Republic has been established with consequent transfer of the state administration in water management to regional and district authorities - departments of creation and protection of the environment.

It is difficult to estimate the effect of the new territorial-administrative division from the point of view of water management after such a short period. As far as the statistical statement is concerned the new structure influenced the balance in water supply and some districts fell below 50 %. Up to now there are 266 public water mains which are managed by municipalities, which represents 9,3 % and the rest is managed by the Water and Sewage Works.

A higher influence within the competence of the local state administration is to be expected at realization of transformation of the Water and Sewage Works, where water management would play its role.

6.2.2. State Funds

State Water-management Fund of the SR

The Fund was established on 1st December 1991 on the basis of decision of Ministry of Forest and Water Management of the SR No. 2544/120-1991. Sources of the State Water-management Fund of the SR are the payments for groundwater withdrawal 2,00 Sk.m^3 and since August 1, 1996 according to the Decree of the Slovak Government No. 235/l996 also payments for groundwater withdrawal for public water supply networks amounting to 1,00 Sk.m^3.

State Environmental Fund of the SR

The State Environmental Fund has been established according to the Act No. 128/1991 at the Ministry of the Environment of the SR. The goal of the fund is to concentrate financial means and use them for development of the environment.

From the economic point of view the task of the fund is to mobilize the capital of respective investors and collect the fines of those who contaminate surface or ground water or damage the public water supply or the public sewerage supply and use this income for ecological purposes in order to create more favorable conditions on the investment market for ecological investments, thus enhancing their realization.

7. Actual Policies and Strategies

7.1. Actual Policies and Strategies

Actual policies and strategies concerning new construction in the territory of Slovakia have been implemented in the Concept of Territorial Development of the Slovak Republic (KÚRS).

The water transport is planned to be extended by:

- construction of public harbors on the Danube River in Bratislava, Komárno and Štúrovo,
- navigation of the Váh river in the section Komárno - Žilina, including parallel construction of the harbors.

There are also plans to reconstruct the dams, upgrade the watercourses and build irrigation (particularly on the Váh River) and to accomplish constructions of the hydroelectric power stations Gabčíkovo, Žilina and Selice and start with a new one in Sereď.

7.2. Sector Policies

Several sectoral policies and strategies that relate to water quality have been elaborated in the respected ministries and institutions. All of them deal with environmental aspects to some extent. These are as follows:

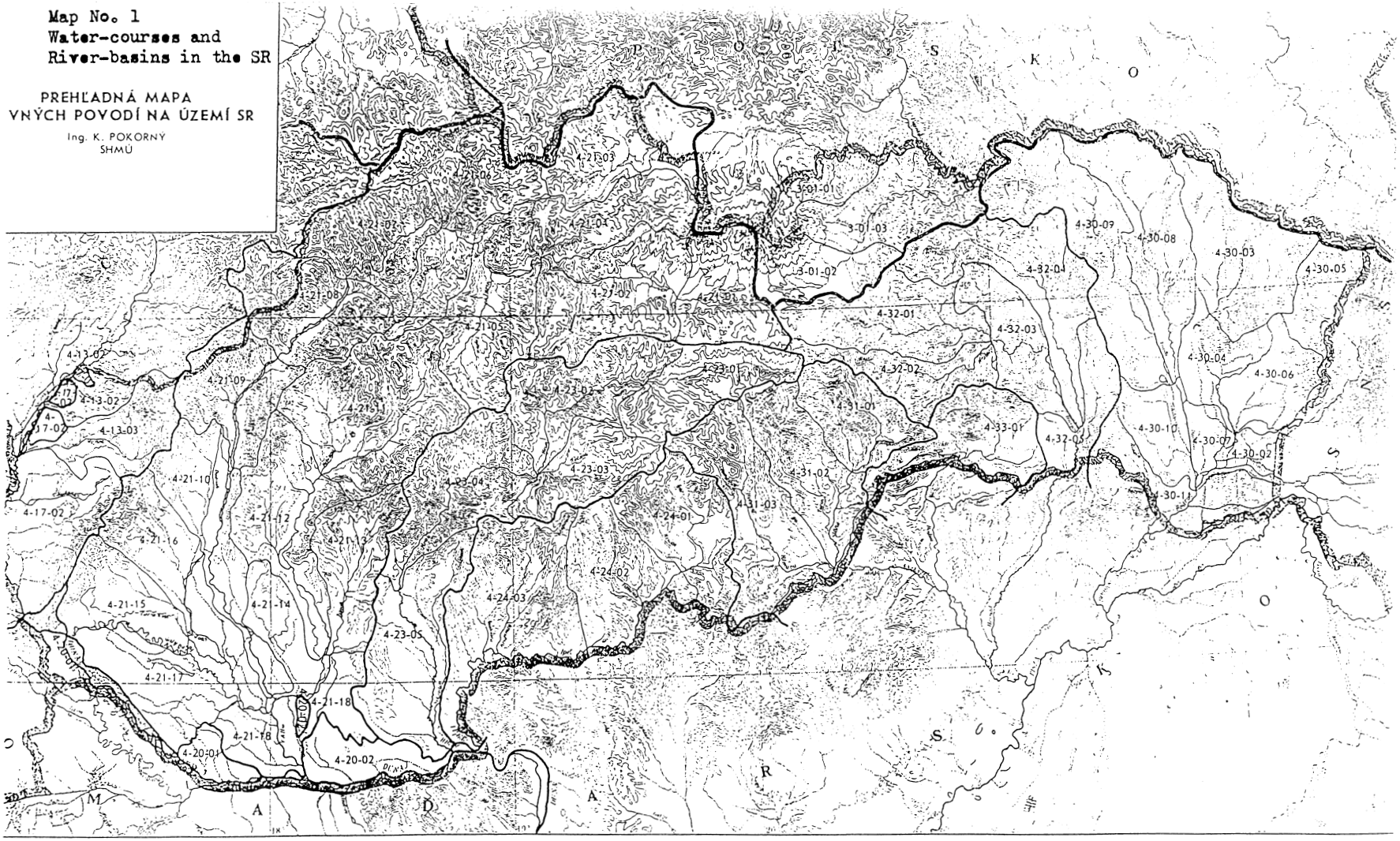
- Strategy, Principles and Priorities of the State Environmental Policy, Approved by the National Parliament (No. 339/1993),
- Concept and Principles of Soil Management Policy,
- Concept of Water Management Policy, 1993,
- Hydrological Plans of River Basins,
- Concept of Waste Management, Approved by the National Parliament (No. 542/1994),
- Basic Strategic Goals of Industry,
- Concept of Energy Management in the SR to 2005, 1993,
- Concept of Transport Management, 1993,
- Concept of Telecommunication Development, 1993,
- Concept of Housing Policy for 1994-2000, 1995,
- Programme of Village Revitalization, 1992,
- Intentions in Tourism Development, Ministry of Management of the SR, 1994.

Annexes

Map No. 1
Water-courses and
River-basins in the SR

PREHĽADNÁ MAPA
VNÝCH POVODÍ NA ÚZEMÍ SR

Ing. K. POKORNÝ
SHMÚ



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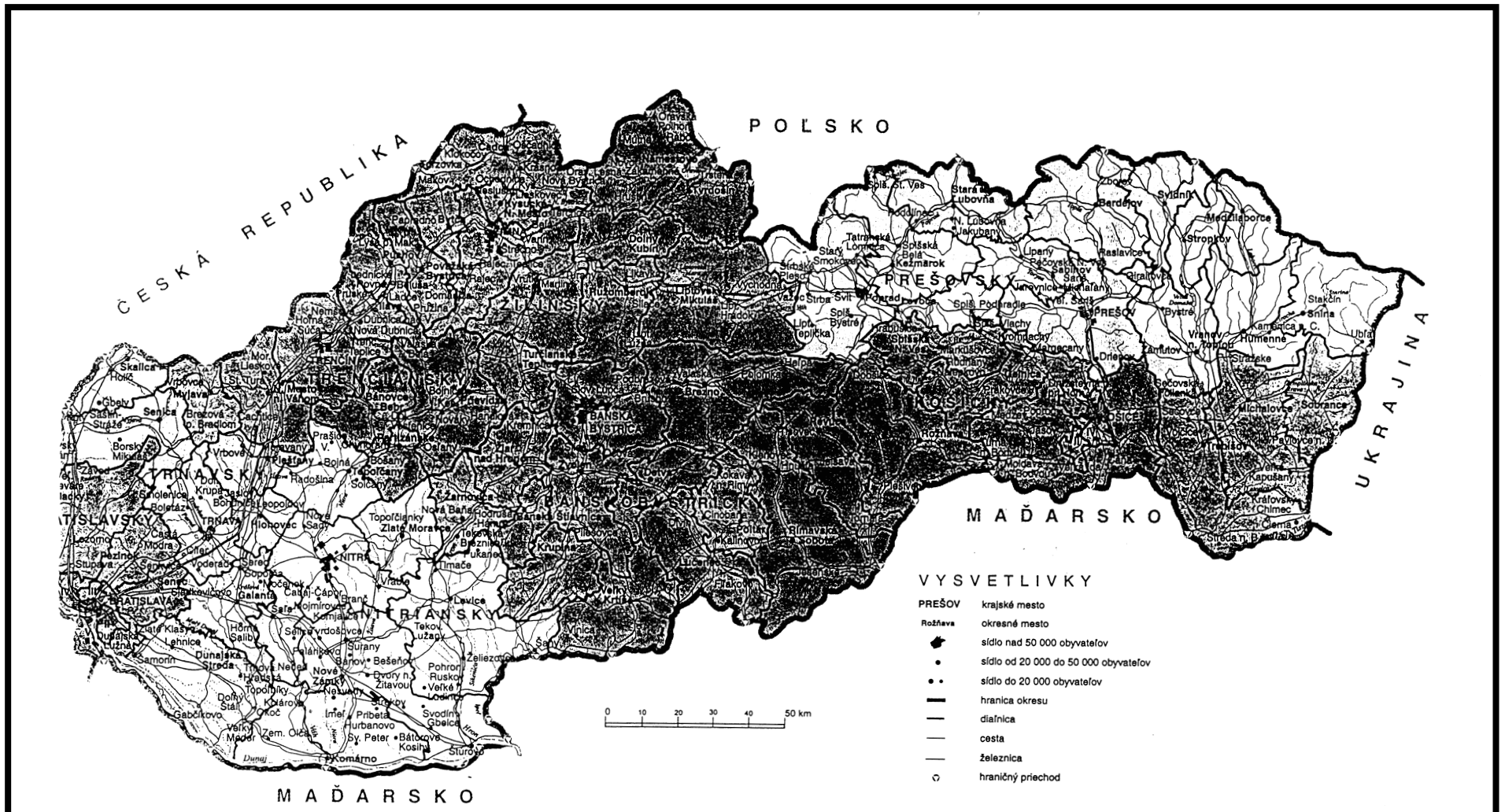
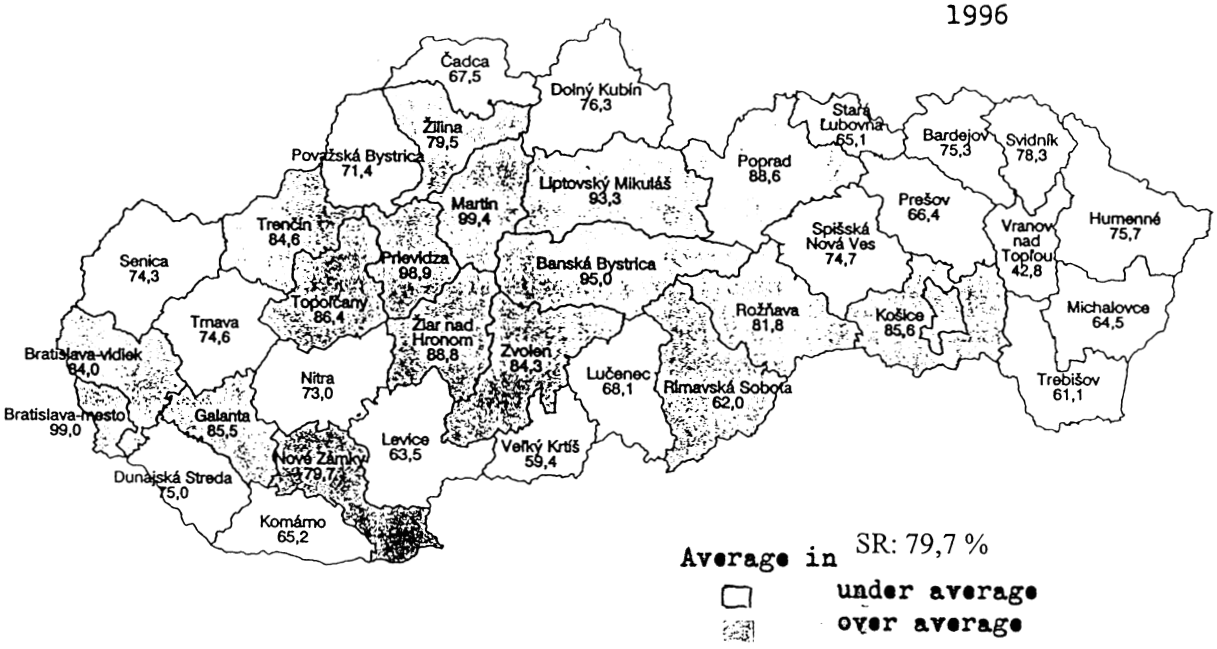


Map No. 2 Administrative division of the Slovak Republic

Map No. 3a Share of population connected to public water supply

1996



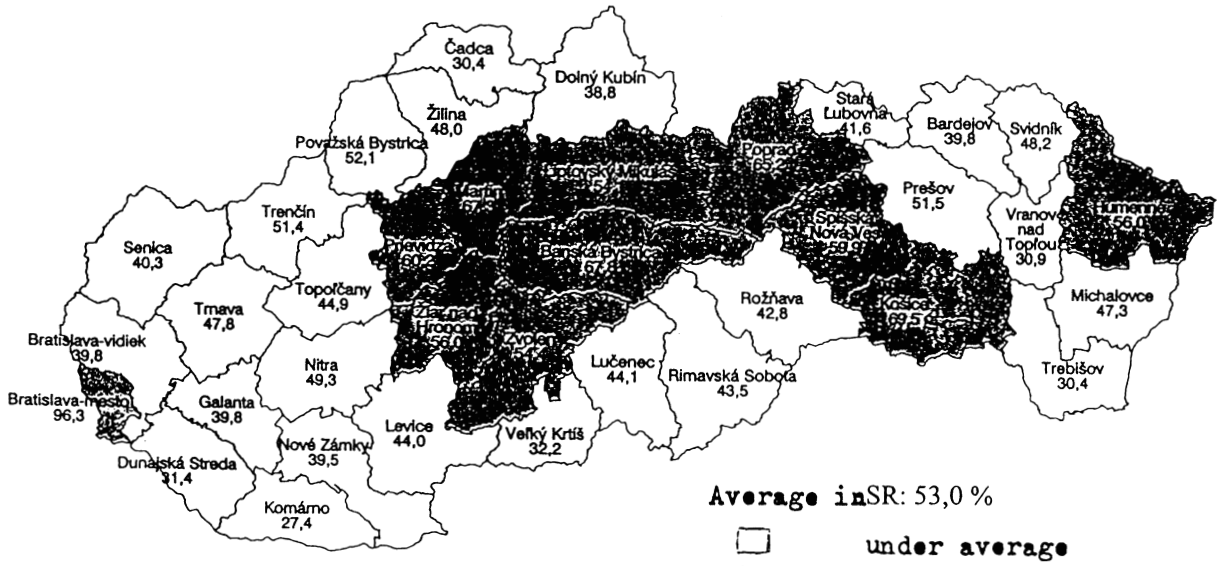
Average in SR: 79,7 %

under average

over average

Source: ŠÚ SR

Map No. 3b Share of population connected to public sewerage in 1996



Average in SR: 53,0 %

under average

over average

Source: ŠÚ SR

Bibliography

1. Statistical Yearbook of the Slovak Republic 1997
2. Report on Water Management in the Slovak Republic 1997
3. National Action Plan for the Danube River basin, 1997
4. Concept of Territorial Development of the Slovak Republic (KÚRS)
5. Developing a Healthy Environment along the Danube River with the Strategic Action Plan, Unedited Draft, WHO 1996
6. The General Project of Protection and Rational Utilization of Waters in Slovakia, Ministry of Soil Management and Ministry of Environment of the Slovak Republic, Bratislava 1995
7. Report on the State of Environment in the Slovak Republic in 1996
8. Workshop on Drinking Water Related Environmental Health Aspects in the Catchment Area of the River Danube in Bratislava, Dec 1993, Volumes I, II, UNDP 1993
9. National Strategy for Conservation of Biological Diversity in Slovakia. Ministry of Environment Bratislava 1998

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Part B

Financing Mechanisms

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List of Abbreviation

a.s.	Akciová Spoločnosť (Slovak), shareholders company
bill.	billion
mil.	million
MNC	million in national currency
NEAP	National Environmental Action Plan
SB SR	State Budget Slovak Republic
Sk	Slovak crown, Slovak currency
s.e.	state enterprise
SR	Slovak Republic
WSW	Water and Sewage Work

exchange rate: 34.5 Sk = 1 US$

1. Summary

The basic legal regulation in the water protection and its using is the Act No. 138/1973, Coll. of Act concerning waters (the Water Act) as amended by the Act No. 238/12993 Coll. of Acts. At the present, the economic tools for water protection and its usage are based upon this act. The penalties, defined by the above act, may also be considered as a complementary but correspondingly effective tool for the water protection. The incomes from charges and penalties flow to the state funds.

The main objective by National Environmental Policy are concerned to:

- reduction in the amount of pollutants in discharged wastewater,
- halting the growth of the gap between the volume of water extracted and discharged,
- reduction of agricultural use of underground water with exception for the food and pharmaceutical industry,
- boosting the proportion of total wastewater purified with high-efficiency methods and of small wastewater treatment plants,
- decrease in consumption of drinking water,
- assigning priority to the completion of wastewater treatment plants under construction and the construction of treatment plants near sources of enormous water pollution.

The price for drinking water and drained water are determined by the Ministry of Finance SR. The determined maximum drinking water price for households is lower than the actual average total cost per m^3. Similar the determined maximum price is lower than the average total own costs per m^3. Costs for drinking water increased to 9,27 Sk/m^3 and for drained water to 5,78 Sk/m^3 in 1997. For other consumers of drinking, process and drained water contract prices are in force.

On the level of respective state enterprises water and sewage works cross subsidization occurs from two points of view. Because the maximum prices of drinking and drained water for households are determined in such a way, that they do not cover even the level of total own costs, a continuous growth of contract prices for other consumers takes place. Deliveries for households and for other consumers are approximately in the ratio 60:40, however the ratio in revenues is opposite.

Charges for discharging of wastewater to surface water depend on the kind and quantity of the wastewater pollution and pollution level of the water stream to which the wastewater is discharged. The charge is not paid for wastewater discharges if the quantity of the pollution discharged does not exceed values given in the relevant legal regulation. The charges are incomes of the State Environmental Fund. The payers of charges are companies, which discharge the wastewater to surface waters and is composed of two parts:

1. basic charge
2. additional charge

The penalties are imposed by water management bodies according to facts determined in the Decree of the Government No.31/1975 Coll. of Acts for breaching of duties defined for the water management sector. It especially concerns:

- water consumption without a permit issued by the water management bodies
- discharge of waters without a permit issued by the water management body or contrary to it
- pollution of surface or ground waters or endangering of their quality or health unexceptionable through the manipulation with substances detrimental to waters
- damage to public water pipelines or public sewage
- breaching of other duties determined by the above acts or duties imposed by them.

The maximum amount of the penalty is 1 million Sk.

The State Environmental Fund SR has been established by the Act No. 128/1991, changed by Act No. 69/1998 Coll. of Acts. The purpose of the fund is to concentrate financial sources and spend them for the environment. The economic mission of the Fund is to mobilize the capital of individual investors to solve ecological problems and create more favorable conditions on the investment market for ecological investment, and thus to spend and facilitate their implementation.

The Fund sources in the quality protection and water quantity area and their rational using are especially:

- charges for wastewater discharges to surface waters
- penalties imposed by the state administration bodies in the water management
- contribution from the State Budget SR.

The State Water Management Fund SR has been established by the Act No. 318/1991 Coll. of Acts. The Government of Slovak Republic by its provision No. 589 of October 22, 1991 accepted the statute of the State Water Management Fund. The Fund is used to cover concrete developmental water management constructions, hydro-geological research, removal of accidents in water structures, development of sciences and technologies.

The State Water Management Fund sources are as follows:

- charges for the ground water consumption
- subsidies from the State Budget SR
- loans from the financial institutions
- interests from the Fund sources
- gifts and contributions by legal and physical entities.

Sources of the State Water management Fund since 1994 are the payments for groundwater withdrawal 2,00 Sk/m^3, and since August 1, 1996 pursuant the Decree of the Slovak Government No. 235/1996 (Digest) also placements for groundwater withdrawal for public water supply networks amounting to 1,00 Sk/m^3.

For implementing development goals, included in the Conception of Water Management policy SR by 2005, allocation of means amounting to 4 billions Sk is required. Participation of the state, vital for financing water engineering structures, was reduced to 1 billions Sk annually. This amount covers 25 % of the annual aggregate invested capital in water management. Major parts of investments are financed by water management enterprises from their capital and reserves and remaining investments are financed by combine resources. Participation of state funds in financing investment construction has been negligible hitherto.

The situation in banking system with providing the loans:

Credit market

- Commercial Loans in SK available
- Interest Rates between 20 % and 27 % p.a.
- Duration max. 8 –10 years (average 18 months)
- Bank Guarantees in Sk available
- Fee between 1 % and 4 % p.a. provided by commercial banks
- By Slovak Guarantee and Development Bank Fee between 1 % and 4 % in once.

The principle problem of the Slovak Republic is disharmony between the quantity of financial funds, gained for exploitation of water and its pollution, and the need of financial sources for realization of tasks, departing from the protection and sustainable exploitation of water as a renewable natural source. By analyzing this state, this disharmony can not be solved only by changing the amount of the payments for exploitation of water.

It should be focused on multi-resources financing of water endangering structures in the future. More extensive utilization of credits, higher proportion of resources from the State Water management Fund and from the State Fund of Environment is desirable, as well as contribution of other potential investors and participation of insurance companies.

Potential Revolving Fund should improve the situation in the environmental protection area by loans with low interest rate and another supporting activities too.

2. Legal Basis

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

The Laws and Regulations of the Slovak Parliament, Acts of Slovak Governments and other Acts.

- Act No. 128/1991 – State Environmental Fund. The goal of the Fund is to concentrate financial means and use them for the environment. The Fund on central level, responding to Ministry of Environment SR.
- Act. No. 318/1991 in wording of later provisions and Act No. 58/1995 and Act No. 304/1995. The State Water management Fund has been established. Act concerning to the organization of the Fund procedures and utilization the sources of the Fund.
- Decree of the Slovak Government No. 589 date 22.10.1991, approving the statute of the State Water management Fund SR.
- Decree of the Slovak Government No. 235/1996, regulated the payments for groundwater withdrawal for public water supply networks.
- Act No. 40/1994 established the State Subsidizing Fund of Agriculture and Food Processing SR.
- Act of the Ministry of the Environment of the Slovak Republic No.176/1992 on terms and conditions of providing and using the funds of the State Environmental Fund of the Slovak Republic
- Act No.138/1973 on waters (Water Law) as amended by the Parliamentary Act No. 238/1993
- Parliamentary Act No. 135/1974 on state administration in water management as amended by the Act No. 238/1993
- Act of the Czechoslovak Government No. 35/1979 on payments in water management and amended by the Act of the Czechoslovak Government 91/1988 (Complete version 2/1989)
- Act of the Slovak Government No.31/1975 on penalties for violating obligations set for the water management

Table 2.1. Laws and Regulations

Exact Title and sources Where hard copy is available	Level of relevance/ Application	Authorities responsible for execution, control,	Main subjects, contents, particularities
Act No. 128/1991 coll. State Environmental Fund Collection of Acts, Ministry of Environment SR	Central	Ministry of Environment SR	Activities SEF, Incomes Utilization the sources
Act No. 304/1995 coll. – The State Water management Fund, Collection of acts. Ministry of Environment, Libraries	Central	Ministry of Soil Manage-ment, State Water Management Fund	Organization of the Fund, Fund procedures, utilization the sources
Decree of the Government No.589/1991 – Statue of the State Environmental Fund Ministry of Environmental, Ministry of Soil Management	Central	State Water Management Fund	Organization of the Fund
Decree of the Government No. 235/1996 Ministry of Environment	Central	Water Management Plants	payments for groundwater withdrawal
Act No. 40/1994 coll. Ministry of Soil Management, Ministry of Environment	Central	Ministry of Soil Management	established the State Subsiding Fund of Agriculture and Food processing
Decree the Ministry of Environment No.176/1992 coll. Ministry of Environment	central	Ministry of Environment, State Environmental Fund	terms and conditions of providing and using the Fund
Act No. 238/1993 coll. Water Law Ministry of Environment, Ministry of Soil Management, Public libraries	central	Ministry of Soil Management, Ministry of Environment	
Act No. 135/1974 coll. amended by Act No. 238/1993 coll. Ministry of Soil Management, Ministry of Environment, Public libraries	central	Ministry of Soil Management	Administration in water management
Act No. 31/1975 coll. Ministry of Environment, Ministry of Soil Management	central	Ministry of Soil Management	penalties for violating obligations

2.2. Assessment of Main Deficiencies and Needs for Improvement

The acts and decree have to support the activities in financing the environmental water management projects. The basic act regulates the price of drinking, drained and wastewater, but cannot to create the possibility for accumulation sources for investment. It is prepared the actualization of basic acts concerning to price, fees and penalties in water management.

Surface water price has been regulated hitherto by the financial notice of the Ministry of Finance Slovak Republic as a maxim, amounting to 1,90 Sk.m^3. If the principle, that costs for administration of watercourses are covered by payments for surface water withdrawal and for utilization of waterpower for production of electric energy, should be valid in the future, adequate price mechanisms have to be developed. It is necessary to make possible the price development for surface water in the form of material regulation.

The draft of the system of transformation to material regulation of drinking water and drained water: Maximum prices assessed for households do not cover operation costs even at high prices for other consumers. The enterprises water and sewage works are becoming unprofitable. New price legislation is in force since April1, 1996. The regulation of prices on natural monopolies creates its part. The draft of the system of transition to material regulation of drinking and drained water prices is based on successive convergence of prices of drinking and drained water for households, and for other consumers by the year 2005, when balance of their price levels should take place.

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

Implementation of the strategy of national environmental policy is in ten principles:

1. Precedence of preventive over corrective measures,
2. Implementation of national environmental policy in all areas of the economy and in the service sector especially,
3. An understanding of the resolution of the environmental problems as the resolution of economic problems of the society,
4. An awareness that our generation bears a responsibility to future generations for the environment,
5. Resolution of complex environmental problems through systematic elimination of the synergetic effects of existing and newly-produced pollutants and other negative phenomena,
6. Payment of expenses connected with polluters eliminating environmental damage for which they are responsible,
7. Assessment of the effect and impact of disruption of nature on public health, the land and other aspects of the environmental situation, including the threat to living organisms and to our priceless, irreplaceable natural and cultural heritage, the threat of exhausting non-renewable resources and possibilities for more rational use of renewable resources,
8. An understanding of environmental conservation as a basic condition for halting the unfavorable trends in the state of public health,
9. A new approach to forests as the primary eco-stabilizing factor in the countryside and to soil as a component of the environment vitally biodiversity, nutrition and the existence of life,
10. Respect for life in all its form and for all natural and cultural values.

The medium term objectives (National Environmental Policy) are proposed to achieve at 2010. The main objectives in protection and rational use of water are:

- 50 % reduction in the amount of pollutants in discharged wastewater,
- halting the growth of the gap between the volume of water extracted and discharged, and where the extraction of surface water can be substituted for groundwater,
- reduction of agricultural use of underground water to 3-5 % with exception for the food and pharmaceutical industry, watering of livestock and poultry and use of geothermal waters,
- boosting the proportion of total wastewater purified with high-efficiency methods (biological, chemical) and of small wastewater treatment plants by 20 %,
- 30 % decrease in consumption of drinking water, to be achieved by measuring consumption (for example, installing water meters), eliminating at least half of the leakage in the water distribution system (to 10-15 % of total volume), and more conservative consumer practices,
- assigning priority to the completion of wastewater treatment plants under construction and the construction of treatment plants near sources of enormous water pollution impossible to eliminate (for example in the municipal sphere),
- 60 % increase in the volume of wastewater purified,
- resolving the deficit of drinking water in 16 districts with the priority for Košice-county, Veľký Krtíš, Lučenec, Rimavská Sobota, Prievidza, Spišská Nová Ves and Rožňava,

- promotion of both the natural and artificial retention of water within the Slovak territory and general slowing of water run-off, particularly from the catchment area of water deficit regions (by means of re-forestation, landscaping, dams, pools and by other such measures),
- a one-third reduction in the contamination of class IV and V purity water,
- creation of condition for the revitalization of dead rivers and lakes in sites where the sources of contamination have been eliminated,
- substantial reduction in the accident count by means of more accurate inspection of potential cases, any by other preventive measures,
- increasing to 60 % the percentage of the population living in residences connected to sewage lines,
- identification and elimination of the causes of deterioration in groundwater quality, using monitoring systems at the most important sources to follow changes in water guilty,
- more effective co-ordination of ground- and surface water sources in more extensive water supply systems, especially where conditions for that are the best (the Eastern Slovakia, Rožňavská, Spišsko-Popradská, Central Slovakia and Northern Slovakia water supply systems).

Short-term objectives are precondition for achievement of long-term and medium-term objectives. They are as follows:

- 25 % reduction in the amount of pollutants in discharged wastewater, especially in districts experiencing water shortages and in the areas of greatest pollution,
- reducing utilization of groundwater for agricultural purposes to 5-10 % of the current level in areas where surface water can be substituted for groundwater and with exceptions for food and pharmaceutical production and use of geothermal energy,
- introduction of measures promoting the retention of water of Slovak territory, particularly in the Velký Krtíš, Lučenec and Rimavská Sobota districts, as well as the overall elimination of the water shortage in this region of southern Slovakia, with such measures as reforestation, landscaping, and retaining walls,
- introduction of measures for measuring and reducing water consumption, reducing of leakage in the water distribution system of the average accident count and of the pollution of class IV. and V. purity water by 10 %,
- preparation and implementation of the new water law and of regulations provided for its execution, particularly government decrees, with which be regulated water pollution indicators.

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

4.1. Relevant Public Funding Sources and Instruments in Use

There are several funding sources only on national level, based on the subvention from State Budget SR. Corresponding sources are described in the following item.

4.2. Standardized Funding Mechanisms for Investments in Water Pollution Control

The Funding Mechanisms for investments in water management are based on the subvention from State Budget SR.

The State Environmental Fund SR has been established by the Act No. 128/1991, Coll. of Acts. The purpose of the fund is to concentrate financial sources and spend them for the environment. The economic mission of the Fund is to mobilize the capital of individual investors to solve ecological problems and create more favorable conditions on the investment market for ecological investment, and thus to spend up and facilitate their implementation.

The Fund sources in the quality protection and water quantity area and their rational using are especially:

- charges for wastewater discharges to surface waters
- penalties imposed by the state administration bodies in the water management
- contribution from the State Budget SR.

Table 4.1. Table State Environmental Fund - sources and utilization

State at 1.1.1997	56.799.000 Sk	1.646.34 US$
Incomes – charges and fees		
charges for wastewater	194.920.000 Sk	5.649.55 US$
interest	8.984.000 Sk	260.405 US$
penalties, fees	589.166.000 Sk	17.077.275 US$
repayments from the subventions after the final calculation	482.000 Sk	14.000 US$
charges for the ground water consumption	4.608.000 Sk	133.000 US$
-penalties for delayed payments	345.000 Sk	10.000 US$
Contribution from the State Budget	239.500.000 Sk	6.942.000 US$
Allocated sources	1.094.820.000 Sk	31.734.000 US $
Expenses	999.192.000 Sk	2.962.000 US$
non-investment	54.119.000 Sk	1.568.000 US$
investment	945.073.000 Sk	27.394.000 US$

(Source: Správa o hospodárení s prostriedkami Štátneho fondu životného prostredia SR za rok 1997; 1 US$ = 34,5 Sk)

The State Water Management Fund SR has been established by the Act No. 318/1991 Coll. of Acts. The Government SR by its provision No. 589 of October 22, 1991 accepted the statute of the State Water Management Fund. The Fund is used to cover concrete developmental water management constructions, hydro-geological research, removal of accidents in water structures, development of sciences and technologies. The Fund provides non-investment subsidies for settling activities of water management enterprises, which are not covered from other sources and have public-benefit nature.

The State Water Management Fund sources are as follows:

- charges for the ground water consumption
- subsidies from the State Budget SR
- loans from the financial institutions
- interests from the Fund sources
- gifts and contributions by legal and physical entities.

State Subsiding Fund of Agriculture and Food Processing SR established by the Act of the Slovak Parliament No.40/1994 Dig. to enhance renewal and development of technical and technological conditions of entrepreneurs within the branch of agriculture, thus ensuring the task of population subsistence, development of enterprising activities in forest and water management in accordance with the conceptual plans. The establishment Act regulates the task of the Fund. Ministry of Soil Science SR issued the instruction on granting means from the Fund. According to methodological directive this may be realized by means of loans, pledged interest, settlement of a part of interests, or by combining warrants and loans, and warrants and settlement of a part of interests and a part of credits.

State Fund of Conservation and Reclamation of Agricultural Land. Fund SR was established by Act No. 307/1992 on protection of agricultural land fund. The Statute of the Fund was approved by the Decree of the Slovak Government No.76/1993 Dig., modifying the conditions and mode of granting means from this Fund. In accordance with this regulation the directive of Ministry of Soil Since No. 35/1997 has been issued, declaring the purpose and mode of granting means from this Fund.

The means of this fund may be used for new construction, completion of structures, reconstruction, and updating of hydromelioration facilities, operation, maintenance and repair of major reclamation facilities owned by the state, maintaining the water regime.

State Budget participation.

1996

Amount of 495,0 mil. Sk (14.350.000 US$) from the State Budget Slovak Republic was allocated for section of watercourses and amount 452,0 mil. Sk (13.101.449 US$) for the section of water-supply networks and sewage systems. From total amount 452,0 mil. Sk Government allocated 250,0 mil. Sk (7.246.638US$) for the construction of the project "Water supply and drinking water networks in municipalities located within the protected area of the Nuclear Power Plant Mochovce", which will provide drinking water for the population in this area. The remaining sum of 202,0 mil. Sk was allocated as follows:

Water and Sewage Works, state enterprise (s.e.) Bratislava (WSW)	7,0 mil. Sk	(202.900 US$)
West-Slovakia Water and Sewage Works, s.e. Bratislava	56,0 mil. Sk	(1.623.190 US$)
North-Slovakia Water and Sewage Works, s.e. Žilina	30,0 mil. Sk	(869.570 US$)
Central-Slovakia Water and Sewage Works, s.e. Banská Bystrica	34,0 mil. Sk	(985.510 US$)
East-Slovakia Water and Sewage Works, s.e. Košice	75,0 mil. Sk	(2.173.910 US$)

On the basis of the proposal of the Board of the State Water Management Fund and by the decision of the Ministry of Soil Science the subsidy amounting to 138,6 mil. Sk was distributed in 1996 as follows:

for settlement of costs required for general public activity 133,6 mil. Sk (3.872.464 US$) to two enterprises of river basis:

Danube River Basin Authority, s.e. Bratislava	15,6 mil. Sk	(45.217 US$)
Hron River Basin Authority, s.e. Banská Bystrica	118,0 mil. Sk	(3.420.289 US$)

for settlement of higher cost required for drinking water production due to deteriorated natural conditions:

East-Slovakia Water and Sewage Works, s.e. Košice	5,0 mil. Sk	(144.928US$)

1997

The State Budget for 1997 provided a capital transfer to systematic and individual subsidies amounting to 773,0 mil. Sk, of which 393,0 mil. Sk for watercourses and 380,0 mil. Sk for sanitary engineering structures. Within the scope of these subsidies the individual subsidy amounted to 330,0 mil. Sk. (Drinking water reservoir Turček, 1. and 2. stage and Water engineering Work Selice), the amount of 200,0 mil. Sk was allocated for the construction of "Water supply and water networks for municipalities located within the protected zone of the Nuclear Power Plant Mochovce", and 3,0 mil. Sk for the task of economic mobilization.

The remaining means of the State Budget amounting to 240,0 mil. Sk were granted as systematic subsidies for activities of public benefit within the sphere of actin of river basin authorities and Vodohospodárska výstavba, s.e. (Water engineering construction company) (60,0 mil. Sk) and Water and Sewage Works (180,0 mil. Sk).

The addition to investment subsidies 200,0 mil. Sk are allocated as ordinary transfer into the State Water Management Fund for financing of expenses required for public-benefit activities of enterprises – River Basin Authorities.

1998

For 1998 the State Budget considers capital investment for entrepreneur subjects of water management amounting to 813,6 mil. Sk (Slovak Water management Enterprise, s.e. Banská Štiavnica, Water and Sewage Works and Water, and Water Engineering Construction, s.e. Bratislava).

Systematic subsidies	523,0 mil. Sk	15.159.420 US$
Water and Sewage Works	450,0 mil. Sk	13.043.478 US$
for the construction of the project		
"Water Supply and Water Mains in municipalities within protected Zone of the Nuclear Power Plant Mochovce"	250,0 mil. Sk	7.246.377 US$
River Basin Authorities and Water Engineering Construction, s.e.	70,0 mil. Sk	2.028.986 US$
The task of economic mobilization	3,0 mil. Sk	86.957 US$

Table 4.2. Review of subsidies from national budget (mil. Sk)

		1995	1996	1997	1998
Investment subsidies total		741	947,0	773	813,6
of which	individual	464	435,5	330	290,6
	Systematic	277	511,5	443	523,0
Non-investment subsidies		167	138,6*	200*	200*
Subsidies total		908	1 085,6	973	1 013,6
State bonds		57	0	0	0
Means for WM allocated from the State Budget		965	1085,6	973	1 013,6

** solved by means of transfer through the State Water management Fund SR.*

The standardized funding mechanisms are a combination of source investors with the commercial loans and loans and grants from before clarified funds.

4.2.1 Typical Sources of Investment Money for Municipal Wastewater Treatment Plants

Typical sources of investment are co-financing:

- the sources of municipality (budget the municipality),
- grants from the State Environmental Fund,
- commercial loans.

The sources in State Environmental Fund are limited, very problematic is to obtain the loans from the commercial banks. Special loan programme for water management project does not exist now.

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

Typical sources of investment are co-financing:

- the sources of industrial companies, water treatment plants,
- grants from the State Environmental Fund
- commercial loans.

Grants can be obtained from the State Environmental Fund and State Water Management Fund.

For implementing development goals, included in the Conception of Water Management Policy Slovak Republic by 2005, allocation of means amounting to 4 billions Sk is required. Participation of the state, vital for financing water-engineering structures, was reduced in the last years to 1 bill. annually. This amount covers 25 % of the annual aggregate invested capital in water management. Major parts of investments are financed by water management enterprises from their capital and reserves and remaining investments are financed by combined resources. Participation of state funds in financing investment construction has been negligible hitherto, and did not cover in the last years even a half percentage of the volume of investments in water management. Construction of the System of River Power Gabčíkovo and Žilina has been financed by means foreign credit guaranteed by state.

4.2.3. Patterns and Procedures for Municipal and Industrial Wastewater Treatment

Municipal and Industrial Wastewater Treatment can be financed by subvention from

- State Environmental Fund,
- State Water Management Fund,
- and by State Budget participation too.

4.2.4. Agricultural Pollution of Ground Water and Surface Water

Agricultural sector can use above mentioned sources for financing projects and also by State Subsiding Fund of Agriculture and Food Processing and State Fund of Conservation and Reclamation of Agricultural Land.

4.3. Private Financing Models in Use

They are in use in industrial sector. The industrial private companies use for financing the combination of owner sources, commercial loans and particularly the grants from the state funds.

The leasing model is acceptable for financing technology in water treatment plants. The condition for leasing:

- the guarantee of investor is necessity
- healthy economic and financial situation
- the period of repayment should be lower than the period of depreciation

The transformation of the state enterprises was approved by Decree of the Slovak Government No. 621/1995 and by the Decree of the National Parliament No. 192/1995. The transformation process is based on the Act No. 92/1991 Dig. on conditions of the transfer of state property to other persons in the wording of later regulations, as well as approved principles, according to which the property transfer concerns infrastructure, i.e. water and sewage works, occurring on territories of respective municipalities. The state will transfer this property free of charge, according to the decision on privatization of a part of the enterprise and on the basis of a privatization project into municipal ownership.

4.4. Actual Water and Wastewater Tariffs

4.4.1. Actual Tariff Policies and Systems

The price for drinking water and drained water are determined by the Ministry of Finance SR. The determined maximum drinking water price for households is lower than the actual average total cost per m^3. Similarly the determined maximum price is lower than the average total own costs per m^3. Costs for drinking water increased to 9,27 Sk/ m^3 and for drained water to 5,78 Sk/ m^3 in 1997. For other consumers of drinking, process and drained water contract prices are in force.

On the level of respective state enterprises water and sewage works cross subsidization occurs from two points of view. Because the maximum prices of drinking and drained water for households are determined in such a way, that they do not cover even the level of total own costs, a continuous growing of contract prices for other consumers takes place. Deliveries for households and for other consumers are approximately in the ratio 60 : 40, however the ratio in revenues is opposite.

4.4.2. Level and Structure of Tariffs

Range of rates per cubic meter drinking water are from 6,- Sk to 15,- Sk

They are only differentiation between domestic 6,- Skm^{-3} fixed fees and for industrial use they are the contract.

Table 4.3. Revenues in Water management sector

Parameter	Unit	1993	1995	1996	1997
REVENUES total	mil.Sk	5 932	7 2123	9158	9442
surface water delivery	$mil.m^3$	849	777	794	735
surface water - earnings	mil.Sk	874	886	915	939
invoiced drinking water	$mil.m^3$	410	345	332	324
invoiced drinking water earnings	mil.Sk	1 916	2 207	2 352	2 674
drained water	$mil.m^3$	403	343	331	316
drained water earnings	mil.Sk	1 561	1 788	2 006	2 092

4.4.3. Level and Structure of Cost

The development of total output costs, drinking water deliveries, and drained waters and of average total output costs per $1m^3$ in enterprise water and sewage works is presented in following figures.

Table 4.4. Drained water

	1994	1995	1996
Total costs (mil.Sk)	1 516	1 57	1 722
Volume of drained water (thousand m^3)	372 03	343 547	330 521
Average total costs ($Sk.m^{-3}$)	4,07	4,62	5,21
Average price ($Sk.m^{-3}$)	4,53	5,21	6,07

Table 4.5. Drinking water

	1994	1995	1996
Total costs (mil.Sk)	2 246	2 412	2 630
Drinking water delivery (thousand m^3)	377 361	345 100	331 900
Average total costs ($Sk.m^{-3}$)	5,95	6,86	7,77
Average price ($Sk.m^{-3}$)	5,72	6,40	7,09

4.4.4. Level of Actual Cost Coverage

Actual prices do not cover the cost for drinking and drained water.

Table 4.6. Drinking water

	1993	1994	1995	1996	1997
	included VAT	included VAT	included VAT	included VAT	included VAT
average total cost	5,22 Sk/ m^3	5,95 Sk/ m^3	6,79 Sk/ m^3	7,77 Sk/ m^3	9,52 Sk/ m^3
Price for households	4,00 Sk/ m^3	4,00 Sk/ m^3	4,00 Sk/ m^3	5,00 Sk/ m^3	6,00 Sk/ m^3
Price for other consumers	8,48 Sk/ m^3	9,68 Sk/ m^3	10,76 Sk/ m^3	12,16 Sk/ m^3	14,81 Sk/ m^3

Table 4.7. Drained water

	1993	1994	1995	1996	1997
	included VAT	included VAT	included VAT	included VAT	included VAT
average total cost	3,45 Sk/ m^3	4,07 Sk/ m^3	4,61 Sk/ m^3	5,21 Sk/ m^3	5,78 Sk/ m^3
Price for households	3,00 Sk/ m^3	3,00 Sk/ m^3	2,98 Sk/ m^3	3,01 Sk/ m^3	4,00 Sk/ m^3
Price for other consumers	5,30 Sk/ m^3	6,58 Sk/ m^3	7,90 Sk/ m^3	9,68 Sk/ m^3	11,08 Sk/ m^3

(Report on Water Management in the Slovak Republic 1997)

4.5. Actual System and Practice of Pollution Charges/Penalties

Charges for discharging of wastewater to surface water depend on the kind and quantity of the wastewater pollution and pollution level of the water stream to which the wastewater is discharged. The charge is not paid for wastewater discharges if the quantity of the pollution discharged does not exceed values given in the relevant legal regulation. The charges are incomes of the State Environmental Fund.

The payers of charges are companies, which discharge the wastewater to surface waters and is composed of two parts:

- basic charge
- additional charge.

The basic charge is calculated according to costs for a concrete or generally applicable method of wastewater treatment, for discharging of which duty to pay the charge is applied. The amount of additional charge depends on the level of the impaired water quality in the water stream caused by wastewater.

The payment of charges does not release the organization from responsibility for damages caused by discharging pursuant to general obligatory rules.

The penalties are imposed by water management bodies according to facts determined in the Decree of the Government No.31/1975 Coll. of Acts for breaching of duties defined for the water management sector. It especially concerns:

- water consumption without a permit issued by the water management bodies,
- discharge of waters without a permit issued by the water management body or contrary to it,
- pollution of surface or ground waters or endangering of their quality or health unexceptionable through the manipulation with substances detrimental to waters,
- damage to public water pipelines or public sewerage,
- breaching of other duties determined by the above acts or duties imposed by them.

The maximum amount of the penalty is 1 million Sk.

4.5.1. Charges for Water Abstraction (Municipal, Industrial, Irrigation)

Presently valid economical tools in the field of use and protection of water are based on the institute of compensations. (Departing from the Law No. 138/1973 Coll. on Waters and the Governmental Decree No. 35/1979 Coll. on Compensations in the Water Management in wording of the Decree of the Government No. 2/1989 Coll. and its amendments).

Moreover, they are also based on the Decree of the Government of the Slovak Republic No. 235/1996 Coll., which amends the Decree of the Government of the ČSSR No. 35/1979 Coll. on Compensations in the Water Management, with enforcement from the 1st of August, 1996 - fees for withdrawals of ground water for public water supply.

Lack of compensations, as an economical tool is, in the fact, that they do not contain the fee, which expresses the value of natural riches of water. Also the costs, related to providing the sources of surface water (internalization of externalities), are not fully calculated into the value of the water, expressed by its price.

The price of surface water withdrawal is established by the Assessment of the Ministry of Finance of Slovak Republic N. R-1/1996 from 12.3.1996 as a maximum price 1,90 SK/m^3.

Compensation for withdrawal of the water from water streams is set as a price for the water, equally determined for all basins in the area of Slovakia. The payers of the compensation are the subjects, which withdraw the water from water streams in the amount over 15000 m^3 per year, or 1250 m^3 per month.

Compensation for groundwater withdrawal is equally established for the whole area of Slovakia. The payers are the subjects, which withdraw the water from groundwater sources in the quantity over 15000 m^3 per year or 1250 m^3 per month

The Law of the Slovak National Council No. 58/1995 Coll. on the state budget for 1995 realized the amendments in the Law No. 128/1991 Coll. on the State Environmental Fund of the Slovak Republic and in the Law No. 318/1991 Coll. on the State Water Management Fund of the Slovak Republic in the sense, that the compensations for withdrawal of ground water are the sources of the State Water Management Fund of the Slovak Republic. The Decree of the Government No. 235/1996 Coll. enacted the collection of the fees for withdrawal of ground water also for public water supply. State water and sewerage companies pay 1,- SK for withdrawals of ground water per m^3 since August 1st, 1996, what creates the incomes of State Water Management Fund of the Slovak Republic.

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

The fixed price for domestic is 4,00 Sk/m^3 approved by Decision of Ministry of Finance R-7/1997.

For the industrial using are contract prices in average 9,13 Sk/m^3.

4.5.3. Other Relevant Charges/Penalties

Penalties for non-legal utilization of surface water are 1,- Sk/m^3

Penalties for non-legal utilization underground water are 7,- Sk/m^3.

Table 4.8. Penalties for non-legal wastewater discharge

	Penalty per m^3	Min. penalty
I. category	5,- Sk/m^{-3}	15 000 Sk
II. category	3,- Sk/m^{-3}	10 000 Sk
III. category	2,- Sk/m^{-3}	5 000 Sk
IV. category	0,20 Sk	10 000 Sk

4.5.4. Assessment of Efficiency of Actual Practice

The existing system of tariffs, charges and fees does not cover the cost. There is no opportunity to create sources for investment in water management.

The basis for the calculation of price and tariffs should be changed.

4.6. Economic and Financial Incentives for Pollution Reduction Measures

There are no incentives (tax reduction, exemptions) for environmental investments. We propose

- up-grading the fees and penalties system to economic situation in Slovakia
- more differentiation among the region in fees and charges system

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

Banking system in Slovakia is dual. The National Bank of Slovakia, schedule bank, is responsible for the currency development.

The commercial banks are providing the bank activities to the entrepreneurs and customers. The commercial bank can be with the full bank license or specialized bank institutions.

Special parts of bank system are specialized state financial institutions, they provide some bank activities on behalf of state and they are owned by state

Monetary Survey	**1997**	**June 30,1998**
Domestic credits total (bill.Sk)	468,7	483,3
of which		
Net credit to government	101,7	103,8
Credits to enterprise and population	334,6	342,2
- of which enterprises	314,2	320,0
Credits in foreign currency	35,4	36,8

Credit market - Commercial Loans in SK available

- Interest Rates between 20 % and 27 % p.a.
- Maturity of the loans max. 8 –10 years (average 18 months)
- Bank guarantee in Sk is available
- Guarantee from Slovak Guarantee and Development is charged from 1% to 4% in once

Currently no shortage of liquidity.

Table 4.9. Banks in Slovakia – Top 10

Banks and branches of foreign banks	Shareholders fund 12/31/1996 (000 Sk)	Shareholders fund 06/30/1997 (000 Sk)	Shareholders equity 06/30/1997 (000 Sk)	Capital adequacy 12/31/1996	Capital adequacy 06/30/1996
Všeobecná úverová banka	10 097 357	10 113 801	4 078 108	7,3	5,1
Slovenská sporiteľňa	6 527 898	6 937 580	2 074 207	8,3	6,5
Investičná a rozvojová banka	3 260 970	1 902 415	1 000 000	3,5	-
Československá obchodná banka	2 869 451	2 741 922	Branches of foreign banks don't disclose shareholders equity. Long- term payables to the bank's headquarters, which are included in the shareholders funds, are of a similar function.		
Poľnobanka	2 259 153	2 396 723	1 850 673	9,2	10,4
Istrobanka	1 285 046	1230 422	1 000 000	8,8	9,1
Tatra banka	1 268 912	-	502 160	12,4	-
Priemyselná banka	1 081 894	1 135 037	1 131 140	12,4	12,5
Poštová banka	996 403	1 010 986	909 000	8,0	9,8
Banka Slovakia	799 099	800 621	756 874	51,4	33,2
Prvá komunálna banka	742 657	1 094 341	1 002 000	8,3	11,6
Specialized state financial institution					
Konsolidačná banka	-4 83 934	-7 969 382	2 356 939	-	-
Slovenská záručná a rozvojová banka	1 864 749	2 049 264	600 000	23,6	23,2

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

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

The owner structure in water management is a specific structure. The plants are in ownership of the state at present. The better condition for development and investment will be after the transformation process. Transformation process is based on the Act No. 92/1991 Dig. on conditions of the transfer of state property to other persons in the wording of later regulations, as well as approved principles, according to which the property transfer concerns infrastructure, i.e. water and sewage works, occurring on territories of respective municipalities. The state will transfer this property free of charge, according to the decision on privatization of a part of enterprise and on the basis of a privatization project into municipal ownership.

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

Financing of the completion of the river power plant Gabčíkovo and of the construction of the river project Žilina has been provided by international financing. Effective budget amounting to 200,0 mil. USD have been provided through fiduciary bank credit (modified bond emission on the public Eurodollar market), over which the Slovak Government approved the state guarantee.

5.2.1. Completed and Ongoing Projects

Biological Wastewater Treatment – Bernolákovo

Ongoing project in 1997 year, co-operation with the Denmark, approved participation 4.057.850 DKK, participation the municipality Bernolákovo 30.000.000 SKK/869.565 US$

Implementation of ekotoxilogical and biological methods in monitoring of quality surface waters in Slovakia.

Ongoing project in 1997, co-operation with the Netherlands, planed participation 16.000 NLG, Slovak participation 200.000 SKK/5.798 US$

5.2.2. Planned Projects

Wastewater Treatment Plant Gajary, Zohor, Malacky

Construction Wastewater Treatment Plant and sewerage of municipalities Gajary, Zohor Malacky (West Slovakia) financed by Programme PHARE. Total amount of 1.376.000 ECU.

Reduction of wastewater

Technical Project planned in cooperation with the Denmark, proposed amount 5.000.000 DKK. Project is under preparation.

5.3. Centralized National Institution/Development or Promotion Bank for Handling International Funds

Typical specialized development institution, or bank does not exit in Slovakia at the present. The Slovak Guarantee and Development Bank (SGDB) is considered to be one of these institutions. Slovak Guarantee and Development Bank provides bank guarantees for the loans to entrepreneurial entities, that do not dispose with a suitable security means in a needed range and which are provided by the financial institutions. Slovak Guarantee and Development Bank supports by bank guarantees and contribution programmes start-up and development the enterprises.

In 1997 the bank enlarged the activities to provide the loans scheme in co-operation with the commercial banks. The programme is oriented to support activities of entrepreneurs in Slovakia with the lower interest rate than commercial loans. Bank concerns to develop their activities such a development bank in Slovakia too.

At present there is not specialized institution for handling international funds. The commercial banks with owner activities are handling on their owner business.

The Environmental Revolving Fund

In 1995-1996 has been prepared the study concerning to establishment of the Slovak Environmental Fund.

Conclusions and recommendations:

- Revolving Fund shall fill the need of soft-loan financing for environmental investments with longer loan duration's and lower interest rate than the commercial credit market offers,
- The National Environmental Action Plan (1996) indicates an environmental investment need of 106 bill Sk. (i.e. about 2,9 bill. ECU),
- One main target group of the Revolving Fund should be wastewater sewage systems and treatment plants,
- The main funding should be focused on environmental projects with considerable longer economic and/or technical amortization duration than the loan duration offered by the commercial credit market (i.e. currently maximum 7 years)
- The basic budget donation for a Revolving Fund must be fixed for a period at least 3 – 5 years in advance
- The minimum life-time of the Revolving Fund must be secured for at least 15 years to enable the effect of the "revolving-aspect" to the budget donation,
- A project – pipeline of environmental investments including a minimum of standardized project documentation shall be organized,
- The offered support of commercial banks both for loan management and for investor's bank guarantees should be used.

Assessment of Main Weaknesses, Problems, Delay in Project Implementation

Lack of financial sources in domestic banks

There are not enough financial sources with acceptable price (interest rate) for financing long term projects in water management.

Regulation of surface water price

Surface water price has been regulated hitherto by the financial notice of the Ministry of Finance SR No. R-1/1996 as a maximum, amounting to 1,90 Sk/m^3 (including added value).

If the costs for administration of watercourses are covered by payments for surface water withdrawal and for utilization of waterpower for production of electric energy, adequate price mechanisms have to be developed.

Regulation the price of drinking water and drained water

Maximum price assessed for households does not cover operation costs even at high price for other consumers. The enterprise water and sewage works are becoming unprofitable.

Based on the analysis of necessary financial means for water management development according to the approved conception the annual sum amounts to 3 – 4 bill. Sk. State Budget resources are low, and limited are also the resources of the State Water Management Fund. State enterprises water and sewage works have no possibility to create resources for development fund at present price as well as the resources for repayment the loans obtained in the future.

Transformation of the state water and sewage enterprises

The state water and sewage enterprises are facing transformation. In this time there is not interest to invest, or the financial institutions are not available to finance investment projects before transformation.

6. Actual and Planned Public and Private Investment Portfolio for Water Quality and Water Management Programmes and Projects

6.1. Compilation of Actual and Planned Investment Portfolio

Actual and ongoing projects planed for 1999 and future.

Municipal sewage collection /treatment/ discharging,

Projects:

- Košice – expansion of wastewater treatment plant 2nd stage
- Nitra – wastewater treatment plant
- Banská Bystrica – expansion of wastewater treatment plant
- Upgrading of wastewater treatment plant Michalovce
- Svidnik – sewer network and wastewater treatment plant
- Expansion of wastewater treatment plant Humenné
- Topoľčany – wastewater treatment plant upgrading
- Liptovský Mikuláš – reconstruction of wastewater treatment plant
- Ilava –reconstruction and expansion of the wastewater treatment plant
- Rožňava – expansion of wastewater treatment plant
- Banská Štiavnica – wastewater treatment plant and collection
- Krompachy – sewer network and wastewater treatment plant
- Zvolen – expansion wastewater testament plant
- Lučenec – expansion wastewater treatment plant
- Turzovka – upgrading and expansion wastewater treatment plant
- Kysucké Nové Mesto upgrading and expansion wastewater treatment plant
- Čadca - upgrading and expansion wastewater treatment plant
- Fiľakovo - upgrading and expansion wastewater treatment plant
- Nové Zámky - upgrading and expansion wastewater treatment plant

The project target is construction, expansion and upgrading of existing wastewater treatment plants to cover the increased municipal industrial wastewater production and required effluent standards. All this projects are ongoing.

Total capital requirements	**4.778.670.000 SKK**	**(138.512.174 US$)**
from which are non-secured	1.685.480.000 SKK	(48.854.493 US$)

Industrial sewage treatment/pretreatment

Planned projects (1999 -)

Chemko, a.s. Strážske – Improvement the efficiency of chemical wastewater treatment and the reduction of energy consumption of aeration system

Total capital requirements 15.050.000 SKK (436.232 US$)

Assi Domän Packaging, a.s. Štúrovo – Upgrading and reconstruction the existing mechanical-biological wastewater treatment plant and to improve the total efficiency of the total amount of the produced wastewater. The aim is also to reduce the process wastewater discharged to combine and separate sewer systems. Project will solve the reconstruction of combined sewer and convey the wastewater to the existing treatment plant.

Total capital requirement 317.700.000 SKK (9.208.696 US$)

Total capital requirements 332.750.000 SKK (9.644.928 US$)

Emerging projects

Reconstruction of wastewater treatment plant in Bukocel, a.s. – The project implements the new system of suspended solids separation in wastewater and the thickening, conditioning of primary sludge for combustion.

Total capital requirements 200.000.000 SKK (5.790.000 US$)

Chemko Strážske – Project 2000 – reduction of mass and energy consumption in the production process of cyclohexanon and the reduction of ecology loading.

Investment costs 2.415.000.000 SKK (70.000.000 US$)

Construction of wastewater treatment plant with reconstruction and expansion of sewer network Bučina, a.s. Zvolen – reduction of mass loading of pollution discharged to the Hron River, Slatina and Zolná creek and simultaneously to decrease the contamination of groundwater, surface waters and soil.

Investment costs 94.000.000 SKK (2.724.638 US$)

Centralize the collection and treatment of wastewater polluted by chrome, Koželužne Bošany. To ensure the collection and treatment of wastewater contaminated by Cr^{3+} with the subsequent recuperation and recycle.

Investment costs 80.702.000 SKK (2.339.188 US$)

Biological wastewater treatment, Harmanecké papierne,a.s. Harmanec – Project solves the problem of biological wastewater treatment and the treatment of sewage with alternative treatment of municipal wastewater discharged from the settlement of Harmanec and state enterprise VKÚ. The main goal is to reduce the pollution in terms of BOD, less 105 t/úyear, COD less 300 t/year and SS 30 t/year and to reach the effluent standards set by Slovak and also EU Decree.

Investment costs 80.000.000 SKK (2.318.840 US$)

Sludge disposal upgrading in wastewater treatment plant, VSŽ Oceľ Košice. To improve the way of sludge disposal to reach the requirement of Slovak legislative with the respect of groundwater pollution control.

Investment costs 115.264.000 SKK (3.340.986 US$)

Total capital requirements 2.984.966.000 SKK (86.513.652 US$)

Industrial sewage treatment
Total capital requirements 3.317.716.000 SKK (96.158.580 US$)

Projects of landfills and dumps

Emerging concepts

Reduction of contamination of groundwater and revitalization of landfill in Krompachy – to eliminate the groundwater contamination by landfill in Krompachy and to revitalization the existing industrial and municipal landfill.

Final landfill Chalmová – VI.construction. To ensure the sufficient capacity of landfill site for residual ash produced by thermal power plant – Elektrárne Nováky, and to control the groundwater and soil contamination by leachate water.

Estimated investment costs 335.160.000 SKK (9.714.782 US$)

Reconstruction of wet waste tip – VSŽ Oceľ, s.r.o. Košice The reconstruction of slag-ash mixture lagoon to reach the requirements of Slovak legislation with the aim of groundwater protection.

Estimated investment costs 212.550.000 SKK (6.160.870 US$)

Reconstruction of industrial landfill – Bukocel, a.s. . The aim of project is the reconstruction of industrial landfill situated close to the watercourse of Ondava River. At present the landfill is only separated from the river by soil dam. The existing dam is necessary to reconstruct.

Estimated investment costs 50.000.000 SKK (1.449.275 US$)

Disposal of wastes from the PCB production – Chemko, a.s. Strážske . The aim of project is the disposal of wastes containing PCB which were accumulated during the PCB production in special storehouses.

Estimated investment costs
250.000.0000 – 400.000.000 SKK (7.246.377 – 11.594.203 US$)

Total capital requirements 997.710.000 SKK (28.919.130 US$)

Table 6.1. Proposed programmes and projects (as actualized in January 1999)

	Total cost	
	(NC) SKK	(US$) US$
Municipal sector	4.778.670.000 SKK	138.512.174 US$
Industrial sector	3.317.716.000 SKK	96.158.580 US$
Landfills	997.710.000 SKK	28.919.130 US$
Total investment cost	9.094.096.000 SKK	263.589.884 US$

Annexes

Annex 1.

Project Files as Requested for the Revision of the National Action Plan and the Elaboration of the Pollution Reduction Programme

Programmes and projects - municipal sewage collection/treatment/discharging

No	Type/Name of Project or Programme	Total Capital Requirements		National Funding Sources											International Funding			Remarks
				Equity	Envir. Fund	Water Manag.	Public loans			Public grants			Comm. Bank	Others	Organ isa-	Grant	Loan	
						Fund	Centr.	Region	Local	Centr.	Region	Local	Loans		tion			
		(MNC)	(MUS$)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)		(MUS$)	(MUS$)	Non-sec.
1 M	VVaK Košice	900	26,08	230	115	45	430	80						0				260
2 M	ZVaK Bratislava-Nitra	552	16	0	0	0	0							0				0
4 M	StVaK B.Bystrica	593	17,19	75,5	0	78	438,8							0				0
5 M	VVaK Košice	114	3,03	15,1	41,5	0	50							7,4				45
6 M	VVaK Košice	439,8	12,72	110,6	164,2	0	165							0				212
7 M	ZVaK Bratislava - Trenčín	10	0,29	0	0	0	0											0
8 M	VVaK Košice	550,7	15,94	70,1	222,1	0	258,5							0				300
10 M	ZVaK Bratislava	31,3	0,91	28,3	0	0	3							0				10,3
11 M	VVaK Košice - Rožňava	91,605	2,66	21	22	0	31				80		2	0				0
12 M	SeVaK Žilina - L.Mikuláš	80	28,92	20	30	0	0							0				65,08
13 M	SeVaK Žilina	80	2,32	22	20	30	0							8				65
14 M	SeVak Žilina	40,5	1,17	10,5	30	0	0							0				17,7
15 M	VVaK Košice	92	2,66	37	22	0	31						2	0				16
16 M	StVaK B.Bystrica	339	9,82	55,8	0	92,9	190,3							0				119,5
17 M	VVaK Košice	236,4	6,85	77,6	78	0	80,8							0				83,8
18 M	StVaK B.Bystrica	300	8,69	2	25	25	248							0				298
19 M	StVaK B.Bystrica	169,4	4,91	0,5	18,9	40	110							0				0
21 M	SeVak Žilina	29,9	0,87	10,4	19,5	0	0							0				15,1
22 M	SeVaK Žilina	36,5	1,06	22,6	13,9	0	0							0				8,5
23 M	SeVaK Žilina	182,67	5,29	33,2	15	30	101,3							3				86
24 M	StVaK B.Bystrica	31,5	0,1	0	10	21,5	0							0				31,5
25 M	ZVaK N.Zámky	60	1,74	0	8	0	0							0				52
	Total	4778,67	169,22	842,2	855,1	362,4	2137,7	80	0	0	0	0	2	11	0	0	0	1685,48

Note: *MNC - millions in national currency - Slovak crowns*
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Programmes and projects - industrial sewage treatment/pre-treatment

No	Type/name of Project or Programme	Total Capital Requirements		Fun-ding period	National Funding Sources											International Funding			Re-marks
					Equity	Envir. Fund	Water Mang. Fund	Public loans			Public grants			Com. Bank Loans	Others	Orga-nisa-tion	Grant	Loan	Non -sec.
								Centr.	Region	Local	Centr.	Region	Local						
		(MNC)	(MUS$)		(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)		(MUS$)	(MUS$)	(MNC)
2 I	Bukocel, a.s.	200	5,79		0	0						0							200
6aI	Chemko, a.s.	2415	70		483	1250						750							1932
6b I	Chemko, a.s.	16	0,464		8	8						0							8
6c I	Chemko, a.s.	15.05	0,436		7,5	7,5						0							15
7 I	Assi Domän Packing	317	9,19	1998–2005	0	0						0							0
8 I	Bučina, a.s.	94	2,72		0	0						0							0
9 I	Biotika, a.s.	50	14,5		10	15						0						0,74	50
10 I	Koželužne	90,8	2,63		41,3	49,5						750							25,8
11 I	Harman. Papierne	80	2,32		0	0						0							80
12 I	VSŽ Oceľ	115	3,34		0	0						0							115
	Total	977,8	111,3970	-	549,8	1330						1500						0,74	2 425,8

Note: *MNC - millions in national currency - Slovak crowns*
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Programmes and projects - for landfills

No	Type/name of Project or Programme	Total Capital Requirements		National Funding Sources										International Funding			Re-marks
				Equity	Envir. Fund	Water Mang. Fund	Public loans			Public grants			Comm. Bank Loans	Others	Or-gani-sati-	Grant	Loan	
							Centr	Region	Local	Centr.	Region	Local						
		(MNC)	(MUS$)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	(MNC)	on	(MUS$)	(MUS$)	
1 L	Kovohuty Krompachy	N/A	N/A															
2 L	Elektrárne Nováky	335,2	9,72															
3 L	VSŽ Oceľ	212,5	6,16															
4 L	VSŽ Oceľ	503	14,5															
5 L	Bukocel, a.s.	50	1,45															
6 L	Chemko, a.s.	400	11,59															
	Total	1500,7	43,42															

Note: *MNC - millions in national currency - Slovak crowns*
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Annex 2.

Definition of Adequate Investment Portfolio

According to information obtained in projects File is defined investment portfolio in the

- industrial sector,
- municipal sector
- landfills and dumps.

Proposed programmes and projects (as actualized in January 1999 - see Chapter 6)

	Total cost	
	(NC) SKK	(US$) US$
Municipal sector	4.778.670.000 SKK	138.512.174 US$
Industrial sector	3.317.716.000 SKK	96.158.580 US$
Landfills	997.710.000 SKK	28.919.130 US$
Total investment cost	9.094.096.000 SKK	263.589.884 US$

Summary of the cost estimation of the proposed programs and projects in municipal sector

No. of project	Wastewater treatment plant	Ranking of the projects	Total capital costs	Total capital costs	National Funding Sources				Total requested or non-secured	
					Equity of Owner	National Envir. Fund	Water Manag. Fund	Public loans Centr.+ Reg.		
	Locality	[priority]	[MNC]	[MUS$]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MUS$]
1- M	Košice	high	900.000	26.087	30.000	100.000	30.000	130.000	290.000	8.406
2- M	Nitra	high	552.000	16.000					373.676	10.831
4- M	Banská Bystrica	medium	593.461	17.202			38.000	131.106	169.106	4.902
5- M	Michalovce	medium	114.000	3.304	10.000	20.000		25.000	55.000	1.594
6- M	Svidník	medium	410.000	11.884	16.000	86.000		110.000	212.000	6.145
7- M	Trenčín right side	medium	267.000	7.739					257.000	7.449
8- M	Humenné	medium	597.806	17.328	35.000	100.000		200.000	335.000	9.710
10- M	Topoľčany	low	34.298	0.994	28.298				28.298	0.820
13- M	Rožňava	low	91.605	2.655	16.000	30.000			46.000	1.333
14- M	Liptovský Mikuláš	low	80.000	2.319	22.000	20.000	30.000		72.000	2.087
	Total		3640.170	105.512	157.298	356.000	98.000	596.106	1838.080	53.278

Note: MNC - millions in national currency - Slovak crowns
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Summary of the cost estimation of the proposed programmes and projects in industrial sector

No. of project	Plant Locality	Ranking of the projects	Total Capital costs	Total capital costs	National Funding Sources				International		Commerc. Bank Loans	total requested or non-secured	
					Equity of Owner	National Envir. Fund	Water Manag. Fund	Public grants Centr.+ Reg.	Loans	Grants			
		[priority]	[MNC]	[MUS$]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MUS$]
1a -I	NCHZ Nováky	high	12	0.348		1	1			3		5	0.145
1b -I	NCHZ Nováky	high	30	0.870	3	2	5	5	5	5	5	30	0.870
2 -I	Bukocel Hencovce	high	200	5.797								200	5.797
3a -I	PCHZ Žilina	medium	21.93	0.636							21.93	21.93	0.636
3b -I	PCHZ Žilina	medium	68.681	1.991							66.481	66.481	1.927
3c -I	PCHZ Žilina	medium	57.464	1.666							55	55	1.594
3d -I	PCHZ Žilina	medium	28.809	0.835							27.509	27.509	0.797
6a -I	Chemko Stážske	medium	2415	70.000	483	1207.5			724.5			1932	56.000
6b -I	Chemko Stážske	medium	16	0.464	8	8						8	0.232
6c -I	Chemko Stážske	medium	15.05	0.436	7.5	7,5						15	0.435
6d -I	Chemko Stážske	medium	100	2.899	50	50						100	2.899
7 - I	AssiDomän Packaging Štúrovo	low	317.7	9.209								317.7	9.209
8 - I	Bučina Zvolen.	low	94	2.725								94	2.725
9 - I	Biotika Slovenská Lupča	low	50	1.449	10	15			25			50	1.449
10 - I	Tannery Bošany	low	80.702	2.339	8.8	17						25.8	0.748
	Total		3507.336	101.662	570.3	1300.5	6	5	754.5	8	175.920	2948.420	85.461

Note: *MNC - millions in national currency - Slovak crowns*
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Summary of the cost estimation of the proposed programmes and projects for landfills

No. of Project	Landfill or Lagoon/Locality	Ranking of the Projects	Total capital costs	Total capital costs	Total requested or non-secured	
		[priority]	[MNC]	[MUS$]	[MNC]	[MUS$]
1 - L	Kovohuty Krompachy	High	N/A	N/A	N/A	N/A
2 - L	Power plant Nováky-Kostoľany	Medium	335.160	9.715	335.160	9.715
3 - L	VSŽ Oceľ Košice	Low	212.550	6.161	212.550	6.161
4 - L	VSŽ Oceľ Košice	Low	503.062	14.582	503.062	14.582
5 - L	Bukocel Hencovce	Low	50.000	1.449	50.000	1.449
6e - I	Chemko Strážske	Low	400.000	11.594	400.000	11.594
	Total		1500.772	43.501	1500.772	43.501

Note: MNC - millions in national currency - Slovak crowns
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Summary of the cost estimation of the proposed programmes for non-structural projects

No. of pro-ject	Name of the project	Ranking of the projects	Total capital costs	Total capital costs	National Funding Sources			International		Total requested or	
					Equity Of owner	Natio-nal Envir. Fund	Water Manag. Fund	Loans	Grants	non-secured	
		[priority]	[MNC]	[MUS$]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MNC]	[MUS$]
1 - O	Restoration of wetlands	high	14,408	0,418					11,873	11,873	0.344
3 - O	Transformation of water boards	medium	6,156	0,178					6,156	6,156	0.178
2 - O	Analysis of quality sediments and their disposal	low	20,000	0,580	3,000	2,000	1,000		14,000	20,000	0.580
	Total		40.564	1,176	3,000	2,000	1,000	0,000	32,029	38,029	1,102

Note: MNC - millions in national currency - Slovak crowns
MUS$ - millions in US$
exchange rate used : 34.5 Sk = 1 US$

Summary of the cost estimation of the proposed programmes or projects with significant impact on transboundary pollution

No. of pro-ject	Name of the project	Name of the project	Description of the project	Ranking of the projects	Total capital costs	Total capital costs	total requested or non-secured	
				[priority]	[MNC]	[MUS$]	[MNC]	[MUS$]
1 - M	WWTP Košice	Košice-expansion of wastewater treatment plant 2nd stage of construction	In 1991/92 years a new WWTP has started. At present the civil construction of plant is finished and the mechanical treatment is already running. The biological treatment step is not finished due to the financial constraints. The completing of aeration tanks and clarifies is the main goal of the project.	High	900,0	26,087	290,0	8,406
3 - M	WWTP Malacky	WWTP is under construction, the civil structures are financed by the Programme Phare, the investment costs for the technology is covered by the municipality of Malacky. This year the 1st stage of the upgrading and expansion of treatment plant will finish. The starting and implementation of the 2nd stage of construction has not been clarified and therefore it is not covered by investment costs, yet. The design project for the 2nd stage was already done.		Medium	N/A	N/A	N/A	N/A
2 - I	Bukocel Hencovce	Reconstruction of wastewater treatment plant in Bukocel, a.s.	The reconstruction of treatment plant consist of construction sedimentation tanks, thickeners and upgrading of dewatering process. It is expected the reduction of pollution discharged to the Ondava river.	High	200	5,797	200	5,797
6d - I	Chemko Strážske	Reconstruction of sewer system	The project assumes to separate the sewage from the combine sewer system, its collection and transporting to the existing treatment plant.	Medium	100	2,899	100	2,899
7 - I	AssiDomän Packaging Štúrovo	The reduction of discharged wastewater pollution to the Danube river	The project should be implemented in 3 stages. The existing plant is not able to reach the effluent standards therefore its upgrading is necessary. At the company site the Danube river creates the natural border with Hungary and the sensitivity Danube is effected by the planned waterworks Gabčíkovo-Nagymaros.	Low	317,7	9,209	317,7	9,209
1 - O	Restoration of wetlands	Floodplain Meadow Restoration in the Lower Morava River	The project should identified the degraded meadows, to restore about 1000 ha of degraded meadow, to establish the system of monitoring. It is predicted that about 290 t of TN and 30 t of TP would removed by hay annually.	High	14,408	0,418	11,873	0,344
	Total				1532,108	44,410	919,573	26,655

Bibliography

1. Report on Water Management in the Slovak Republic, Ministry of Soil Management, Bratislava 1997
2. Environmental Programme for the Danube River Basin, Ministry of the Environment of the Slovak Republic, 1994
3. Správa o stave životného prostredia Slovenskej republiky v roku 1996, Ministerstvo životného prostredia Slovenskej republiky,
4. Národný Environmentálny akčný program (schválený uznesením vlády SR č.350/1996), Ministerstvo životného prostredia Slovenskej republiky, 1996
5. Správa o hospodárení s prostriedkami Štátneho fondu životného prostredia SR za rok 1997, Štátny fond životného prostredia Slovenskej republiky, január 1998
6. Generel ochrany a racionálneho využívania vôd
7. National Environmental Policy (approved by the Resolution of the Parliament of the Slovak Republic 339 of the November 18, 1993 and the Resolution of the Slovak Government 619 of September 7, 1993), Ministry of Environment of the Slovak Republic
8. Monitoring of the Slovak Economic, Statistic Office of the Slovak Republic, years 1997, 1998
9. Economic newspaper and journals
   - Trend 1997, 1998
   - Hospodárske noviny, 1997, 1998
10. Internal Documents of Ministry of Environmental of Slovak Republic, Ministry of Economic of Slovak republic