DANUBE POLLUTION REDUCTION PROGRAMME

NATIONAL REVIEWS 1998
SLOVENIA

TECHNICAL REPORTS

Part A: Social and Economic Analysis

Part B: Financing Mechanisms

MINISTRY OF ENVIRONMENT AND PHYSICAL PLANNING

in cooperation with the

Programme Coordination Unit
UNDP/GEF Assistance

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Preface

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

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

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

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

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

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

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

Further, the basic data, as collected and analyzed in the frame of the National Reviews, will be compiled and integrated into the ICPDR Information System, which should be operational by the end of 1999. This will improve the ability to further update and access National 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 **Slovenian National Reviews** were prepared under the supervision of the Country Programme Coordinator, **Mr. Mitja Bricelj**. The authors of the respective parts of the report are:

- Part A: Social and Economic Analysis: **Mr. Marjan Ravbar**
- Part B: Financing Mechanisms: **Mr. Janez Kimovec**
- Part C: Water Quality: **Mr. Boris Kompare**
- Part D: Water Environmental Engineering: **Mr. Uros Kranjc**

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Part A

Social and Economic Analysis in Relation to Impact of Water Pollution

Table of Contents

1. Summary

The state of the Danube environment in the national context: Its diverse landscape and natural and geographical features contribute strongly to the extent and level of environmental pollution in Slovenia, as does its industrial development until now. The most polluted countryside lies in the basins and deep mountain valleys among the Alps and their foothills. They can be found in basins (the Celje Basin, the Ljubljana Basin etc.) and in deep valleys (the Zasavje, Mežica, upper Sava valleys etc.). The enclosed relief enhances negative landscape effects of environmental pollution even with relatively small emission levels, produced by relatively small cities. The period from the end of the 1960s to the beginning of 1980s was the period of greatest pollution of Slovene industrial and energy supplying areas. It is generally accepted that environment pollution was on the increase until the middle of the previous decade and that from that time onwards, a gradual decrease in pollution of rivers is noticeable. However, the quality of surface water is diminishing.

The effects of human activities on water are observed through the prism of changes in the extent of urbanization and employment structure. The population increased by almost half a million after the war. As early as in the 1960 has the domination of the primary sector in the active population structure passed to the domination of the secondary structure, while at the same time -especially in the last decade- there was an increase in the share of the tertiary and quaternary sectors. The process of urbanization increases the concentration of population in the lowlands and its decrease in the highland, karstic and hilly areas. The conclusion is that the concentration of population, industrial areas and animal farms has a decisive impact on the pollution of water in the Danube River basin, especially in the river basins of

the Drava:	Maribor, Ptuj with Kidričevo, Ravne in Koroška, Ormož and Ruše,
the Mura:	Murska Sobota, Lendava, Ljutomer and Gornja Radgona and
the Sava:	Ljubljana, Kranj, Velenje, Celje, Kamnik, Trbovlje, Škofja Loka, Vrhnika, Jesenice, Rogaška Slatina, Hrastnik, Krško, Kočevje, Domžale, Štore, Šoštanj.

Population affected by water pollution: Systematic research of number and share of the Slovenian population that have health and other problems due to contamination of drinking and other water sources has never been conducted, therefore the extent of contamination of water supply sources can only be indirectly inferred. The contamination of the Danube River basin rivers varies from moderate to wide-spread and the rivers are not used for drinking water supply. Data on water quality of groundwater and karstic sources point to a gradual deterioration of drinking water quality. The population of some regions in the Sava, Drava and Mura River basins is supplied with groundwater that often contains a concentration of nitrates and pesticides that exceeds the allowed limit, especially the concentration of atrazin. The water from the karstic sources in the river basins of the Sava and Kolpa needs to be disinfected since it is often bacteriologically inadequate. The increase of heavy metals and micro pollutants in the sediments of some sources points to the endangered health of the population of the Karst region of the Danube River basin.

Water quality and impact on ecosystems: Due to the pollution of the Danube basin rivers of many years, the polluted rivers mainly affect biotopes in river beds, but have a lesser impact on other elements of the ecosystem or river basin. In the Sava basin, the biotopes are, due to severe water pollution, changed the most in the lower streams of the Ljubljanica, the Kamnik Bistrica, Rinža, Paka, Savinja and Voglajna and the middle courses of the Sotla, and because of PCB, life forms in the Krupa in Bela krajina are affected. In the Drava River basin, life forms were most affected in the Meža, however, the situation is improving. In the Mura River basin, water life was degraded most in the Ščavnica. Severe water pollution caused the population of salmonidae to drop and an increased pollution of river sediments and of sediments of karstic sources was also noticeable.

The diminishing of surface water quality does not necessarily affect other elements of the ecosystem. Due to pollution of the Bled Lake there is eutrophication or occasionally accelerated growth of the algae. Rehabilitation measures are improving the situation.

Water sources: The Mura (1376 km^2), the Drava (3253 km^2) and the Sava (with the Kolpa and the Sotla Rivers) (11 734 km^2) river basins in Slovenia all belong to the Danube River basin. The watershed between the Black Sea and the Mediterranean basins runs in Slovenia from the north-west and across the highest ridges of the Julian Alps, the northern parts of the Alpine foothills and across the ridges of the Dinaric-Karstic planes to the border between Slovenia and Croatia in the south-west part of Slovenia. The major part of the watershed runs over carboniferous rock formations, therefore the underground watershed is predominant. The river basins of major rivers in the Danube River basin share one feature: they rise in the mountainous area with a high rainfall, then transverse through the foothills of the Alps and the hilly area to the lowlands. They usually leave the Slovenian territory after a 100 km long course in a day or two, which emphasizes water transit. The length of surface river streams is approximately 22 600 km, and the average river network density is 1,33 km/km^2. River network density is 1,38, (the biggest in the Drava basin - 1,88 and is high with regard to more than 40 % of karstic surface), especially because of the high rainfall. In the Black Sea basin there are 98 % of dynamic underground water resources in aquifers with intergranular porosity and 85 % of all dynamic underground water resources in Slovenia.

Ecosystems and biological resources: Physical, geographical and ecosystem characteristics of the Danube River basins are mainly a reflection of her transit geographic position, where alpine, sub-alpine, dinaric-karstic and sub-pannonian characteristics interweave. The Drava basin bioclimatically marks a transition from the Alpine and dinaric part of the basin with very humid climate to the humid climate of the main part of the Sava basin and to the semi-humid and partly semiarid climate of the Drava and the Mura River basins. Almost entire Danube basin area belongs to potentially forest ecosystem, which is, however, reduced. The forest surface has increased by approximately 10 % in the last forty years, and the trees are damaged due to diseases and air pollution. Forest ecosystem covers approximately half of the Danube basin area and is prevalent in the dinaric-karstic, Alpine and sub-alpine part of the Sava River basin and highland areas of the Drava River basin.

Humid biotopes include various forms from the high and the low moor, swamps, flood and swamp forests and meadows, backwaters etc. It is estimated that they cover an area of 26.000 ha or 1,25 % of the Slovenian territory. Some wetlands are parts of natural parks or protected as natural reserves. It is estimated that 10.500 ha of humid biotopes are protected in the Black Sea basin, which represent 17,5 % of protected areas in natural parks. Half of protected wetlands are situated in the Sava River basin, however, the wetlands only represent 10 % of areas protected in natural parks.

Human impact and key problems of environment degradation in view of water pollution: Due to the hilly relief, rivers flow at different rates at different times of year. River pollution levels change from low in Spring and Autumn to high in Summer and Winter. Slovenia has many rivers with small streams polluted from dispersed industry dumping its waste leading to the whole water system being polluted. After 1990, there has been a noticeable reduction in water pollution due to reduced production levels, better waste management and punitive actions. Industrial pollution of rivers and streams has fallen by 30 to 40 % since 1990 whereas municipal pollution has remained at the same level.

The Sava River basin covers 58 % of Slovenian territory, has 53 % of population and two thirds of all sources of drinking water, and in the Sava and her tributaries as much as 4/5 of Slovenian Wastewater is discharged. Her pollution begins already at the source, with Wastewater discharge from Kranjska gora and Bohinj, and strongly increases with the Sora tributary, but especially after Ljubljana, which is one of the rare European capitals that has yet to take care of its Wastewater treatment. From Ljubljana onward, the river is in the 3rd or 2nd to 3rd pollution class, all the way

to the border with neighboring Croatia. It is further polluted by wastewater from the Zasavje region, especially from the mining industry after the coal separation, and by the Savinja River at Zidani most. Wastewater treatment is more properly conducted in small settlements, with over 100 small municipal wastewater-cleaning plants.

By the time the Drava flows into Slovenia, it already falls into 2nd to 3rd class in pollution rating (especially noticeable are lead and zinc additions). Moderately polluted tributary flow into it on its course through Slovenia although they do not greatly change her pollution rating until the Croatian border.

The Mura has improved its pollution rating from the 3rd to 2nd class in the last five years, also due to improvements in pollution control in Austria. The acutely polluted Šèavnica tributary(4th class) and the Ledava (3rd class) flow into it.

On the Drava, Mura and Celje fields, intensive farming with a high use of protective chemicals and mineral fertilizer has lead to pollution of groundwater. The high level of pesticides in the water is already exceeding safety levels for drinking water by European standards.

Population development and water sector relevant characteristics: Three variant projections made for the period until 2020 by the Office of the Statistics of the Republic of Slovenia, caution that, according to the most optimistic variant, the population growth will reach approximately 2,21 million of inhabitants, or annual growth of approximately 8400 inhabitants. The middle variant predicts the continuation of slow population growth, so that it will only increase to approximately 2,05 million, while the pessimistic projection estimates a drop of between 105.000 to 150.000 inhabitants in the next 25 years. The number of inhabitants in Slovenia would therefore regress from nearly 2 million to 1,89 million.

In the urbanized, lowland and valley areas a further growth of population and economic activities can be expected, mainly channeled to products less demanding both with regard to energy and raw materials, and to service activities. The most optimistic estimation of the population growth in the urbanized areas is an annual rate of + 0,5 %, while the population number will continue to decrease in the countryside. The total of population in the Slovenian part of the Danube River basin will at best increase from the present 1,74 million to 1,94 million in 2020.

Estimation of actual and future demand for water: From the viewpoint of drinking water supply of the Slovenian part of the Danube River basin population, groundwater areas were the most important in the middle of the 1990s, and they were followed by karstic sources. In the Mura River basin, the groundwater areas were the only, and in the Drava and Sava basins, prevalent drinking water resources.

In 1995 there were 91 million m^3 of drinking water available from the drinking water supply for the Slovenian population. The annual water consumption has not changed greatly in recent years and is between 45 and 50 m^3. In 1995, it was 46,4 m^3/inhabitant. In the Black Sea basin, 80 % of all drinking water is used for household supply. Drinking water consumption will not drastically change in the years to come. Due to water losses in water supply systems, a greater exploitation of water supply systems is to be expected. The quantity of the existing drinking water resources is adequate and will be able to procure the needed quantity of drinking water in all river basins, even with minor consumption growth. The smallest reserves of drinking water in the captured river sources are, with regard to the relatively low share of population connected to public water supply systems, in the Mura River basin.

Estimation of actual and future production of Wastewater: The sewage system in the Slovenian part of the Danube basin is poorly developed, since less than a half of households is connected to public sewage systems. A goal set in the previous decades, namely to bring water into every household, has been achieved, and now effort will have to be made for an adequate wastewater disposal. The sewage system network is denser in extensive fields with urban centers, under which

there are the biggest drinking water resources. In the next two decades, the sewage system can be expected to expand and it ought to be of better quality. Central wastewater cleaning plants will have to be constructed for big urban settlements. A simultaneous expansion of the sewage system in less densely populated areas and construction of small Wastewater cleaning plants will is a necessity, especially up to 1000 EE.

Analysis of health hazards through water pollution and unsanitary conditions: Systematic research of health and other hazards through water pollution and pollution of other surface waters does not exist in Slovenia. Surface water is only exceptionally used as a source of water supply of the population, since most of the Danube River basin water in Slovenia is moderately to extremely polluted. In 1994, 1995 and 1996, only the river sections at the source of Alpine rivers of the Sava River basin fell into the 1st and 1st to 2nd quality class (the Tržiè Bistrica, Kokra, Kamnik Bistrica, Savinja) and the Meža in the Drava River basin. The Sava Dolinka, Sava Bohinjka, Sora, the upper section of the Ljubljanica, the middle section of the Kamnik Bistrica and Savinja, the upper section of the Krka, and the Kolpa as far as the confluence with the Lahinja in the Sava River basin, all fell into the 2nd quality class. There are no major river sections in the Drava and Mura River basins that would fall into the 2nd quality class. Due to poor river quality and temperature conditions, only certain upper and/or middle river sections are suitable for bathing in the summer (for example: the Kolpa, Krka, Sora and Savinja Rivers), however, few people also bathe in the rivers that fall into the 2nd or 3rd or an even lower quality class. Therefore we can indirectly conclude, that in spite of moderate pollution of the rivers and other surface waters, there is no health hazard for the population when using drinking water from groundwater and sources, while river water is only exceptionally used as the source of household water supply. If the negative trend of deterioration of captured water sources (groundwater, karstic sources) continues, water supply problems, health problems and other negative effects on the population can be expected. In the case of a sudden accidental pollution, the karstic sources of the Sava River basin (the river basins of the Ljubljanica, Krka and Kolpa) will be potentially more affected. In 1995, 5 % or approximately 90.000 inhabitants of the Danube River basin were dependant on water from the water supply systems where the concentration of nitrates was exceeded.

Analysis of actual and expected impact of economic activities on water demand and potential pollution of aquatic systems: Industrial activities: In 1995, Slovenian industry and mining spent 113 million m^3 of fresh water, namely 76,6 million m^3 as industry water and 36,3 million m^3 as drinking water. For production, 48 million m^3 of water was spent and 50,7 million m^3 for cooling. Coal mining spent 2,2 million m^3 of fresh water, 1,6 million m^3 of industry water and 0,7 million m^3 of drinking water. Industry water was mainly used for production, while drinking water was mainly used for sanitary purposes. 1,4 million m^3 of water was abstracted from rivers and the rest from other sources.

Industrial and mining activities discharged 765.728.000 m^3 of wastewater into the environment, 2.606.000 m^3 directly into the ground, somewhat more than 30 million m^3 into the municipal sewage system, and as much as 733.102.000 m^3 into surface waters. The following activities discharge the biggest quantities of wastewater: paper manufacture and production (27.562.000 m^3), metal manufacture (6.827.000 m^3) and chemical manufacture (8.223.000 m^3). 46.775.000 m^3 or 6,11 % of wastewater is treated in industry and mining, 17.319.000 m^3 mechanically and 26.128.000 m^3 chemically and biologically.

Municipal discharges: In 1995, 131.816.000 m^3 of water was accumulated in the municipal sewage systems in Slovenia, and as much as 118.958.000 m^3 in the Black Sea basin alone. 71.376.000 m^3 or 60,0 % of wastewater are completely treated in wastewater treatment plants. Data valid for the whole of the country state that 61,0 % of wastewater is only mechanically treated, 0,1 % only chemically treated, and 2,7 % only biologically treated. 36,2 % of all treated wastewater are treated combining various treatments. 60 wastewater treatment plants, with an overall capacity of 1.446.491 EE have been built in the Sava River basin, while those wastewater treatment plants

with the capacity of 1000 EE total 46. Therefore more than a half of all WWTPs are situated in the Sava River basin, however, only 226.536 or 19,1 % of inhabitants are connected to the 42 wastewater treatment plants that treat municipal wastewater. The greatest number of inhabitants connected to a wastewater treatment plant is in the Domžale – Kamnik system (50.000), Šoštanj (27.000), Kranj (25.000) and Novo mesto (20.000). The most urgent problems are the incomplete Ljubljana and Celje WWTPs. Celje and more than 50.000 of its inhabitants extremely pollute the Savinja River.

Agricultural activities: There are 93.680 ha of land (84 %) in the Slovenian part of the Danube River basin that is often affected by drought and needs to be irrigated. Most part or 74 % of land is in the Mura and the Drava River basins, where there are eight hydromeliorization systems (which also include drainage systems), and the rest or 26 % of irrigated land is in the Sava River basin. The national irrigation plan (1994) states that 120.080 ha of cultivable surface can be irrigated, which would take 235,6 million m^3 of water, mostly abstracted from the Mura, Drava, Sava and Kolpa, and from groundwater and reservoirs. In 1995, 4200 ha of land surface in Slovenia was prepared for irrigation, of which 1592 ha were actually irrigated. It is estimated that approximately 80 % of Slovenian irrigated surfaces are in the Danube River basin. In 1995, 4.785.000 m^3 of water was accumulated for irrigation, 6 % from groundwater, 29 % from rivers and 63 % from reservoirs.

Intensive use of mineral fertilizers and protective chemicals is the main surface source of groundwater area pollution, while massive animal concentration is a considerable cause of water pollution. Numerous pig, cattle and poultry farms are preserved from the past. Extensive pig especially farms present the most problematic, dispersed form of stream and river pollution. In the Sava River basin there are huge pig farms with the following average number of pigs: Ihan (53.700), Stièna (12.000) and Klinja vas near Koèevje (17.300) (in the karstic part of the Krka River basin) and Pristava near Leskovec (15.000). In the Drava River basin there is a pig farm in Draženci near Ptuj (40.500), and in the Mura River basin Cven near Ljutomer (10.000), in Podgrad near Gornja Radgona (21.300) and the Nemšèak farm near Beltinci with the Jezera farm (56300). Big pig farms in the Donava River basin with the average number of pigs of approximately 230.000, present a problem especially due to the lack of agricultural land in the vicinity of the farms and only partial wastewater treatment. Pig farms in the karstic areas (e.g. Klinja vas), in groundwater areas (e.g. Pristava, Nemšak) and in the vicinity of water streams with modest flow (Ihan, Stièna), are a particular cause of problems. All of the farms have yet to reach the demanded quality of wastewater before discharge into surface water.

2. Description of the State of the Danube Environment

2.1. Water Resources

A. Landscape Characteristics of the Danube River Basin

Slovenian water sources obtain water from an area that covers over 43.000 km^2, while the state territory covers an area of 20.256 km^2 (Lah, 1996). The Drava and Mura Rivers, which flow into Slovenia, have their upper courses in Austria, and also partly in Italy (the Drava River). Slovenian territory belongs to the Black Sea and the Adriatic basins, where four European macro-geographic units meet: the Alps, the Mediterranean, the Pannonian Plains and the Dinaric Plains. The Danube River basin covers 16.336 km^2 of Slovenia or 81 % of the state territory. Approximately 88 % of Slovenia's population live there. The basin extends over the south-east part of the Alps, its foothills, part of dinaric-karstic area and a part of sub-Pannonian area. Great relief diversity, lithologic duality (carboniferous and non-carboniferous formations), rainfall transit (lower annual rainfall toward the east and north-east) and extensive forests are characteristic of the basin. Landscape diversity and hydrological transcience both reflect in geographical arrangement and the dynamics of the water sources.

The Mura (1376 km^2), the Drava (3253 km^2) and the Sava (with the Kolpa and Sotla Rivers) (11.734 km^2) have a part of their river basin in Croatia as well (Kolbezen, Pristov, 1998). Their river basins in Slovenia all belong to the Danube River basin. In Slovenia, the watershed between the Black Sea and the Mediterranean basins runs from the north-west and across the highest ridges of the Julian Alps (Mangart, Jalovec, Vogel, Kuk), the northern parts of the foothills of the Alps and across the ridges of the Dinaric-Karstic plains to the border between Slovenia and Croatia in the south-west part of Slovenia. The major part of the watershed runs over carboniferous rock formations, therefore the underground watershed is predominant.

B. Hydrogeographical Characteristics of the Water Streams

The river basins of the major rivers in the Danube River basin share one feature: they rise in the mountainous area with a high rainfall, then transverse through foothills of the Alps and hilly area to the lowlands. The water courses usually leave Slovenia after 100 km or after a day or two, which emphasizes water transit.

Slovenia has 7 transborder rivers (Economic Commission for Europe, 1997, p. 56). The length of surface river courses in the Danube River basin is 22 600 km, the river network density is 1,38 km/km^2, the biggest being in the Drava River basin (1,88) (Kolbezen, Pristov, 1998, p. 8). The river's network is dense, especially if we take into consideration that there are more than 40 % of karstic surface area (almost no surface water courses), especially due to high humidity level (Table 2.1.).

Because of river water inflow from Austria, extreme humidity and higher specific flow, the rivers on average contain more water than one would estimate by the surface area of their river basins. The following rivers have the average annual flow of over 10 m^3/s and over 50 km of course length: the Sava (w.g.s. Èatež - 290 m^3/s), the Drava (w.g.s. Ormož - 325 m^3/s), the Mura (w.g.s. G.Radgona - 157 m^3/s), the Savinja (w.g.s. Laško - 41,5 m^3/s), the Krka (w.g.s. Podboèje - 54,7 m^3/s), the Kolpa (w.g.s. Metlika - 73,1 m^3/s), the Sora with the Poljane Sora (w.g.s. Suha - 20,7 m^3/s), the Dravinja (w.g.s. Videm - 12,0 m^3/s) and the Ljubljanica (w.g.s. Moste - 57,3 m^3/s). The Meža also has quite big average annual flow (w.g.s. Otiški vrh - 13,2 m^3/s). The Ledava, Šèavnica, Pesnica and the Sotla are also longer than 50 km. Only the Drava, Mura in Sava have the average annual flow of over 100 m^3/s (Vodnogospodarske osnove Slovenije, 1978; Enciklopedija Slovenije, 1997; Kolbezen, Pristov, 1998) (Table 2.2).

With the exception of the Mura and the Drava Rivers (due to late melting of the snow in the source area of both river basins in the Austrian Alps there is a high flow in the summer half of the year) very prominent drop in flow is characteristic of all other Danube River basin rivers in summer, usually in July and especially in August, but also in September. Low summer flow, high temperature, low fall of minor sub-Pannonic and partly also karstic rivers of the Alpine and Dinarskega area increase water vulnerability in the summer and ecological vulnerability of the majority of water streams. Then even some lengthy water streams in the Mura and Drava River basins almost or completely dry out due to evaporation (the Ledava, Pesnica and Šèavnica Rivers).

Among the recorded extremely high flows with regard to the size of the river basin surface area the Savinja (1406 m^3/s) and the Kolpa (1116 m^3/s) Rivers stand out, which drain the flood water of the mainly hilly and karstic river source areas (Table 2.1, 2.2). At the time of torrential floods the water level rises and drains in a few hours (in the alpine area and its foothills). Some floods usually locally affect minor river basins or their parts, however, some last for days and weeks on end (on karst polje). Noteworthy are the flood areas at the Ledava, Pesnica, Dravinja, at the Savinja in the Spodnja Savinjska valley, at the Krka, the Sava in Brežiško - Krško polje and at the Kamnik Bistrica and Ljubljanica confluence, on the Ljubljana moor, in Planinsko, Cerkniško and Loško polje, at the Pivka etc. Protection from floods has for more than a century consisted of extensive regulation activities, which also have an impact on ecological vulnerability of rivers as well as drain the flood water to the lowland riverside water course areas.

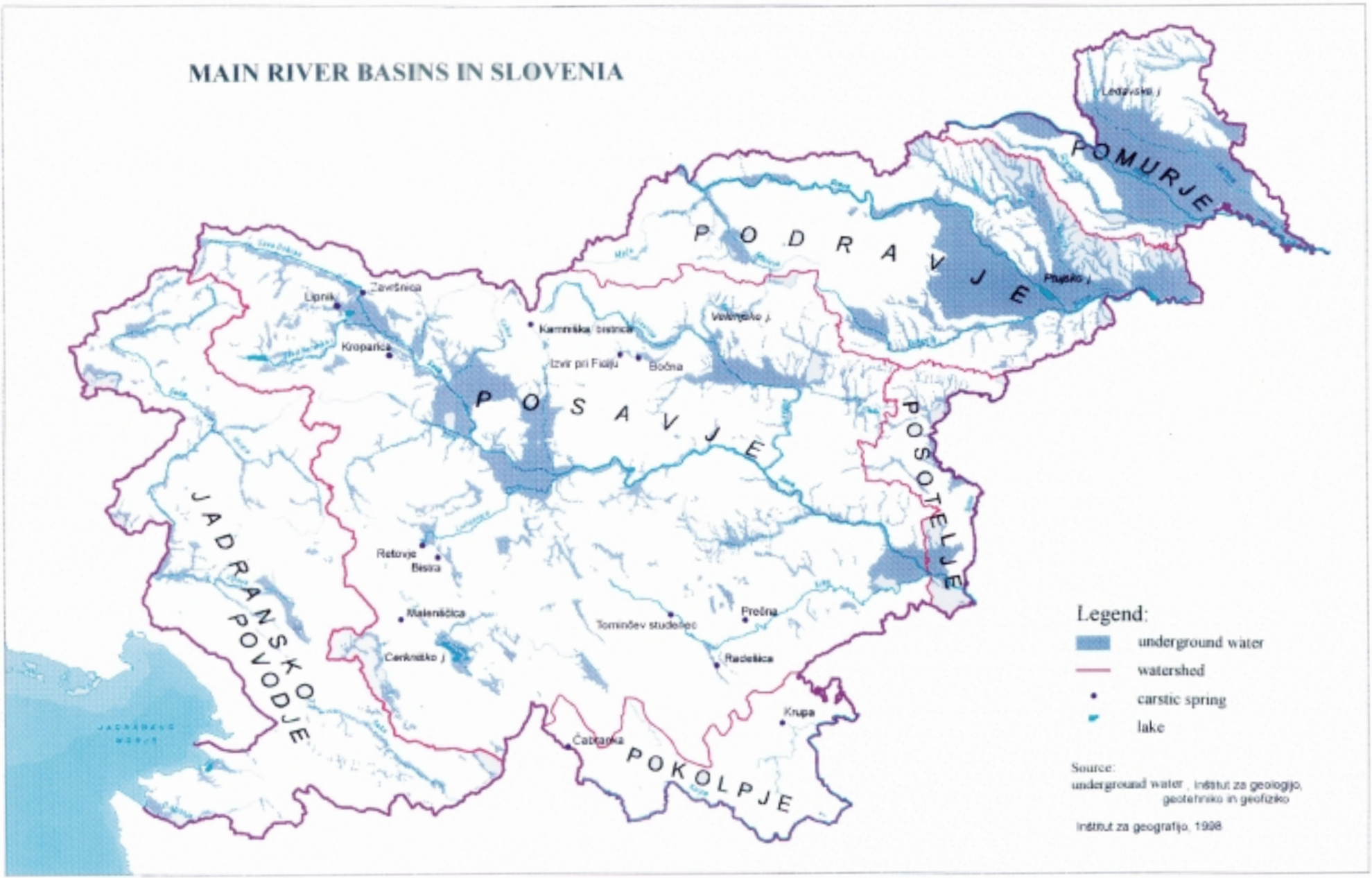

MAIN RIVER BASINS IN SLOVENIA
POMURJE
PODRAVJE
POSAVJE
POSOTELJE
JADRANSKO POVODJE
POKOLPJE
Ledavsko j.
Ptujsko j.
Velenjsko j.
Cerkniško j.
Lipnik
Završnica
Kroparica
Kamniška Bistrica
Izvir pri Fiužu
Bočna
Retovje
Bistra
Malenščica
Tominčev studenec
Prečna
Radeščica
Krupa
Cabranka
JADRANSKO MORJE
Legend:
underground water
watershed
carstic spring
lake
Source:
undergrouand water , Inštitut za geologijo, geotehniko in geofiziko
Inštitut za geografijo, 1998

Table 2.1. Basic characteristics of the main Danube basin rivers in Slovenia (longer than 50 km and/or with the average annual flow of over 50 m^3/s) (1961 - 1990)

River	Height above sea level at source or inflow into Slovenia (m)	Height above sea level at mouth or runoff from Slovenia (m)	Relative difference in height (m)	River surface area in Slovenia (km^2)	River length-together (km)	River length-in Slovenia and at the border (km)	Water gauge station (lower course)	Average annual flow (sQs) (m^3/s)	Specific runoff ($l/s/km^2$); runoff coefficient (%)	Lowest recorded flow (nQnk) (m^3/s)	Highest recorded flow (vQvk) (m3/s)
Sava	833	132	701	10 746	727	221	Èatež	290	30,4; 60,2	51,9	3267
Drava	340	175	165	3253	707	142	Ormož*	325	20,4; 50,1	55,0	2708
Kolpa	313	130	183	1943**	294	118	Metlika	73,1	37,3; 64,6	4,6	1116
Savinja	1310	185	1125	1848	102	102	Laško	41,5	25,2; 55,5	4,2	1406
Mura	250	130	120	1376	438	95	G. Radgona	157	8,5; 28,3	40,5	1205
Krka	275	141	134	2315	94	94	Podboèje	54,7	24,6; 54,2	4,5	362
Sotla	580	135	445	451**	90	86	Rakovec	9,06	15,8; 42,5	0,4	281
Dravinja	1150	210	940	817	73	73	Videm	12,0	17,2; 45,2	0,63	291
Ledava	250	140	110	675	76	68	Polana	1,37	6,2; 22,4	0,02	80,5
Pesnica	300	190	110	539	69	65	Zamušani	5,5	11,8; 35,5	0,21	150
Šèavnica	360	175	185	288	56	56	Pristava	2,44	9,6; 31,0	0,06	48,7
Sora	700	308	392	636	52	52	Suha	20,7	40,9; 67,2	2,12	687
Ljubljanica	300	260	37	1890**	41	41	Moste	57,3	36,0; 63,7	3,41	405

* *period between 1926 - 1965*

** *river basins both in Slovenia and Croatia*

Source: Kolbezen, Pristov, 1998; Statistièni letopis RS, 1995; Vodnogospodarske osnove Slovenije, 1978

Table 2.2. Characteristic flows (nQnk, sQs, vQvk) (m^3/s) of the main rivers (sQs>40 m^3/s) in the Danube river basin in Slovenia between 1961 - 1990 (excluding the Drava)

River Water gauge station	J	F	M	A	M	J	J	A	S	O	N	D	Year
Sava	60,4	51,9	75,7	106	108	82,0	55,0	52,0	53,0	56,3	52,6	60,8	51,9
Èatež	263	269	328	393	325	295	228	185	228	291	362	313	290
	3114	2012	2042	2220	2860	1631	2003	1993	2873	3001	3267	2383	3267
Ljubljanica	4,07	4,76	7,68	9,34	9,14	9,24	5,99	3,80	3,41	3,72	3,76	5,86	3,41
Moste	61,6	60,4	72,0	80,4	54,3	50,8	35,8	28,9	40,8	56,2	75,2	72,2	57,3
	335	259	405	273	344	296	289	240	352	377	297	320	405
Savinja	5,69	5,69	7,56	10,4	10,9	8,80	5,60	4,20	5,85	4,80	5,60	6,90	4,20
Laško	35,2	36,2	47,0	57,1	46,4	43,5	35,2	27,6	32,7	43,0	51,9	42,7	41,5
	810	461	831	536	593	759	722	744	1030	1179	1406	926	1406
Krka	7.69	7,04	9,54	14,0	11,7	10,9	8,18	5,75	4,50	6,21	7,60	6,82	4,50
Podboèje	48,1	56,1	75,6	80,9	51,8	48,6	38,8	30,7	40,0	53,1	68,8	64,5	54,7
	307	295	338	299	329	280	356	276	336	362	317	315	362
Kolpa	8,32	7,23	11,1	20,1	14,5	11,7	5,76	4,60	6,10	5,76	8,20	10,6	4,60
Metlika	75,4	78,8	98,8	110	69,5	51,5	31,6	32,6	51,4	77,1	104	97,9	73,1
	1072	929	794	737	814	550	568	996	1116	1050	1072	1100	1116
Mura	44,9	45,4	56,8	82,2	89,8	101	46,4	66,3	54,8	55,8	44,8	40,5	40,5
G.Radgona	87,5	94,5	133	188	251	241	208	178	147	128	119	103	157
	369	438	794	1130	903	1145	1205	1142	913	1067	781	589	1205

Source: Kolbezen, Pristov, 1998

The Danube basin rivers have the following river regimes: (mitigated) nival (the Mura and Drava Rivers), nival - pluvial (e.g. the Sava Bohinjka and Sava Dolinka, the upper Savinja) and pluvial - nival (e.g. the lower Sava, lower Savinja, Krka, Kolpa, Dravinja and Ledava Rivers) (Enciklopedija Slovenije, 1997). Major rivers have combined river regimes. The nival - pluvial regime with a more prominent flow climax in late spring and a primary flow low in winter, which below Ljubljana transforms into pluvial - nival regime with two coequal heights (spring, autumn) and a more prominent low in the summer months, is characteristic of the Sava's upper course. The middle and lower sections of the Savinja, the entire course of the Dravinja and Krka are characterized by a typical pluvial - nival regime (coequal heights in autumn and spring, and summer and winter lows). The Kolpa has features of a Mediterranean variant of pluvial - nival regime with somewhat more prominent autumn height and a very prominent summer low. The flow value of the Drava has, due to the construction of a chain of hydroelectric power stations and disturbance in the natural flow that stems from that (damming with an artificial water regime), significantly changed and adapted to the demand for energy supply.

C. Water Balance

Slovenia has an average precipitation of 1567 mm, or 1005 m^3/s or 31,694 km^3 of water. Evaporation rate is 417 m^3/s (650 mm) or 13,151 km^3 of water, which is 41,5 %. Therefore the annual runoff is 588 m^3/s (917 mm or 58 % of rainfall) or 18.543 km^3 of water (Kolbezen, Pristov, 1998, p. 63). With the transitory Mura and Drava Rivers (approximately 13,2 km^3 on average) approximately 32 km^3 of water annually drains out of Slovenia, or approximately 41 % of water

from neighboring Austria. Average annual runoff is 18.543 km^3 or 588 m^3/s, the specific runoff is 29 l/s/km^2, and the runoff coefficient is 59 % (Europe - 43 %) (Table 2.3, 2.4). High runoff (917 mm) and the specific runoff related to it (29 l/s/km^2), which is almost three times lower than the European average (319 mm, 10 l/s/km^2) (Europe's Environment, 1995), is a result of high rainfall, karstic surface and characteristics of the relief (višinska pasovitost in reliefna energija). Out of approximately 18,5 km^3 of water from the water reservoir area approximately 71 % of water (417 m^3/s) drains into the Danube, and approximately 29 % (171 m^3/s) into the Adriatic (Kolbezen, Pristov, 1998, p. 63).

Average annual runoff in the Danube River basin rivers are (Kolbezen, Pristov, 1998, p. 63) (Table 2.3):

- the Mura basin (1376 km^2): 228 mm, 10 m^3/s
- the Drava basin (3253 km^2): 571 mm, 59 m^3/s
- the Sava basin (10 746 km^2): 936 mm, 319 m^3/s
- the Kolpa basin (998 km^2): 910 mm, 29 m^3/s

Table 2.3. Water balance of the Danube river basin in Slovenia

River basin of	Surface area (km^2)	Precipitation (mm)	Precipitation (m^3/s)	Evaporation (mm)	Evaporation (m^3/s)	Runoff (mm)	Runoff (m^3/s)
Mura	1376	903	39	675	29	228	10
Drava	3253	1222	126	650	67	571	59
Sava	10746	1576	537	641	218	936	319
Kolpa	998	1562	49	652	21	910	29
SLOVENIA	20230	1567	1005	650	417	917	588

Source: Kolbezen, Pristov, 1998

Table 2.4. Water balances of Europe and Slovenia

Volume unit	Precipitation (mm)	Evaporation (mm)	Runoff (mm)	Runoff coefficient (%)
Europe (10.519.367 km^2)	734	415	319	43
Slovenia (20.230 km^2)	1567	650	917	59

Source: Kolbezen, Pristov, 1998

D. Natural and Artificial Lakes

In Slovenia there are 1271 registered stagnant waters. Out of 15 major ones, as many as 14 belong to the Black Sea basin. The biggest three natural lakes are in the Sava River basin. The Cerknica Lake, having the maximum surface area of 24 km^2, is the biggest lake in Slovenia and the world-famous intermittent karstic lake, which only fills up from time to time. The other two are Alpine lakes: the Bohinj Lake (3,18 km^2) with the volume of 120 million m^3 and depth of 44,5 m and the Bled Lake (1,4 km^2).

The major artificial lakes are the Ptuj lake with the surface area of 3,46 km^2 and volume of almost 20 million m^3, Vuhred with 2,41 km^2, the Maribor Lake with 2,39 km^2, Vuzenica with 1,96 km^2 Ožbalt with 1,54 km^2 and Dravograd with 1,42 km^2. In the Sava River basin there are also the Zbilje Lake and Moste with 0,69 km^2 each.

The Ledava Lake with the surface area of 2,18 km^2 serves as a protection from floods and the Šmartinsko lake with 1,07 km^2 as a protection from high levels of water of the neighboring Celje and as a reservoir for industry water.

The so-called montanogeous lakes are special kind of artificial lakes. The Velenje lake with the surface area of 1,24 km^2 and the volume of 22 million m^3 is the biggest of them.

Table 2.5. The biggest lakes in the Danube River basin in Slovenia (Statistični letopis 1997)

Lake	type of lake	Catch-ment	Area (km^2)	Height above sea level (m)	Greatest depth (m)	Extent (m)	Volume (million m^3)
Cerknica	natural	Sava	24,00	552	10,7	40200	76,0
Ptuj	anthropoge-nous	Drava	3,46	220	12,1	14400	19,8
Bohinj	natural	Sava	3,18	526	44,5	11000	120,0
Vuhred	anthropoge-nous	Drava	2,41	317	23,0	26600	11,2
Maribor	anthropoge-nous	Drava	2,39	267	10,7	31400	13,8
Ledava	anthropoge-nous	Mura	2,18	222	6,0	8900	5,7
Vuzenica	anthropoge-nous	Drava	1,96	330	10,8	24000	7,5
Ožbalt	anthropoge-nous	Drava	1,54	299	23,9	25400	10,2
Dravograd	anthropoge-nous	Drava	1,42	339	12,4	20400	5,6
Bled	natural	Sava	1,40	475	30,6	5590	31,7
Dražmer	anthropoge-nous	Sava	1,24	368	55,8	4780	22
Šmartinsko	anthropoge-nous	Sava	1,07	261	7,0	9800	6,5
Zbilje	anthropoge-nous	Sava	0,69	328	20,0	11500	6,5
Moste	anthropoge-nous	Sava	0,69	523	50,0	9300	7,0

Source: SORCE, Statistični letopis, 1997.

E. Karstic Water Sources

Karstic areas are characterized by numerous and abundant water sources, which provide for a vast hinterland area. Flow and quality of karstic water sources is very varied, since the karstic underground does not have great self-purification ability. There are 16 karstic sources with the abundance of over 350 l/s, 12 in the Sava River basin.

Table 2.6. Main sources in Slovenia with abundance of over 350 l/s

Source	basin	Settlement	Abundance (l/s)
Bistra	Sava	Bistra	1600
Lipnik	Sava	Zgornje Gorje	1500
Malenšèica	Sava	Planina	1400
Tominèev studenec	Sava	Žužemberk	1350
Krupa	Kolpa	Gradac	1000
Izvir pri Ficlju	Sava	Gornji Grad	624
Kroparica	Sava	Kropa	600
Preèna	Sava	Preèna	550
Retovje	Sava	Verd	500
Završnica	Sava	Žirovnica	480
Boèna	Sava	Boèna	448
Kamniška bistrica	Sava	Kamniška Bistrica	400
Èabranka	Kolpa	Èabar	350
Radešca	Sava	Dolenjske Toplice	350

Source: Vodnogospodarske osnove, 1978

F. Dynamic Underground Water Resources in Aquifers with Intergranular Porosity

Dynamic underground water resources amount to 50,4 m^3/s. Dynamic resources of aquifers with crevice and karstic porosity amount to 31,6 m^3/s or 62 % and aquifers with intergranular porosity amount to 18,8 m^3/s or 36,8 %. Aquifers with intergranular porosity total 3726 km^2 or 18,4 %.

In the Black Sea basin, there are 98 % of dynamic resources of underground water in aquifers with intergranular porosity and 85 % of all Slovenian dynamic underground water resources. The biggest dynamic groundwater resources are in the Sava River basin, estimated to be 11,7 m^3/s or 62,2 %. Areas with high quantity of groundwater in the Sava River basin are: the Kranj, Sorica and Ljubljana basins, with the total of dynamic resources of over 8,0 m^3/s, and low quantity of groundwater is in Skaruèen-Vodice basin, near the Kamnik Bistrica, on the Ljubljana moor, in Krško, Brežice and Èatež polje and in the Savinja valley, where the dynamic resources of an area do not exceed 1,0 m^3/s. In the Sava River basin there are 67 % of all dynamic underground water resources, namely 25 % in the upper course of the Sava, 24 % in the middle course of the Sava including the Ljubljanica, 10 % in the Savinja and Sotla River basins and 8 % in the lower course, including the Krka River.

In the Drava and Mura River basins, the dynamic resources of groundwater amount to 6,8 m^3/s or 36 %. The most important groundwater areas are the Dravsko polje, the Vrbanski plato near Maribor and the Ptujsko, Mursko, Prekmursko and Apaško polje. In the Drava River basin there is a total of 5,4 m^3/s or 28,5 % of dynamic groundwater resources and 1,4 m^3/s or 7,4 % of resources in the Mura River basin. This area does not contain high underground water resources in crevice and karstic aquifers, which is demonstrated by the data, that the Drava River basin contains 13 % of all dynamic resources of underground water, while the Mura River basin only contains 3 %.

Table 2.7. Dynamic groundwater resources and aquifer resources with intergranular porosity

	dynamic groundwater resources	% of all dynamic resources in Slovenia	dynamic resources of aquifers with intergranular porosity	% of all dynamic groundwater resources in Slovenia	% of all dynamic underground water resources in Slovenia
the Black Sea basin	42,8 m^3/s	85,0	18,4 m^3/s	98,0	36,5
the Sava basin	33,8 m^3/s	67,0	11,7 m^3/s	62,2	23,2
the Drava basin	6,6 m^3/s	13,0	5,4 m^3/s	28,5	10,7
the Mura basin	1,5 m^3/s	3,0	1,4 m^3/s	7,4	2,8
the Kolpa basin	1,0 m^3/s	2,0	insignificant	/	/
Slovenia	50,4 m^3/s	100	18,8 m^3/s	100	37,3

Source: Enciklopedija Slovenije, 1997; Lah, 1995

G. Wetlands and Other Humid Biotopes

Record of humid biotopes - wetlands is incomplete. It is estimated that they cover a surface of 26.000 ha or 1,3 %. In future, wetlands register will be made according to EC methodology. Some wetlands are incorporated into natural parks or protected as natural reserves: Zelenci, Malo polje, Udinboršt, Bobovek near Kranj, Kostanjevica and Goriški mah in the Ljubljana moor, Krakovski gozd, Negovsko jezero, Raèki ribniki, Drava, the Maribor lake. It is estimated that approximately 10 500 ha of wetlands are protected in natural parks in the Black Sea basin, which represents 17,5 % of all protected areas in natural parks. Half of protected wetlands are situated in the Sava River Basin. Wetlands protected in the Drava and Sava River basins represent more than 60 % of all protected areas in natural parks.

Table 2.8. Surface area and share of wetlands in Slovenia

	Wetlands incorporated into natural parks-estimation	Share of natural parks surface area-estimation
the Black Sea basin	10 500 ha	17,5 %
the Sava basin	5 500 ha	10,6 %
the Drava and Mura basins	4 737 ha	63,3 %
the Sotla basin	0	0,0 %
the Kolpa basin	260 ha	100,0 %
Slovenia	11 500	9,5 %

Source: Vrt Evrope, 1996

Many wetland areas were suggested to be protected, especially in the Mura, Drava and the Kolpa River basins. The entire course of the Mura, the Ljubljana moors and the Kolpa, and some sections of the Drava and Ormož lake are planned to be protected.

2.2. Biological Resources and Eco-systems

A. Physical, Geographical, Landscape and Ecological Characteristics of the River Basins

Physical, geographical and ecosystem characteristics of the Danube River basins are mainly a reflection of the transit geographic position, where alpine, sub-alpine, dinaric-karstic and sub-Pannonian characteristics interweave. The Drava basin bioclimatically marks a transition from the Alpine and dinaric part of the basin with very humid climate to the humid climate of the main part of the Sava basin and to the semi-humid and partly semiarid climate of the Drava and Mura River basins. Almost entire Danube basin area belongs to potentially forest ecosystem, which is, however, reduced. The forest surface has increased by approximately 10 % in the last forty years. Forest ecosystem covers approximately half of the Danube basin area and is prevalent in the Dinaric-karstic, Alpine part and the Alpine foothills of the Sava River basin and the highland areas of the Drava River basin (Gams, 1996).

The Mura River rises in Austria and her basin surface area in Slovenia covers 1376 km^2. The Slovenian part of the Mura River basin extends over mainly agricultural sub-Pannonian landscape ecosystem of flatland and hills, with predominant tertiary impermeable rock formations and Pleistocene gravel alluvia. Riverside soil is predominant on gravel and sand alluvia. The main tributaries with a low flow rate are Ledava and Šèavnica, which drain water from the tertiary and hilly part of the Mura basin.

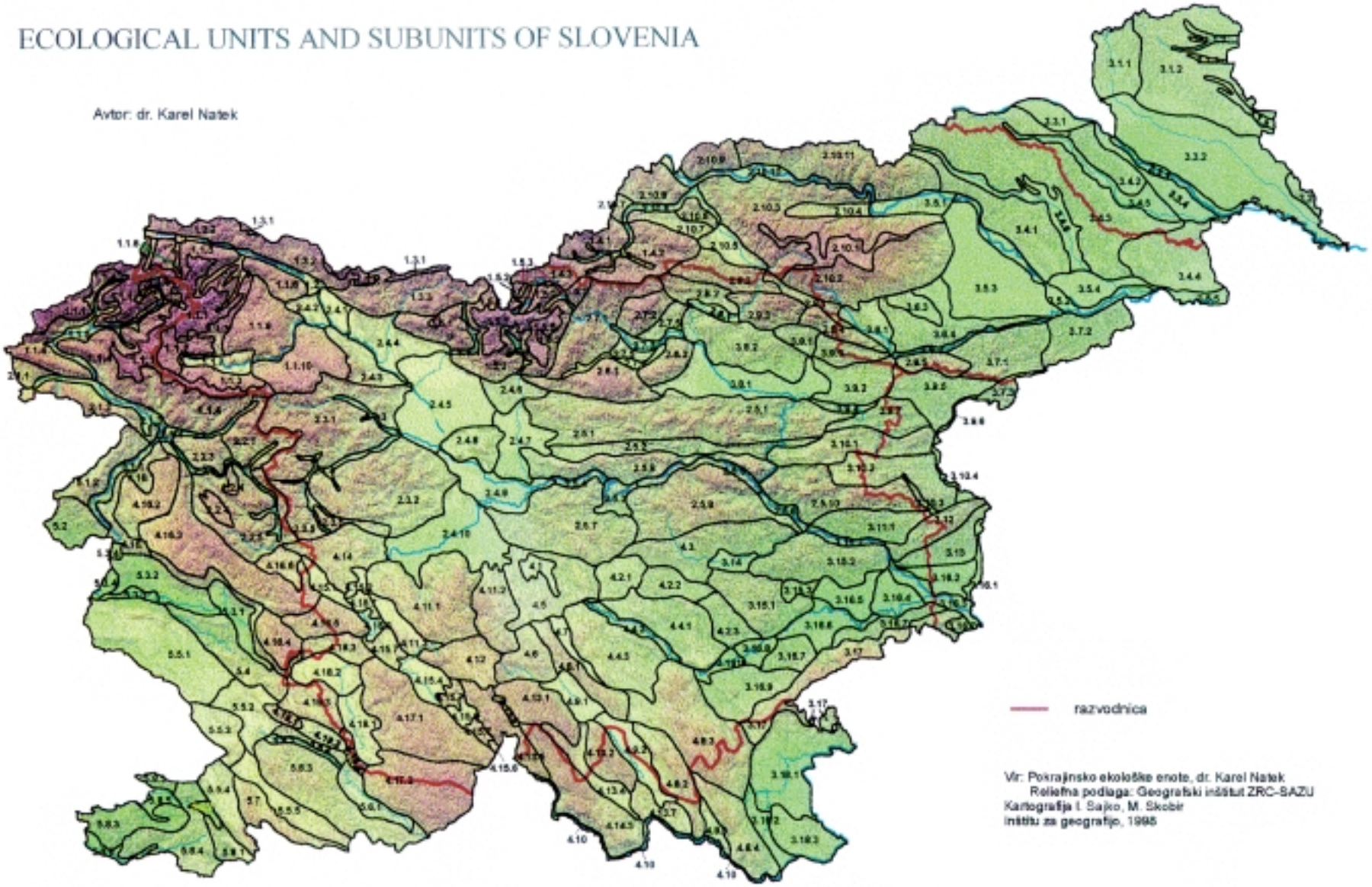
The Drava River rises in Austria and her basin surface area in Slovenia covers 3253 km^2. The Slovenian part of the Drava River basin can be said to consist of predominantly alpine and karstic basin of the Meža River, sub-alpine and non-karstic area of small river basins of Pohorje and Kozjak water sources, sub-alpine – sub-Pannonian basin of the Dravinja with Dravinjske gorice and Haloze, river basins of small water sources of Slovenske gorice and the flatland, gravelly Dravsko - Ptujsko polje (groundwater area) (Kolbezen, Pristov, 1998).

The Sava River basin extends over 11.734 km^2 or 58 % of the Slovenian territory (Table 2. 9). It covers the following landscape units: mountainous, predominantly karstic-alpine area (the Julian Alps, the Savinja Alps and the Karavanken Mountains), extensive, mainly karstic hill ranges at the foothills of the Alps with basins (the Ljubljana and Celje Basins with groundwater areas), a part of dinaric-karstic area (the Ljubljanica, Krka and Kolpa River basins) and a small part of the sub-Pannonian area (the Sotla River basin). The following bioclimatic belts are present (Gams, 1996, p. 40): valley and basin bottoms-floors, thermal belt, hill belt (450 - 950 m), mountain belt (950 - 1700 m) and alpine belt (above timberline). Coniferous forest prevails in the mountainous part and mixed forests in the remaining high altitude river basin part.

Due to ecosystem diversity of Slovenia, differences in precipitation rate and precipitation regimes, the condition of water greatly varies among the river basins. The average specific flow in the Slovenian part of the Black Sea basin is approximately 25 $l/s/km^2$, and the runoff coefficient is 55 %. Annual specific runoff in the river basins of the sub-Pannonian rivers (e.g. the Ledava) is lower than 5 $l/s/km^2$, while runoff coefficient is below 20 % or below 200 mm. In the Sava Bohinjka River basin, the annual specific runoff is 90 $l/s/km^2$, while the runoff coefficient exceeds 80 % or 2500 mm (Kolbezen, Pristov, 1998).

ECOLOGICAL UNITS AND SUBUNITS OF SLOVENIA

Avtor: dr. Karel Natek



Vir: Pokrajinsko ekološke enote, dr. Karel Natek
Reliefna podlaga: Geografski inštitut ZRC-SAZU
Kartografija I. Sajko, M. Skobir
Inštitu za geografijo, 1998

Table 2.9. Hydrological and ecosystem characteristics of the main river basins in Slovenia

Basin	Surface area (km^2)	Share of surface area (%)	River network density (km/km^2)	Specific runoff ($l/s/km^2$)	Runoff coefficient (%)	Ecosystem river basin label
the Black Sea basin	16363	80,9	1,38	25,4	55	ecosystem diversity, humidity, annual precipitation 1550 mm
the Mura basin	1376	6,8	1,48	7,3	25	mainly hilly sub-Pannonic area, precipitation 900 mm
the Drava basin	3253	16,1	1,88	18,1	47	foothills of the Alps and sub-Pannonic area, precipitation 1200 mm
the Sava basin (Kolpa excluded)	10 746	53,2	1,30	29,6	59	the Alps, foothills of the Alps and dinaric- karstic area, bioclimatic belts, precipitation 1600 mm
the Kolpa basin	998 (1943 in all)	4,9	0,53	29,1	58	dinaric-karstic area, precipitation 1600 mm
the Adriatic basin	3857	19,1	1,06	44,6	68	Sub-mediterranean and Alpine area, precipitation 2100 mm
SLOVENIA	20 230 (20 256)	100,0	1,32	29,0	58	ecosystem transience and great landscape diversity, 1570 mm

Source: Enciklopedija Slovenije, 1997; Kolbezen, Pristov, 1998; Environmental Performance Reviews - Slovenia, 1997; Ogrin, 1996; Plut 1988

B. Biotic Diversity

In Slovenia, a record of 24.000 species is kept, however, it is estimated that the number is twice that big. There are 8.888 recorded flora species and 13.632 terrestrial fauna species. Slovenia is also rich in endemic species. 850 fauna species and 46 flora species are recorded as endemic. 550 of endemic species are edaphon animals. 2000 fauna species are recorded on the "Red List", the most endangered of them being the vertebrate animals (there are 65 % of them on the list; most of them are amphibians and reptiles) and 810 of flora species, which include 88 lichen species, 213 deciduous moss species and 509 kinds of higher plants.

Decree on conservation of rare and endangered fauna and flora species and their developmental forms stipulates the conservation of 47 fauna species: 8 beetle species, 5 butterfly species, one locust species, proteus, the "sklednica" turtle, some species of snakes, most bird species, hedgehog, meadow saffron, dormouse, cave animals and all species of beetle and butterfly above timber line. 28 flora species are protected from 1976 onward.

C. Protected Areas

In Slovenia, 710 areas and natural monuments and approximately 140.000 ha of pieces of land or 7 - 8 % of the national territory in all are incorporated into various protected areas. 83.807 ha or 59,7 % of protected area is within the Triglav National Park (according to IUCN II./V. category), 413 ha or 0,3 % within the (III. category) the Škocjanske jame regional park and 56.180 ha or 40,0 % within 34 country parks (V. category). There are also 49 natural reserves in Slovenia (I. in IV. category), whose surface area has not been estimated and 623 natural monuments (III. category).

In the Danube River basin, 60.034 ha of land or 42,8 % of all protected areas are incorporated into natural parks. 52.100 ha or 37,1 % in the Sava River basin, 7.478 ha or 5,3 % in the Drava and Mura River basins, the Trebèe Memorial Park with 196 ha or 0,1 % of land in the Sotla River basin and the Lahinja regional park with 260 ha or 0,2 % of protected surface area in the Kolpa River basin.

Table 2.10. Survey of protected areas in the Slovenian part of the Danube River basin

	Surfaces incorporated into national parks in ha	Share of all protected surfaces in Slovenia
The Black Sea basin	60.034	42,8 %
the Sava basin	52.100	37,1 %
the Drava and Mura basins	7.478	5,3 %
the Sotla basin	196	0,1 %
the Kolpa basin	260	0,2 %
Slovenia	140.400	100,0 %

Source: Vrt Evrope, 1996

In the Black Sea basin, over 100.000 ha of surfaces is to be protected in natural parks. That would increase the share of protected surfaces to 12 %. There are approximately 72.000 ha in the Sava River basin and approximately 32.000 ha in the Drava and Mura River basins.

2.3. Human Impact

The population increased by almost half a million after the war. The share of rural population dropped drastically. As early as in the 1960s has the domination of the primary sector in the active population structure passed to the domination of the secondary structure, while at the same time - especially in the last decade- there was an increase in the share of the tertiary and quaternary sectors. In the middle of the 1990s, service activities dominate in the workplace structure.

In the post-war era, several new development centers appeared alongside old industrial areas, which gradually started to take over the function of new development centers. The traditional centers, such as Ljubljana, Celje, Kranj, Jesenice, Trbovlje and Maribor in the Drava River basin were joined by new centers, especially: Novo mesto, Velenje and somestje Krško-Brežice in the Sava River basin and Murska Sobota in the Mura River basin. The backbone of the economy is the 82 job centers with an excess of more than 1000 workplaces. They provide 84 % of all workplaces. Ljubljana has a dominant position in the Sava River basin, since there are three times as many of workplaces than in the center of the Drava River basin - Maribor. Kranj and Celje come third and fourth and have approximately a half less of workplaces put together than Maribor. Otherwise, the Ljubljana-Gorenjsko-Kamnik employment basin is prevalent, (with 40 % of all workplaces), and it is followed by the Podravje and Celje-Velenje (each with 10 % of workplaces) employment basins. Next there are minor employment centers or groups of centers: Novo mesto, Murska Sobota (each with approximately 4 % of workplaces) and koroško somestje of industrial centers (Slovenj Gradec-Dravograd-Ravne-Mežica), the Zasavje cities, Ptuj, Postojna (with approximately 2,5 % of workplaces). There are more than 10.000 workplaces in these cities, a quarter in industry (in the Mura River basin as much as 44%). Besides, there is a string of small industrial towns, which have one or two industrial branches on average. Workplaces are getting distributed more and more evenly, since they can be found in 3705 settlements. Settlements with less than 50 workplaces are in majority and there is 3200 of them. Only 3 % of the employed population worked there. There were 216 settlements with more than 100 workplaces, which presented 95 % of all workplaces in the Slovenian part of the Danube River basin. A more thorough analysis showed that some major changes have occurred in the last decade. The arrangement of workplaces according to natural and geographical or political and territorial criteria crucially depends on the level of the economical or general development of the settlement. There is a rule that holds true for less developed settlements and that is that they tend to concentrate workplace development in one (industrial) center. The more developed regions, on the other hand, usually spontaneously develop most settlements together with workplaces, which follow each other in strings - "carpets". Because of the increase in the population density and activities in the flatland areas with groundwater, conflicts concerning water supply are on the increase

2.4. Key Issues of Environmental Degradation

Its diverse landscape and natural geographic features contribute strongly to the extent and level of environmental pollution in Slovenia as does its industrial development to now. The most polluted countryside lies in the basins and deep mountain valleys among the Alps and their foothills, most of them are in the Sava River basin (Zasavje, the Celje, Šaleško, Ljubljana, upper Savsko imisijsko area), only exceptionally are they in the Drava basin (the Mežica valley), while there are no strongly polluted areas to speak of in the Mura basin, but more of negative effects on landscape of various actions (regulations, big farms, irrational use of chemicals in agriculture e.t.c.). The enclosed relief enhances negative landscape effects of environmental pollution even with relatively small emission levels. In general, environmental pollution was increasing up to the middle of the last decade, then began to decrease with a reduction in air and river pollution and less damage to vegetation caused directly by high emission levels. Worse has become the quality of underground water, traffic pollution has increased and many local authorities have difficulty in managing their waste.

Contributing to air pollution are unfavorable stillness of winds, all-to-frequent temperature inversions and the location of the main sources of emissions being in relief depressions. With respect to SO_2 emissions, the main sources are three coal-fired power stations, which account for more than 80 % of emissions (cca 120.000 t/year). All three coal-fired power stations are situated in the Sava River basin. The remaining 20 % of SO_2 emissions are due, in approximately equal proportions, to industry and residential heating. Between 1990 and 1995, SO_2 emissions have fallen by 39 %, or from 97 kg to 59 kg per person in Slovenia (from 195 000 t in year 1990 to 119 300 t in year 1995). The causes of this reduction were a fall in industrial production (industry's share of the GDP fell from 36 % in 1990 to 30 % in 1995), more use was made of imported coal which is more environmentally-friendly than domestic coal and alternative energy sources (gas and fuel oil), the introduction of piped gas to many towns and ecological improvements, a considerable lessening of SO_2 emissions is also the result of environmental rehabilitation of one of Šoštanj's coal-fired power stations (Onesnaženost zraka....,1996, HMZ-MOP). Considering that the Danube basin has as much as 88 % of population, some positive changes regarding the use of more environmentally-friendly kinds of fuel in households have been made, and the annual municipal emissions have fallen most exactly in that part of Slovenia, and especially in the Sava River basin.

There has been a progressive rise in nitrogen oxides mainly due to increased emissions from traffic (there has been a 65 % increase in motor vehicles) both domestic and international (more traffic to and from countries of former Yugoslavia). More than 92 % of all nitrogen oxide emissions are from traffic.

In looking at the most polluted parts of Slovenia, it is evident that, unlike other central and Eastern European countries, these are not the biggest urban centers (Ljubljana or Maribor) but places in the vicinity of coal-fired power stations and large industrial plants that also have very unfavorable meteorological conditions as they lay in basins and narrow valleys (of The Sava and Drava tributaries). The most polluted regions of Slovenia are still Zasavje in the Sava basin (Trbovlje, Hrastnik and Zagorje), where there is a confluence of town, industrial and power station emissions, the Šaleško valley - the Sava River basin (and its borders - coal-fired power station pollution - and Celje -the Sava River basin - industrial and municipal emissions and its location in a basin. Experts warn of increasing summer concentrations of ozone that are already at dangerous levels in the summer months.

Due to the hilly relief, rivers flow at different rates at different times of year. River pollution levels change from low in Spring and Autumn to high in Summer and Winter. Slovenia has many rivers with small streams polluted from dispersed industry dumping its waste leading to the whole water system being polluted. After 1990, there has been a noticeable reduction in water pollution due to reduced production levels and better waste management. Industrial pollution of rivers and streams has fallen by 30 to 40 % since 1990 whereas municipal pollution has remained at the same level.

Among the larger (international) rivers in Slovenia, the most polluted is still the Sava which is 2nd or 3rd class polluted from Ljubljana to neighboring Croatia. The Mura has improved its pollution rating from 3rd to 2nd class due to improvements in pollution control in Austria. Tributaries have become critically polluted, especially their shorter lengths such as the lower Kamniška Bistrica, Ljubljanica, Voglajna, Sotla and Šèavnica. A shortage of cleaning devices remains a crucial problem especially in the larger towns such as Ljubljana, Maribor and Celje. At the same time cleaning wastewater has improved in smaller places. Continuing reductions in pollution is evident in both alpine lakes (Bohinj and Bled); (HMR, Kakovost...,1996). All the same, some biological and chemical factors in 1995 and 1996 warn, that the intake of fertilizers into the Bohinj Lake is too big (Poroèilo o varstvu okolja 1996, 1998).

On the Drava, Mura and Celje fields, intensive farming with a high use of protective chemicals and mineral fertilizer has lead to pollution of groundwater. The high level of pesticides in the water is already exceeding safety levels for drinking water by European standards. Due to extensive

meliorative activities on the Drava and Mura River basins, and to a minor extent also the Sava basin, many fauna and flora species are endangered or even extinct, therefore the natural equilibrium is strongly endangered, and it is even more intensified by big agriculture land density.

Forests cover 53 % of Slovenia and are growing at the expense of meadows and fields in the more unapproachable areas of the country. Damage to forests that is at least indirectly attributable to harmful emissions, are evident in the direct hinterlands of larger industrial and energy sources (the Mežiška valley -the Drava basin, Zasavje, the Šaleška valley and Celje's emission area - the Sava basin). 22,4 % of all trees are damaged – 14,8 % of conifers and 26,3 % of deciduous trees. Most affected are firs, pine, spruce and oak.

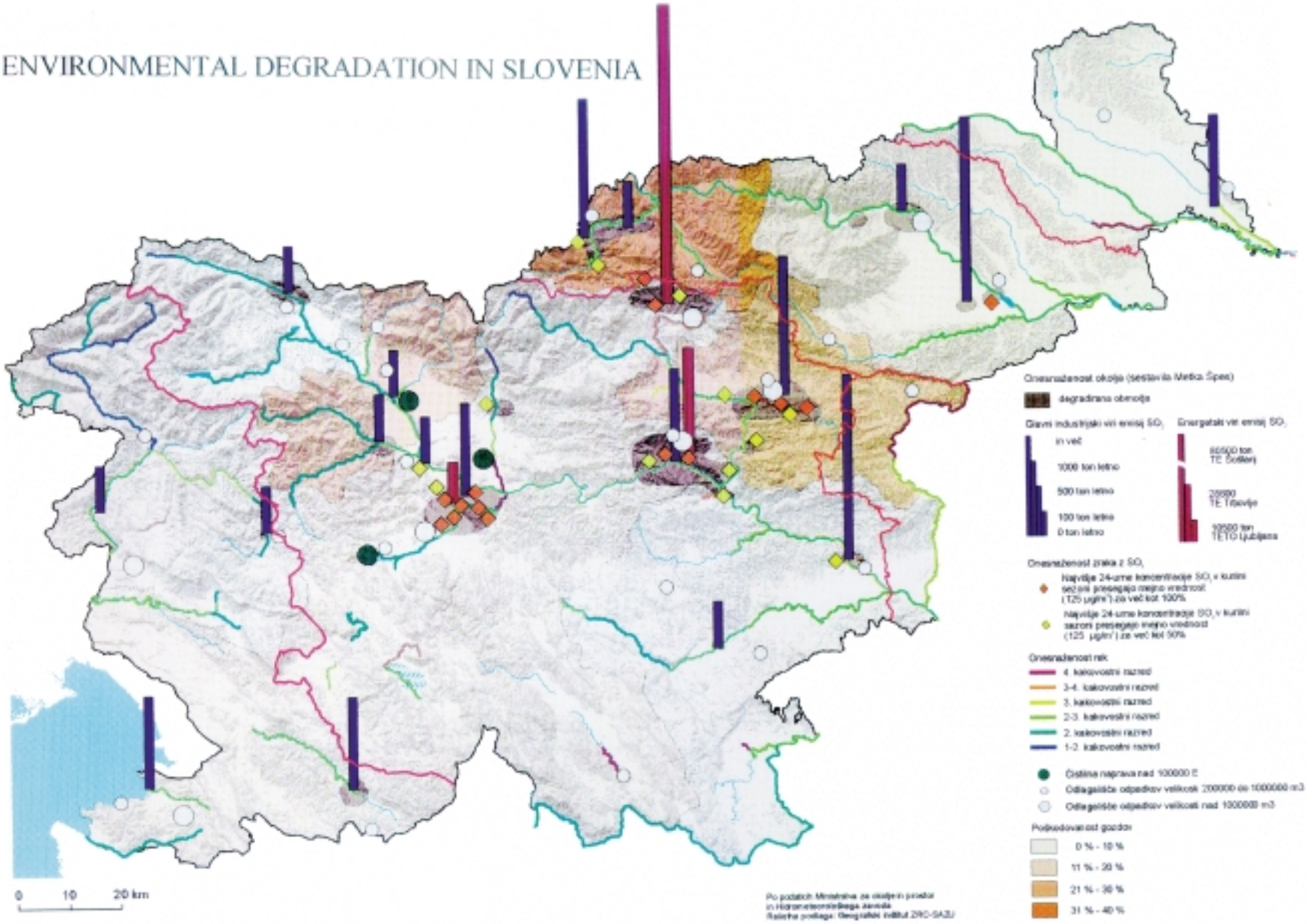
Rich biological diversity is mainly due to the convergence of different types of climate, geological structure and great differences in altitude. According to the Dobris Assessment, except for fish and vascular plant species, the rate of threatened species is higher than in the rest of Europe.

Industry has experienced great changes in the socio-economic upheavals after 1990 - in system, ownership, structure, technology and markets. In 1990, industry employed 345.000 people, five years later 251.500 or just as many as were employed a quarter of a century before. After the collapse of the Yugoslav market, independent Slovenia has turned more and more towards the markets of the EC. This has resulted in the closure of a number of harmful industrial plants.

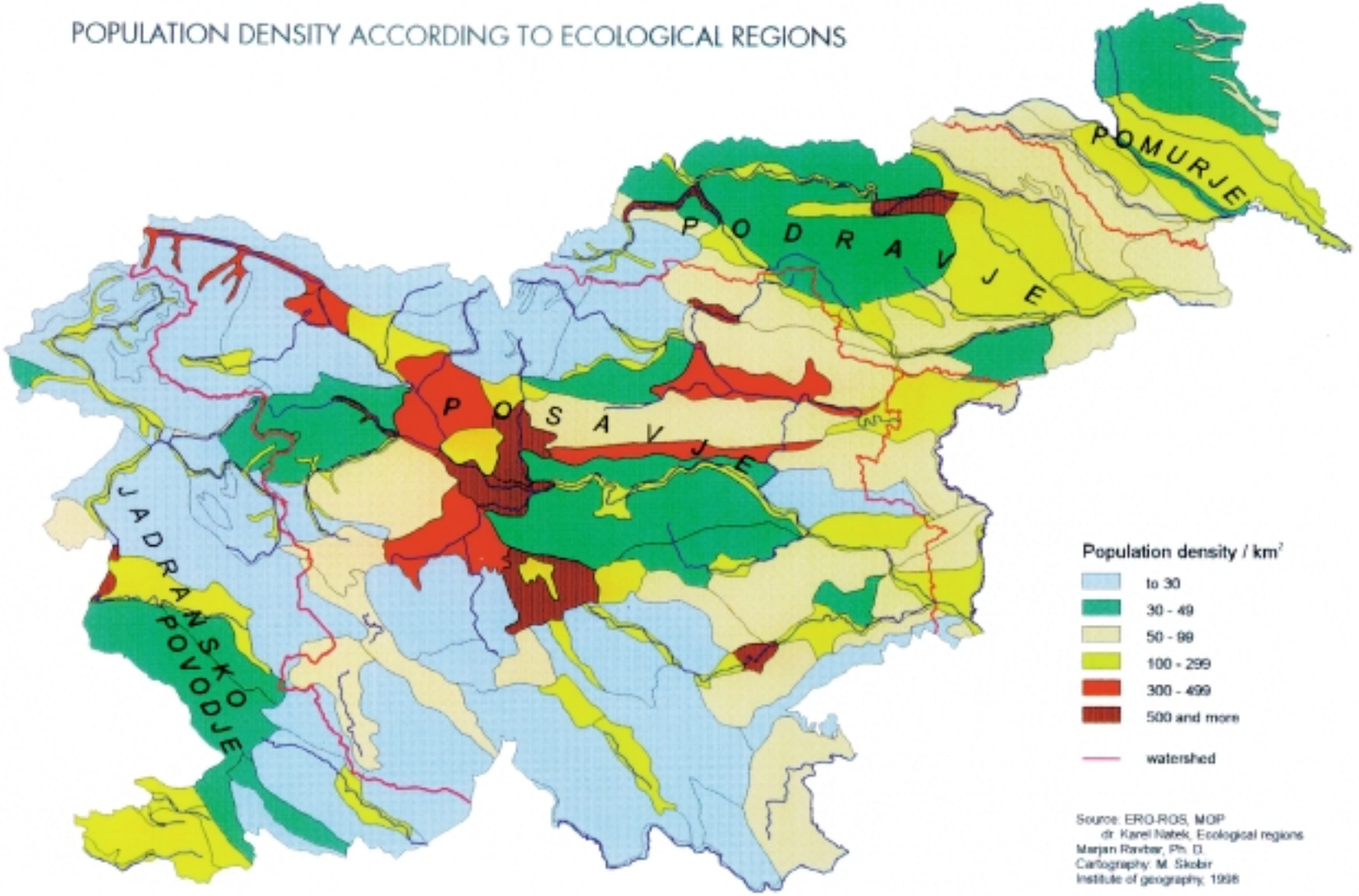
Because of its geographic position, Slovenia is also an important transit country for international traffic. After independence and the start of the Balkan wars, traffic is mainly in the West to East direction where insufficient roads and dense traffic places an additional burden on the environment (traffic emissions). Lately traffic in the North to South direction has reappeared. The negative ecological effects will only be reduced with the use of better quality fuel and the construction of motorways.

Most of waste materials in Slovenia are produced in the area of central Slovenia, in the Drava and Savinja region (in Danube's region of Slovenia are produced 729.200 t municipal waste - total in State 848.500 t, more than 400 kg per capita; and 416.860 t of hazardous and special waste - total in State 445.350 t). 50.000-60.000 illegal dumpsites, which contain approximately 10 million m^3 of solid waste are potentially hazardous as far as water pollution is concerned.

ENVIRONMENTAL DEGRADATION IN SLOVENIA



POPULATION DENSITY ACCORDING TO ECOLOGICAL REGIONS



Source: ERO-ROS, MOP
dr. Karel Natek, Ecological regions
Marjan Ravbar, Ph. D.
Cartography: M. Skobir
Institute of geography, 1998

3. Analysis and Projection of Population and Water Sector - Relevant Demographic Characteristics

3.1. Population and Economic Situation

3.1.1. Settlement Pattern, Population Density

The number of population has been the same for the last few years. According to the Central population register data, 1,9895 million people lived in Slovenia at the end of 1996, and according to the 1991 census, 1,9748 million.

Nine tenth of settlements of four fifths of population (1,74 million.) live in the Danube River basin. The Sava River basin is the biggest basin, since there are three fifths of population and 69 % of settlements, whereas the population number in the Drava River basin is three times lower. 6 % of the population live in the Mura River basin. The remaining 12 % of population live near rivers that flow into the Adriatic. One of the characteristics of Slovenia is a big diffusion of settlements, since only a good half of the population lives in cities. Less than two million people live in six thousand settlements and there are only two cities (Ljubljana with more than 300.000 inhabitants and Maribor with over 160.000 inhabitants), which can hardly compare with other, foreign agglomerations. Other settlements are small. Only Kranj and Celje city agglomerations have over 50.000 inhabitants in the Danube River basin. A group of cities follows: Velenje, Novo mesto, Murska Sobota, Ptuj and Škofja Loka and merged settlements (the Kamnik-Bistrica plain, Revirji, Zgornje Gorenjsko, the Slovenian Koroška, Krško-Brežice polje), where the population, including the suburbs, totals between 20.000 and 50.000.

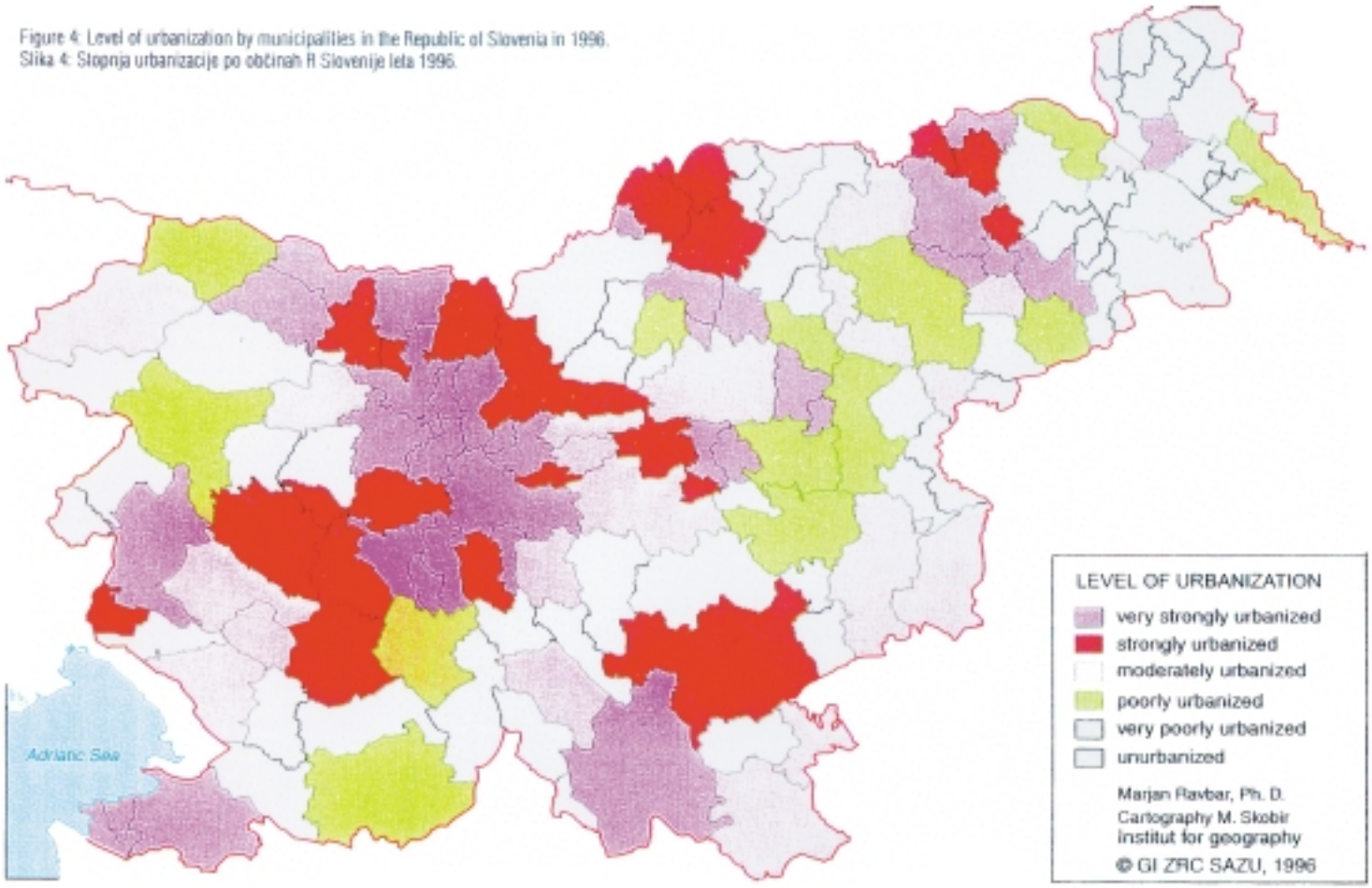
In the last three decades, the population of Slovenia has increased by one fifth (124 %), and in the city regions and urbanized settlements by one half (146 %). In this period, the cities and isolated urbanized centers have experienced the most intensive growth, where the average annual level of growth was 1,64 % or 1,73 % respectively. The Slovenian part of the Danube River basin has always been characterized by low level of urbanization. However, some major changes have occurred in the last few decades. In the 1960s and 1970s we have witnessed fast urbanization process caused by industrialization, when the share of urban population gradually grew from 36,1 % in 1961 to 53 % in 1996. Urbanization growth also affected household water consumption.

Average density of settlements in the Danube River basin is higher than elsewhere in Slovenia (105 inhabitants/km^2). There are no significant differences between the main river basins. However, there are big differences between valley and predominantly flatland coastal (and also ecologically the most vulnerable) areas (where density of settlements exceeds 250 inhabitants/km^2) and the hilly, mountainous and alpine areas, where the population density is five times lower. The Ljubljana, Velenje and Novo mesto basins, the Selce, central Savinja and upper Sava valleys in the Sava River basin, and the Mežica, Mislinja and central Drava valleys in the Drava River basin have an especially high density of settlements - 500 inhabitants/km^2.

Cities, representing 1,2 % of Slovene settlements (where a good half of Slovenian population lives) are immediately surrounded by a wreath of 5 % of settlements in the narrowest suburbanized surroundings followed by 11 % of strongly urbanized suburb settlements. The extremely urbanized rural and half-urbanized, transitional areas of settlements numbered a further 16 % of settlements, while the remaining 3942 settlements were ranked among the rural settlements. Analysis showed that one third of Slovenia is strongly urbanized and that more than nine tenths of the population lives in urbanized settlements. The highest levels of urbanization are found in the central Slovenia from Jesenice to the Ljubljana Basin and the Kamnik-Bistrica plain, in the Koèevje region, Revirji, the Celje Basin, the Šaleška Basin, which all belong to the Sava River basin and Dravsko-Ptujsko polje. These are the areas where waters, especially surface water and groundwater, are very burdened.

The essence of the settlement system is in the rich spectrum of exchange activities between cities and the urbanized areas immediately surrounding the cities and physical transformation of settlements as the result of social restructuring of the population. Scattered residential building and settlement pattern make the construction of the municipal sewage system and the system of WWTPs difficult and costly, but on the other hand, they lessen the concentration of polluters in cities.

Figure 4: Level of urbanization by municipalities in the Republic of Slovenia in 1996.
Slika 4: Stopnja urbanizacije po občinah R Slovenije leta 1996.



URBANIZATION LEVEL ACCORDING TO LANDSCAPE UNITS

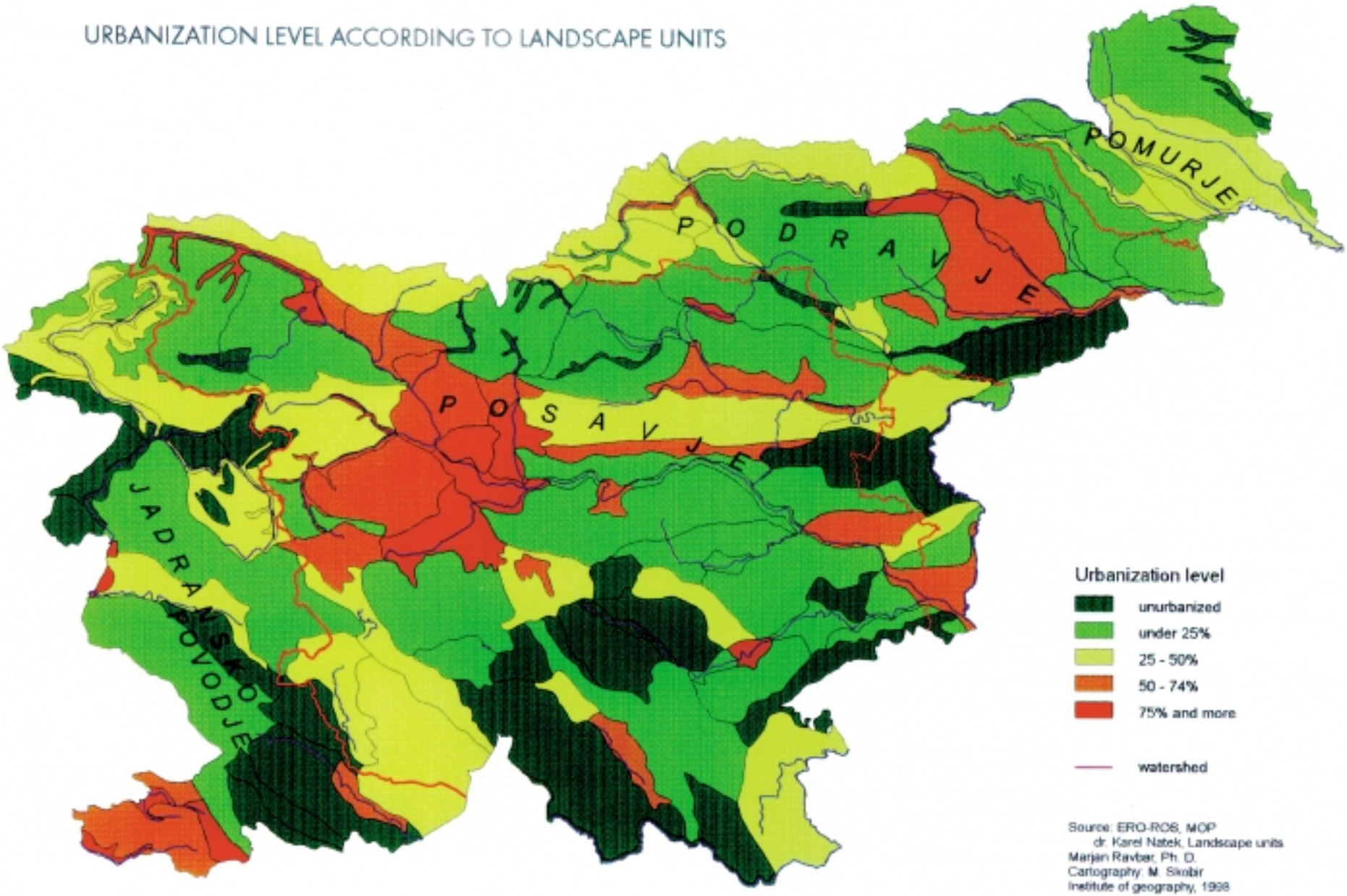


Figure 3: Urbanization in Slovenia (typology of areas – settlements).
Slika 3: Urbanizacija v Sloveniji (tipologija območij – naselij).

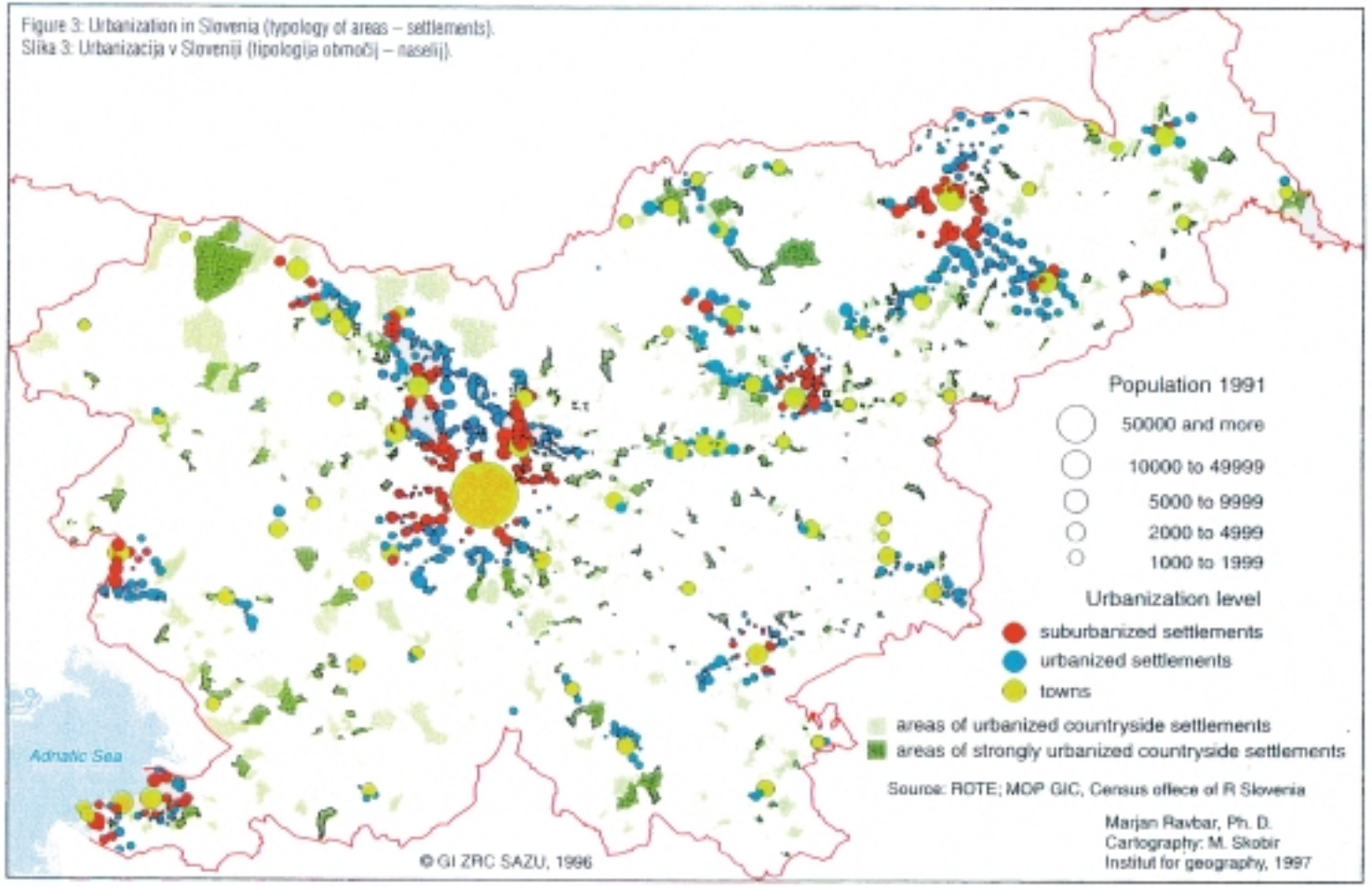


Table 3.1. Typical indices of population settlement in the Sava, Drava, Mura and Kolpa River basins and main types of surface in the Slovenian part of the Danube River basin in 1996

river basin	type of surface	inhabitants - together (1000)	no. of inhabitants in cities (1 000)	% of inhabitants in river basins	population density inhabit/km^2	% of urban population	surface area km^2	% of surface area	% urban area acc. to type of surface
valley-flatland		*248,2*	*150,4*	*13*	*280*	*61*	*88,6*	*4*	*79*
hilly, mountainous or alpine		*167,1*	*39,9*	*8*	*66*	*24*	*254,1*	*13*	*21*
the Drava	together	415,2	190,4	21	121	46	342,7	17	100
valley-flatland		*812,9*	*601,8*	*41*	*307*	*74*	*264,4*	*13*	*84*
hilly, mountainous or alpine		*370,2*	*115,4*	*19*	*42*	*31*	*880,8*	*43*	*16*
the Sava	together	1183,1	717,2	60	103	61	1145,2	57	100
valley-flatland		*85,9*	*26,3*	*4*	*127*	*31*	*67,5*	*3*	*94*
hilly, mountainous or alpine		*31,9*	*1,7*	*2*	*59*	*5*	*53,9*	*3*	*6*
the Mura	together	117,8	27,9	6	97	24	121,4	6	100
valley-flatland		*25,0*	*8,8*	*1*	*62*	*35*	*40,5*	*2*	*100*
hilly, mountainous or alpine		*0,6*	*0*	*0*	*5*	*0*	*11,7*	*1*	*0*
the Kolpa	together	25,6	8,8	1	49	34	52,1	3	100
valley-flatland		*1172,0*	*787,3*	*59*	*254*	*67*	*461,1*	*23*	*83*
hilly, mountainous or alpine		*569,7*	*157,0*	*29*	*47*	*28*	*1200,3*	*59*	*17*
the Danube-	together	1741,7	944,3	88	105	54	1661,4	82	100
other river basins		218,3	100,5	12	59	46	373,1	18	
Rep. of Slovenia		1980,0	1045,0	100	98	52,8	2025,0	100	

3.1.2. Landscape Land Use

The prevalent types of land use in the Slovenian part of the Danube River basin are forest areas, which represent half of the territory. Next, there are meadows and pastures, which cover a good quarter, and tilled land, which covers a seventh of the territory. Urbanized or barren ground represents 7 %. The rest are orchards and vineyards. The structure of land use is evenly spread among the river basins. The Mura River basin is an exception, since there are fewer forests. However, tilled ground prevails there.

Prevailing Land Use in 1994

(Source: M. Gabrovec, D. Kladnik, Some new aspects of land use in Slovenia, Geografski zbornik, 1997)

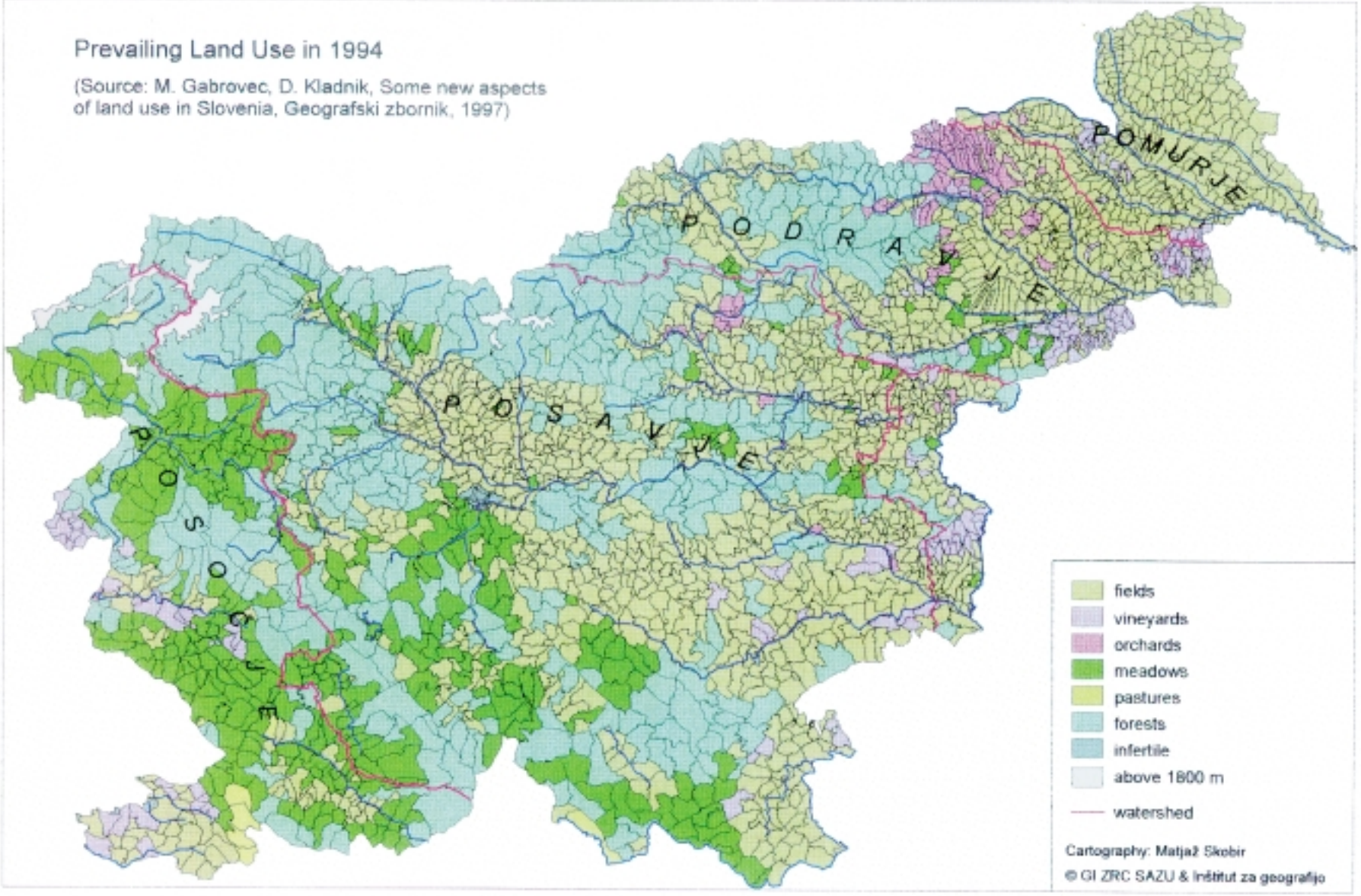


Table 3.2. Land use in the Drava, Mura, Sava and Kolpa River basins in the Slovenian part of the Danube River basin

land use 1994 (km^2)		fields	vineyards	orchards	meadows	Pastures	forests	other	together
the Drava basin	no.	474,9	44,8	117,2	479,0	165,9	1332,7	191,3	2805,7
	%	*17*	*2*	*4*	*17*	*6*	*47*	*7*	*100*
The Mura basin	no.	589,2	33,9	88,1	311,3	39,7	440,3	122,2	1624,8
	%	*36*	*2*	*5*	*19*	*2*	*27*	*8*	*100*
the Sava basin	no.	1174,5	65,9	158,6	2148,7	1181,7	6430,1	960,1	12119,5
	%	*10*	*1*	*1*	*18*	*10*	*53*	*8*	*100*
the Kolpa basin	no.	103,6	10,4	8,3	165,3	155,1	486,8	28,5	958,1
	%	*11*	*1*	*1*	*17*	*16*	*51*	*3*	*100*
the Danube basin	no.	2342,3	155,0	372,2	3104,3	1542,3	8689,8	1302,1	17508,1
	%	*13*	*1*	*2*	*18*	*9*	*50*	*7*	*100*
other river basins	no.	211,3	60,5	26,3	559,4	530,4	1202,9	154,3	2745,1
	%	*8*	*2*	*1*	*20*	*19*	*44*	*6*	*100*
Slovenia	no.	2553,5	215,5	398,6	3663,7	2072,7	9892,8	1456,4	20253,2
	%	*13*	*1*	*2*	*18*	*10*	*49*	*7*	*100*

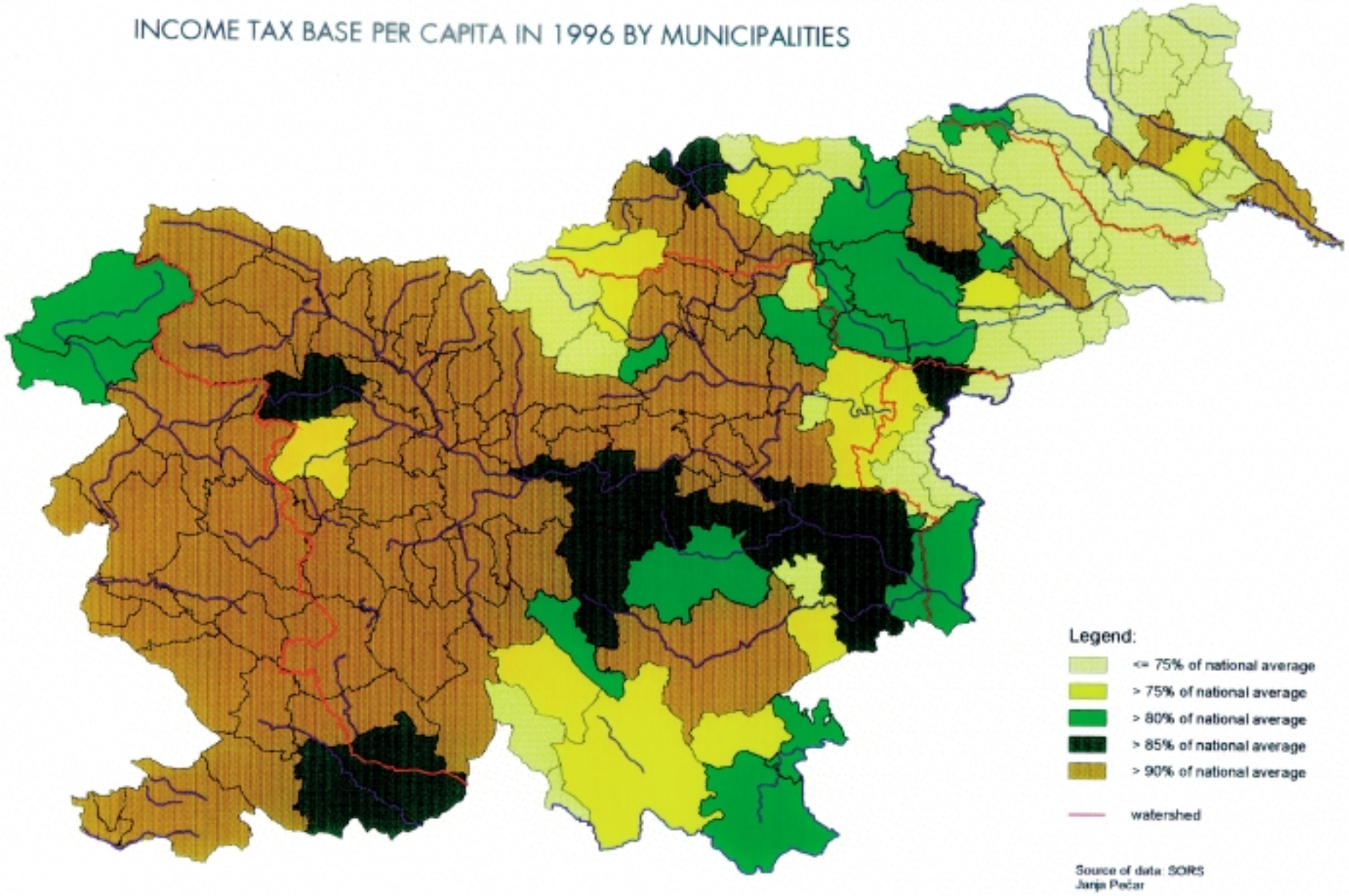
Source of data: SORSE, 1996

3.1.3. Economic Structure

The analysis of developmental factors, which help to form economic potentials and at the same time allow regional disparities measurement, has shown that, in the Sava River basin, only Ljubljana has above-average development potentials. In the category of above-average regional centers are Celje, Maribor, Velenje, Kranj, Postojna, Logatec and conditionally also Novo mesto, as well as Ljubljana's "satellites": Domžale, Kamnik and Škofja Loka. Characteristic of those cities is a mixture of favorable economic, for example, professional structure, opposed to inferior infrastructure or vice versa. Those above-average areas represent a good quarter of Slovenia. Other areas have under-average economic potentials.

There are nine tenths of all workplaces in the Slovenian part of the Danube River basin. The so-called "industrial" workplace structure still prevails, especially in the Mura River basin. The share of service activities has already reached one half of all workplaces. The backbone of economy is the 82 job centers with over 1000 workplaces. They provide 85 % of all workplaces.

INCOME TAX BASE PER CAPITA IN 1996 BY MUNICIPALITIES



TIPOLOGIJA STRUKTURNIH OBMOČIJ OBČIN V R SLOVENIJI
(na podlagi izbora socialnoekonomskih kazalcev regionalnega razvoja)

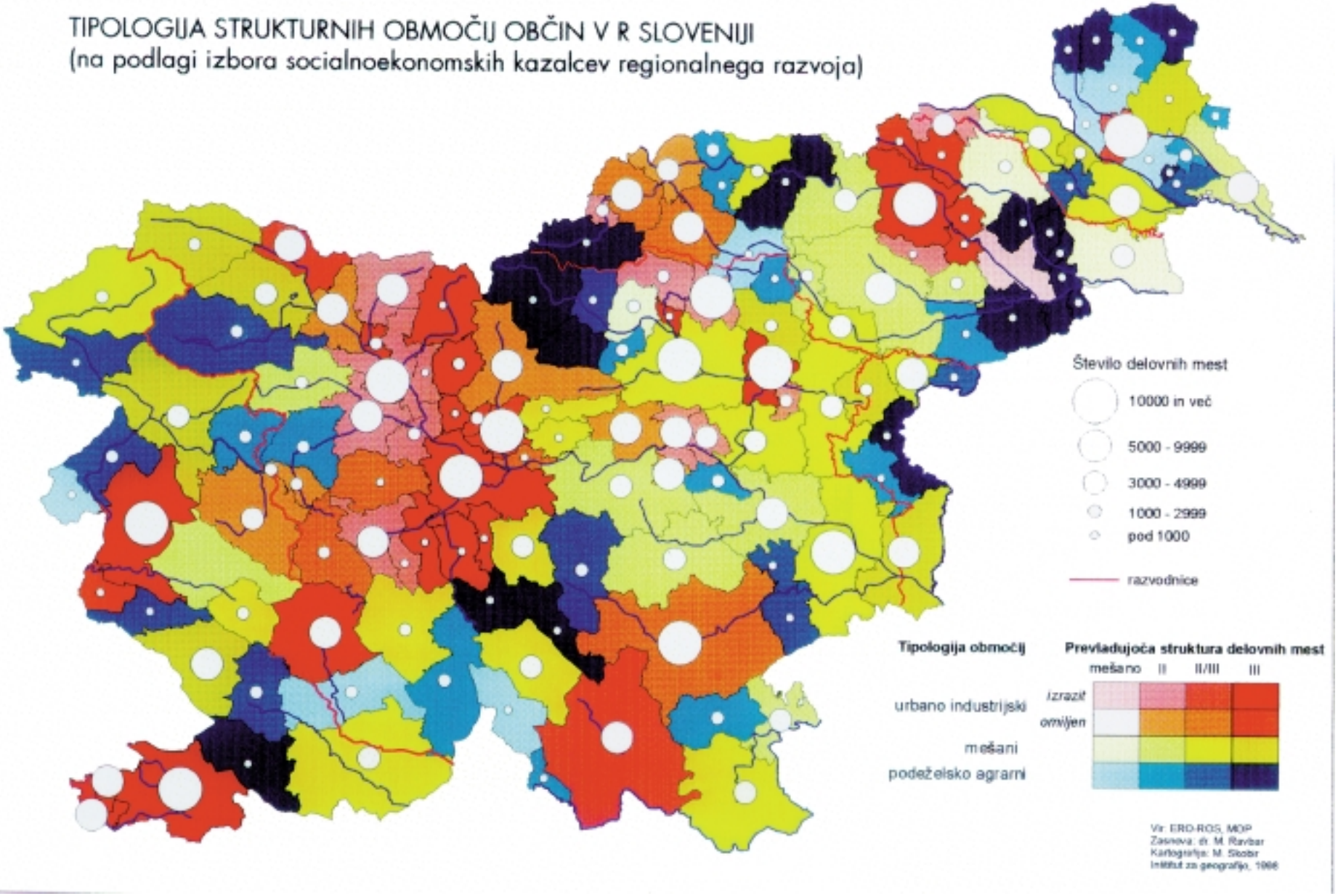


Table 3.3. Number and workplace structure in the river basins of the Slovenian part of the Danube River basin in 1996

					Workplace structure in %						
Basin	work-places - together	share of work-places	no. of settle-ments with work-places	% of settle-ments with work-places	industry, mining	agricul-ture, forestry	con-struc-tion	traffic and commun ications	trade, catering and tourism	craft and personal services	service activities
Drava	136,4	19 %	657	80 %	35 %	4 %	5 %	9 %	13 %	7 %	27 %
Mura	41,9	6 %	284	83 %	42 %	6 %	5 %	3 %	12 %	5 %	26 %
Sava	557,8	76 %	2764	68 %	34 %	2 %	5 %	7 %	14 %	6 %	33 %
the Danube basin	736,2	100 %	3705	71 %	34 %	3 %	5 %	7 %	14 %	6 %	31 %

Source of data: SORSE, 1996

Economic power, calculated on the basis of GAV and income tax for the Danube River basin, is the highest in the central Slovenian region of the Sava River basin and at the same time 2,6 times higher than in the Mura River basin, where it is the lowest. Central Slovenia and Dolenjska have above-average gross added value in recent years. The Pomurje, Posavje, Podravje and Koroška regions have less than 75 % of the national average.

Table 3.4. Economic power based on GAV and income tax in the river basins of the Slovenian part of the Danube River basin in 1996

basin	GDP in 1000 SIT	GDP per capita in 1000 SIT	income tax in SIT per capita	GDP share in river basins	share of inhabitants in river basins	GDP per capita RS=100	tax income RS=100[1]
Drava	*776098,6*	*624,6*	*76675,8*	*70,6*	*62,5*	*112,8*	*89,7*
Mura	*38862,2*	*307,9*	*57608,8*	*3,5*	*6,4*	*55,6*	*67,4*
Sava	*156388,8*	*396,6*	*67743,5*	*14,2*	*19,8*	*71,6*	*79,3*
the Danube basin	971349,6	551	67743,5	88,3	88,7	99,5	79,3
Slovenia	1099960,5	553,6	85453,7	100,0	100,0	100,0	100,0
other river basins	*128610,9*	*574,4*	*92272,5*	*11,7*	*11,3*	*103,8*	*108,0*

Source of data: SORSE, 1996

3.1.4. Number and Share of the Population Connected to Municipal Water Supply Systems

In 1995, 80,7 % of inhabitants of the Black Sea basin were connected to municipal water supply systems managed by municipal enterprises (Študija..., 1995; Sanacija..., 1996), which is a somewhat lower percentage than elsewhere in Slovenia (88 %). Additional 10 % of population are estimated to be connected to water supply systems managed by local and village communities. In urban areas, almost all inhabitants are connected to bigger water supply systems, while in the countryside, smaller water supply systems are more frequent and a part of the population still

[1] Income tax base per capita (indices; RS=100)

acquires water from their own sources. There are 256 water sources for the supply with drinking water with a total of 7575 l/s of dynamic resources. The biggest share of the population connected is in the Sava River basin - 83,9 %, followed by the Sotla, Kolpa and Drava River basins, and the smallest share is in the Mura River basin with 67 % of connected population. In 1995, the average water consumption from the public water supply system was 127 l/day or 46,355 m^3/year. In cities, household water consumption was higher, while in the countryside, drinking water consumption for livestock is added to the household drinking water consumption.

The main source of drinking water for the population supply is underground water from aquifers with intergranular porosity, and the karstic sources. In 1995, 86,5 million m^3 of drinking water was needed for drinking water supply of the population through public water supply systems, and the year before that, 91,8 million m^3. In comparison to 1980, the consumption of water for household use grew by 26 million m^3, and in comparison to 1990 it hardly changed at all (Statistièni..., 1997). Considering the average public water supply system consumption per inhabitant, and the number of inhabitants connected to public water supply systems in the Danube River region, 81 % of drinking water from public water supply systems managed by municipal enterprises is in this area.

Table 3.5. Number and share of inhabitants connected and non-connected to municipal water supply system

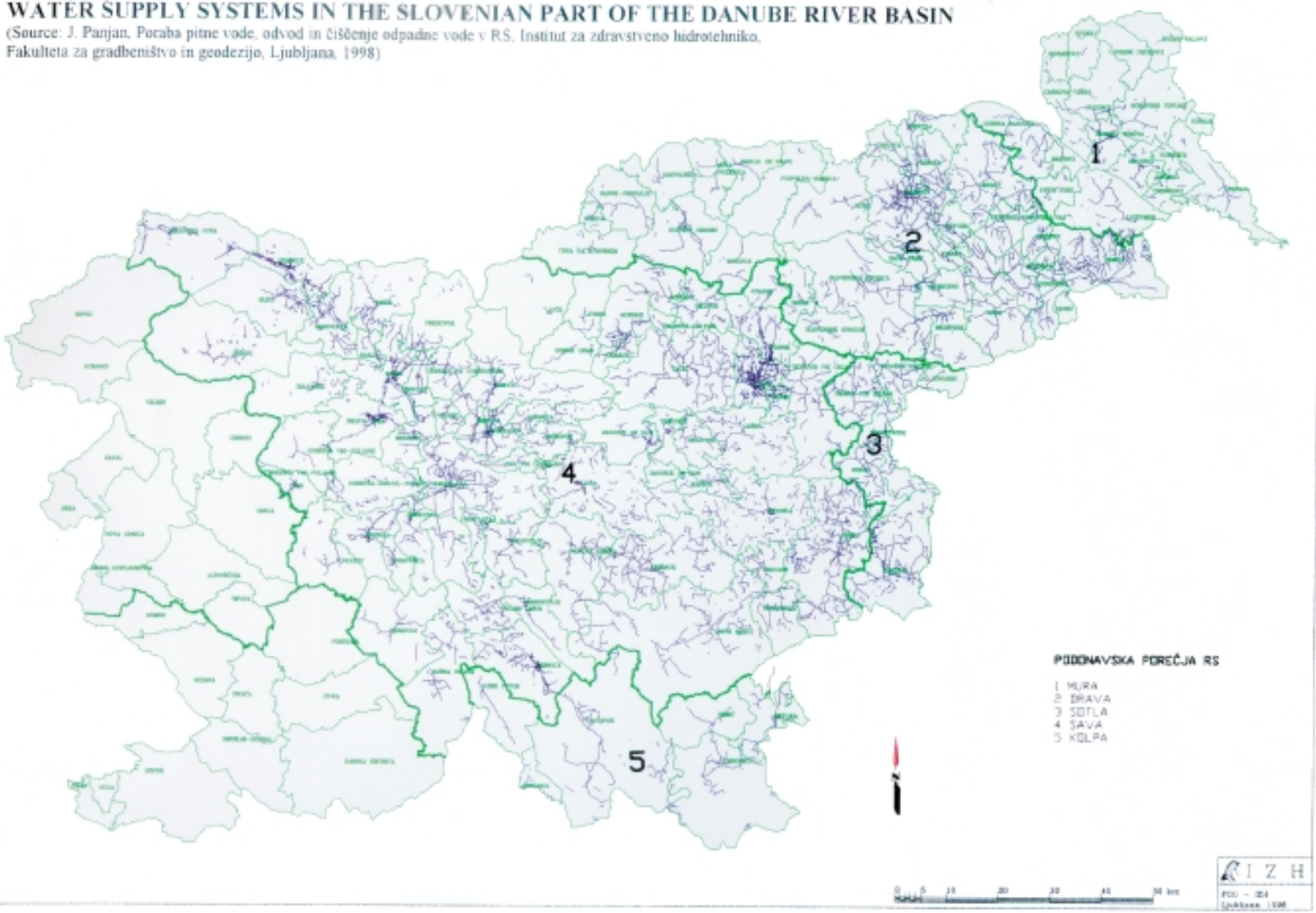
	Total population	Share of population	Population connected to centralized water supply systems	Share of population connected to public water supply systems	Population supplied by other sources	Share of population connected to local water supply systems	An estimate of annual water demand from centralized water supply systems	An estimate of water demand from centralized water supply systems (liters/capita/day)	Losses of water from centralized water supply systems	Annual water demand for population supplied by other sources	Losses of water for population supplied by other sources	An estimate of annual water consump-tion of connected population	An estimate of annual water consumption of population with other sources	An estimate of annual water consumption
The Black Sea basin-tot	1.741.700	100	1.405.071	80,7	336.629	19,3	100.454.762	195,9	40,1	...	...	72.284.907	14.037.429	86.322.336
Urban	944.300	54,2	944.300	100	0	0	67.505.600	195,9		...	...	48.574.848	0	48.574.848
Rural	797.400	55,8	460.771	57,8	336.629	42,2	32.949.161	195,9		....	...	23.710.059	14.037.429	37.747.488
The Sava basin - total	1.208.700	100	1.083.712	89,7	124.988	10,3	76.619.179	193,7	42,5	...	...	54.003.130	5.212.000	59.215.130
Urban	726.000	60,1	726.000	100	0	0	51.334.850	193,7		...	...	36.182.010	0	36.182.010
Rural	482.700	39,9	357.712	74,1	124.988	25,9	25.284.329	193,7		...	...	17.821.120	5.212.000	23.033.120
the Drava basin - total	415.200	100	304.478	73,3	110.722	26,7	19.815.460	178,3	30,6	...	...	15.172.633	4.617.107	19.789.740
Urban	190.400	45,9	190.400	100	0	0	12.384.663	178,2		...	...	9.467.328	0	9.467.328
Rural	224.800	54,1	114.078	50,7	110.722	49,3	7.430.797	178,5		...	...	5.705.305	4.617.107	10.322.412
the Mura basin - total	117,800	100	62.393	53,0	55.407	47,0	4.020.123	176,5	29,3	...	...	3.109.144	2.310.472	5.419.616
Urban	27.900	23,7	27.900	100	0	0	1.796.995	176,5		...	...	1.386.614	0	1.386.614
Rural	89.900	76,3	34.493	38,4	55.407	61,6	2.223.128	176,6		...	...	1.722.530	2.310.472	4.033.002
Slovenia	1,980.000	100	1.724.800	87,1	255.200	12,9	122.378.000	194,4	42,3	...	...	85.949.586	10.641.840	96.591.426
Urban	1.045.000	52,8	1.045.000	100	0	0	74.161.068	194,4		...	...	51.999.145	0	51.999.145
Rural	935.000	47,2	679.800	72,7	255.200	27,3	48.216.932	194,3		...	...	33.950.441	10.641.840	44.592.281

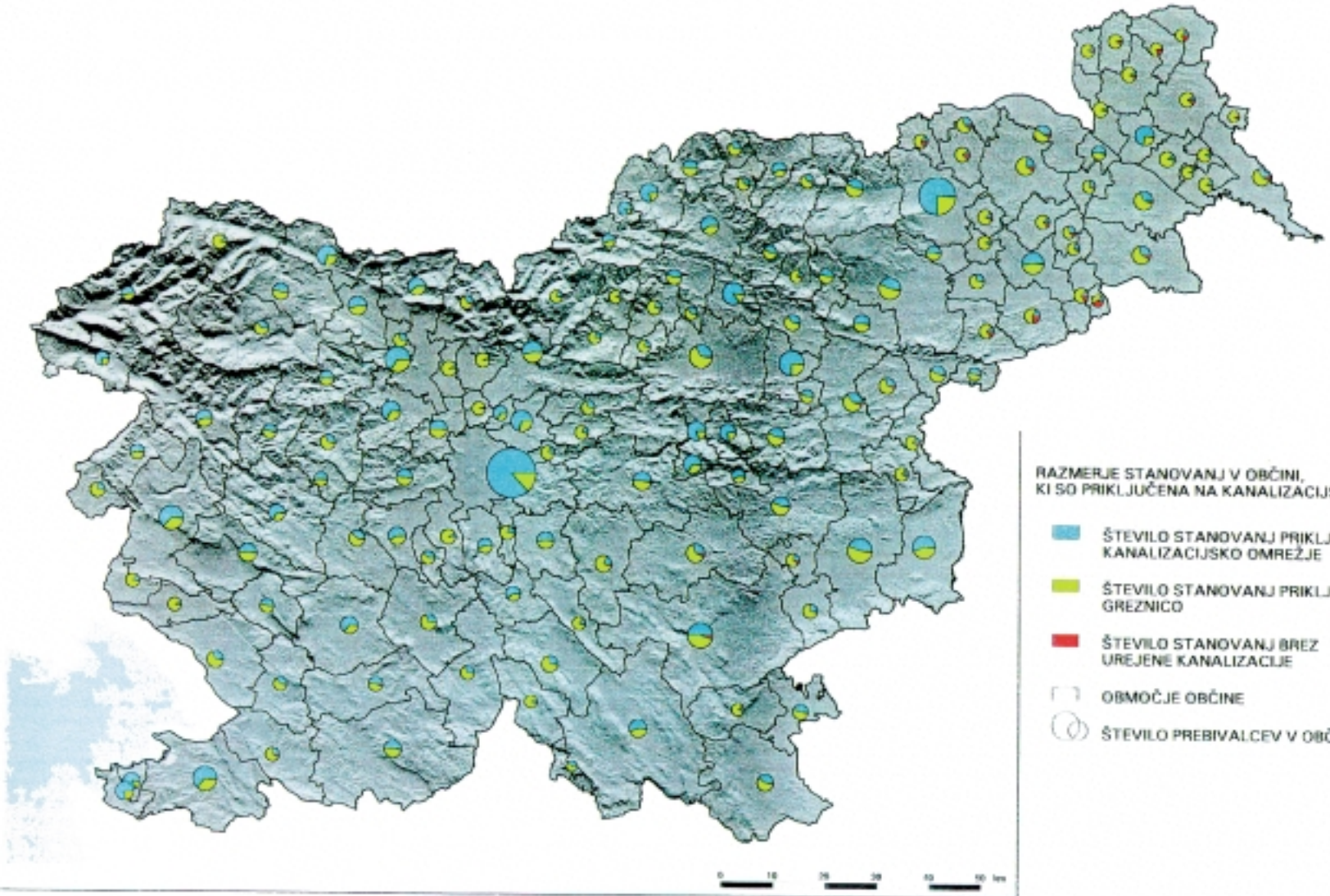
Source: Source: Študija o komunalni oskrbi in projektih varovanja okolja v Sloveniji, VGI, 1995; Sanacija komunalne infrastrukture in izhodišèa za urejanje prostora, VGI, 1996

*Note: * Household water supply is determined with the help of average water consumption from municipal water supply systems per capita in Slovenia, which in 1993 amounted to 127 l/inhabitant/day or 46,355 m^3/inhabitant/year*

WATER SUPPLY SYSTEMS IN THE SLOVENIAN PART OF THE DANUBE RIVER BASIN

(Source: J. Panjan, Poraba pitne vode, odvod in čiščenje odpadne vode v R.S. Institut za zdravstveno hidrotehniko, Fakulteta za gradbeništvo in geodezijo, Ljubljana, 1998)





Izdelal:
MOP - Urad RS za prostorsko planiranje, 22.05.1998

Vir:
1. SURS, Popis 1991
2. GURS, RPE - OBMOČJA OBČIN, 1995
3. GURS, Matjaž Ivačič MOP-UPP, Senčen relief Slovenije, 1996

HOUSEHPLD CONNECTED TO SEWERAGE SYSTEM IN COMMUNITY

Table 3.6. Number and dynamic water resources

	No. of intake water sources	Dynamic intake water resources
the Black Sea basin	256	7.575 l/s
The Sava basin	158	5.712 l/s
The Drava basin	45	1.438 l/s
The Mura basin	41	210 l/s
The Sotla basin	12	215 l/s
The Kolpa basin	17	139 l/s

Source: Študija o komunalni oskrbi in projektih varovanja okolja v Sloveniji, VGI, 1995; Sanacija komunalne infrastrukture in izhodišèa za urejanje prostora, VGI, 1996

There are 70,7 % of all population in the Sava River basin that are connected to public water supply systems managed by municipal enterprises in the Black Sea basin and the dynamic water resources, from which they are supplied, represent 75,4 % of the Danube River basin intake dynamic water resources. In the Drava River basin there are 21,7 % of all inhabitants, and the dynamic water resources that supply them, represent 19 % of intake dynamic water resources. In the Mura River basin there are 4,4 % of all inhabitants, and the dynamic water resources that supply them, represent 2,8 % of intake dynamic water resources in the Danube region. Poor outflow is quite characteristic for the intake water sources in the Mura River basin. Considering the number and joint discharge, it only amounts to 5,12 l/s per water source, while in the Drava and Sava River basins, the dynamic outflow of a intake water source exceeds 30 l/s, and in the Danube River basin 29,6 l/s.

3.1.5. Domestic Wastewater Production

In Slovenia, the quantity of sewage from households amounts to 81.395.000 m^3 (Environmental report 1995, 1996), out of which 37.786.000 m^3 of wastewater drains through the municipal sewage system. In the Danube River basin, 31.650.000 m^3 of wastewater drains through the municipal sewage system. Estimation of wastewater quantity was made on the basis of the quantity of water used from the municipal water supply system.

In Slovenia, the total length of networks amounts to 3973 kilometers, of which primary network amount to 736 kilometers and secondary networks to 3237 kilometers. (Environmental report 1995, 1996)

Table 3.7. Number and share of the population connected to the sewage system and wastewater quantity in 1995

	Total population	Share of population	Population connected to centralized water supply systems	Share of population connected to public Wastewater systems	An estimate of annual production of population connected to centralized water supply systems	An estimate of annual production of population connected to centralized water supply systems/inhabitant (liters/capita/day)	Population using other options	Share of population using other options	An estimate of annual production of population using other options	An estimate of annual production of population using other options/ inhabitant (liters/capita/ day)	An estimate of total annual Wastewater	An estimate of total annual Wastewater / inhabitant (liters/capita /day)	Wastewater treatment plants
The Black Sea basin – total	1.741.700	100	803.295	46,1	31.649.823	107,9	938.405	53,9	35.190.188	102,7	66.840.011	105,1	…
Urban	944.300	54,2	...	...	...	...	...	...	...	...	...	...	...
Rural	797.400	55,8	...	...	...	...	...	...	...	...	...	...	...
the Sava basin – total	1.208.700	100	618.275	51,2	24.360.035	107,9	590.425	48,8	22.140.938	102,7	46.500.973	105,4	...
Urban	726.000	60,1	...	...	...	...	...	...	...	...	...	...	...
Rural	482.700	39,9	...	...	...	...	...	...	...	...	...	...	...
the Drava basin – total	415.200	100	157.639	38,0	6.210.977	107,9	257.561	62,0	9.658.538	102,7	15.869.515	104,7	...
Urban	190.400	45,9		...	...	....	...	...	...	...	...	...	...
Rural	224.800	54,1		...	...	...	...	...	...	...	...	...	
the Mura basin – total	117.800	100	27.381	23,2	1.078.811	107,9	90.419	76,8	3.390.713	102,7	4.469.524	103,9	...
Urban	27.900	23,7	...	...	...	...	...	...	...	...	...	...	...
Rural	89.900	76,3	...	...	...	...	...	...	...	...	...	...	
Slovenia	1.980.000	100	959.048	48,4	37.786.491	107,9	1.020.952	51,6	38.285.700	102,7	76.072.191	105,2	...
Urban	1.045.000	52,8	...	...	...	...	...	...	...	...	...	...	...
Rural	935.000	47,2	...	...	...	...	...	...	...	...	...	...	...

Note: ** the Velenje supply system data missing*
*** the Lenart supply system data missing*

Source: *Sanacija komunalne infrastrukture in izhodišèa za urejanje prostora, VGI, 1996*

Attainable data assert that 959 048 of inhabitants are connected to the public sewage system, and 803.295 in the Danube River basin alone. Therefore, 46,1 % of inhabitants are connected to the sewage system (48,4 % is the Slovenian average) (Poročilo o stanju okolja 1996, 1998).

There are 32 supply systems in the Sava River basin and 599.035 inhabitants (or 50,4 % of the population that are connected to sewage system in the entire Danube River basin) with 23.602.000 m^3 of wastewater are connected to them. The Trbovlje supply system is best at covering its area, since almost 95 % of inhabitants are connected to it. More than two thirds of the population are connected to the network also in the Ljubljana, Kranj, Hrastnik and Celje systems. The lowest share of connected population is in the Mozirje system with 10,5 %, and the Šmarju pri Jelšah, Ribnica and Trebnje systems have less than two fifths of the population connected to them. It is remarkable that the majority of settlements in the basins, where there are larger quantities of groundwater, are relatively well equipped with sewage systems (Ljubljansko, Kranjsko and Celjsko), while the situation on the Brežiško - Krškem polju, where only approximately three tenths of the population are connected to the sewage system, is quite worse. The sewage network density in the Karst is quite disquieting, since there is no supply system that would include at least half of the population. Poor self-purification ability is very characteristic of the Karst, therefore the consequences of uncontrolled leakage into the underground are quite more grave.

Only a good third of the Drava River basin population (38,0 %) is connected to the sewage system, which annually drains 6.211.000 m^3 of wastewater. The Ravne - Prevalje supply system is the best regulated system for wastewater discharge with 70,3 %, and the Slovenske Konjice system is also adequate - 60,0 %. The two biggest urban settlements on the Dravsko - Ptujskem polju - Maribor (42,9 %) and Ptuj (24,4 %), each have, with their respective hinterlands, less than half of their population connected to the sewage system.

The situation is the worst in the Mura River basin, where 23,2 % of the population are connected to the sewage system network and where none of the supply systems covers 30 %. The Ljutomer supply system covers as little as 13,8 %, therefore it is not a surprise that only 1.079.000 m^3 of wastewater is annually drained. Groundwater on the Murskem and Prekmurskem polju is close to the surface, which even intensifies the hazard of pollution.

Inappropriate and badly maintained sewage system networks represent a hazard of contamination of the areas through which they are led as well as contamination of underground water which is the main source of drinking water. Water losses in the sewage system networks are not specified. (Environmental report 1995, 1996)

In Slovenia, there are a relatively large number of sewage systems of which only a few have treatment plants. They are managed by 54 municipal enterprises. There are 73 facilities for sewage purification with a total capacity of over 1000 EE. (Environmental report 1995, 1996) The total of all WWTPs is 107. In the Danube River basin there is a total of 85 WWTPs, while 63 have the capacity of more than 100 EE.

In Slovenia, the municipal wastewater treatment plants mainly treat wastewater from the mixed sewage systems, where the household, industry and other activities wastewater mingle. Due to the specific, dispersed settlement pattern, especially small settlements and sources of dispersed pollution should also use vegetable WWTPs.

Table 3.8. Number and share of the inhabitants connected to wastewater treatment plants in 1997

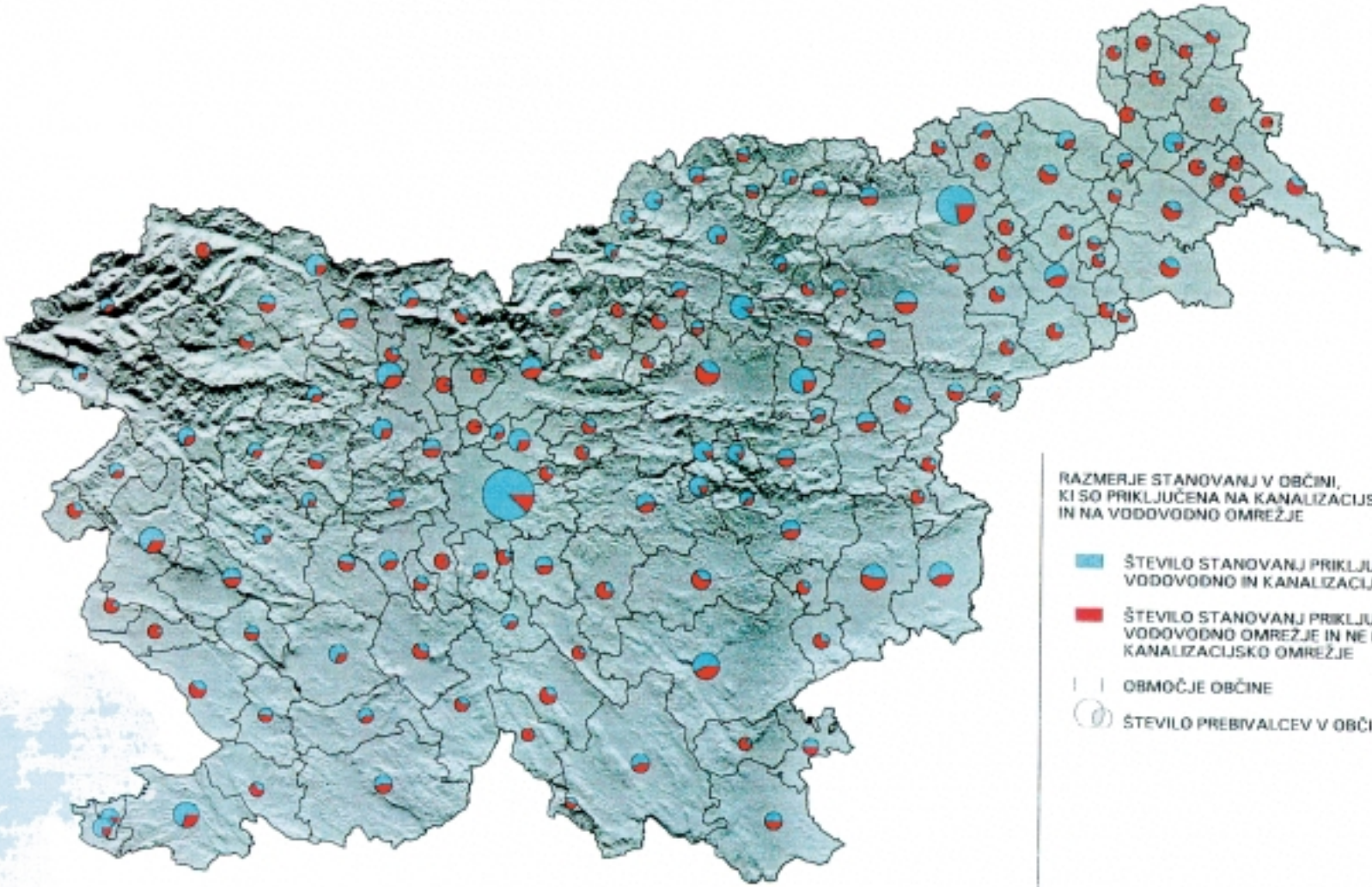
	Number of inhabitants	number of inhabitants connected to WWTPs	share of inhabitants connected to WWTPs
the Danube basin	1.741.700	286.516	16,5
the Sava basin Sava	1.183.100	226.536	19,1
the narrower Kolpa basin	25.600	17.400	68,0
the Drava basin	415.200	16.580	4,0
the Mura basin	117.800	26.000	22,1
Slovenia	1.960.000	361.406	18,4

Source: the archive of Uprava Republike Slovenije za varstvo narave, 1998

Unfortunately, no estimate of quantity of various wastewater treated at wastewater plants especially for municipal waste can be given, since the already deficient data base only includes the total of wastewater.

WASTE WATER SYSTEMS IN THE SLOVENIAN PART OF THE DANUBE RIVER BASIN

(Source: J. Panjan, Poraba pitne vode, odvod in čiščenje odpadne vode v RS, Institut za zdravstveno hidrotehniko, Fakulteta za gradbeništvo in geodezijo, Ljubljana, 1998)



RAZMERJE STANOVANJ V OBČINI,
KI SO PRIKLJUČENA NA KANALIZACIJSKO OMREŽJE
IN NA VODOVODNO OMREŽJE

- ŠTEVILO STANOVANJ PRIKLJUČENIH NA VODOVODNO IN KANALIZACIJSKO OMREŽJE
- ŠTEVILO STANOVANJ PRIKLJUČENIH NA VODOVODNO OMREŽJE IN NE NA KANALIZACIJSKO OMREŽJE
- OBMOČJE OBČINE
- ŠTEVILO PREBIVALCEV V OBČINI

0 10 20 30 40 50 km

Izdelal:
MOP - Urad RS za prostorsko planiranje, 22.05.1998

Vir:
1. SURS, Popis 1991
2. GURS, RPE - OBMOČJA OBČIN, 1995
3. GURS, Matjaž Ivačič MOP-UPP, Senčen relief Slovenije, 1996.

DISCHARGE OF WASTE WATER FROM HOUSEHOLD IN COMMUNITY

3.2. Projection for Planning Horizons 2010 and 2020

3.2.1. Population

Demographic estimations do not foresee a significant growth of population. Projections that have been made in three variants for the period until 2020 by the Bureau of Statistics of the Republic of Slovenia, forewarn that according to the most optimistic variant the population growth will reach approximately 2,21 million of inhabitants, or a annual growth of approximately 8400 inhabitants. The middle variant predicts the continuation of slow population growth, so that it will only increase to approximately 2,05 million. While the pessimistic projection estimates a drop of between 105 do 150.000 inhabitants in the next 25 years. The number of inhabitants in Slovenia would therefore regress from nearly 2 million to 1,89 million of inhabitants. In the long run, all variants estimate a regression in population number in the age group of up to 39, while the number of population in the age group of over will continue to increase.

The above suppositions have been verified in the river basins, according to already existing tendencies. The projection for future tendencies for the year 2021 gave the following results:

Table 3.9. The projection for future population growth for 2020

Basin / Type of surface	No. of inhabitants in 1996 – in 1000	Estimated annual rate of change in %	Estimated number of population and share of urban pop. in the year 2010 in 1000[1]		Estimated number of population and share of urban pop. in the year 2020 in 1000	
	N		N	% URB	N	% URB.
Valley-flatland	248,2	+ 0,2	266,4	65%	282,8	63%
Hilly, mountainous or alpine	167,1	- 0,6	156,0	26%	145,9	27%
The Drava River basin	415,2	+ 0,1	422,2	47%	428,5	47%
Valley-flatland	837,9	+ 0,5	955,9	75%	1062,6	78%
Hilly, mountainous or alpine	370,8	- 0,4	350,9	33%	332,9	35%
The Sava River basin	1208,7	+ 0,4	1306,8	62%	1395,6	65%
Valley-flatland	85,9	+ 0,5	93,3	35%	100,0	40%
Hilly, mountainous or alpine	31,9	- 0,6	23,8	7%	16,4	10%
The Mura River basin	117,8	0,0	117,0	23%	116,3	23%
Valley-flatland	1172	+ 0,5	1315,5	70%	1445,4	72%
Hilly, mountainous or alpine	569,7	- 0,5	530,5	30%	495,0	32%
The Danube River basin	1741,7	+ 0,3	1846,0	56%	1940,4	58%
Other river basins	218,3	+ 0,3	231,5	49%	243,5	51%
R of Slovenia	1985	+ 0,6	2077,5	55%	2183,9	58%

[1] Estimated number of population and share of urban population is prepared on the basis the most optimistic prognosis

In the urbanized, lowland and valley areas a further growth of population and economic activities can be expected, mainly channeled to products less demanding both with regard to energy and raw materials, as well as to service activities. The most optimistic estimation of the population growth in the urbanized areas is an annual rate of + 0,5 %, while it will continue to decrease in the countryside. The sum of population in the Slovenian part of the Danube River basin will at best increase from the present 1,74 million to 1,85 million in 2010 and 1,94 million in 2020.

With regard to this, the demand for drinking and industrial water will not increase. Environmentalists have always been concerned because of delayed rehabilitation of pollution sources and lack of punitive action. The burdening of the environment will grow simultaneously with the increase in the traffic, and with regard to the water sources, the hazard of increase in accidents during the transport of dangerous substances is the most troublesome.

3.2.2. Quantity of Abstracted Household Water in Future

In 1980, the Slovenian population, 75,6 million m^3 in 1985, 86 million m^3 in 1990 and 91 million m^3 in 1995 used 60 million m^3 of drinking water from the drinking water supply system. According to the Ministry of environment and (Poroèilo o stanju okolja 1996, 1998) household water consumption was 60 million m^3 in 1980 and 86 million m^3 in 1995.

The share of population connected to public water supply system is already relatively high and a 10 % rise is estimated by 2020. Only those inhabitants living in the peripheral areas are expected to be excluded from the major supply systems. The annual water consumption has not greatly changed in recent years and is between 40 and 50 m^3 and not expected to change in the next 25 years. In the Black Sea basin 80 % of all drinking water is used for household supply. Drinking water consumption will not drastically change in the years to come. Due to big water losses in water supply systems, rehabilitation measures are to be expected in this sector, which would halve the losses in the next 25 years. The quantity of the existing drinking water resources is adequate and will be able to procure the needed quantity of drinking water in all river basins, even with minor consumption growth. The smallest reserves of drinking water in intake water sources are, with regard to the relatively low share of population connected to municipal water supply systems, in the Mura River basin.

Table 3.10. Projection of population water supply in the Danube River basin until 2020

	1996	2010	2020
Number of inhabitants	1.405.071	1.409.000	1.413.500
Share of inhabitants connected to municipal water supply system	80,7 %	cca .85,0 %	cca. 90 %
Average annual water consumption per inhabitant connected to municipal water supply systems	46,4 m^3	cca. 46,0 m^3	cca. 46,0 m^3
Average annual water consumption per inhabitant connected to other water supply systems	41,7 m^3	cca. 41,0 m^3	cca. 41,0 m^3
Share of losses in water supply systems	40,1 %	cca. 30,0 %	cca. 20,0 %

3.2.3. Domestic Wastewater Production

The sewage system in the Slovenian part of the Danube basin is poorly developed, since less than a half of households is connected to the municipal sewage system. A goal set in the previous decades, namely to bring water into every household, has been achieved, and now effort will have to be made for an adequate wastewater disposal. The sewage system network is adequate in flatland areas, under which there is the biggest quantity of drinking water in store. In the next two decades the sewage system can be expected to expand and it ought to be of better quality, so as to reduce the water losses. In addition, separate sewage systems will have to be constructed, since the share of water treated in mixed sewage systems is smaller at the time of rain. A simultaneous expansion of the sewage system in less densely populated areas and construction of small Wastewater cleaning plants will be/is a must, especially up to 1000 EE.

Table 3.11. Projection of wastewater discharge in the danube River basin until 2020

	1996	2010	2020
Number of inhabitants	1.741.700	1.840.000	1.940.400
Share of inhabitants connected to sewage system	46,1 %	cca. 60 %	cca. 75 %

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

If we compare the EC directives on drinking water with the Slovenian directives we observe that the Slovenian directives as to the maximum content of pollutants comply with the EC recommendations (Table 4.1). Although no systematic research of health hazards for the population due to inadequate quality of drinking water has been conducted, it is concluded that it does not (yet) present a significant health hazard. However, it should be emphasized that the data on the quality of the intake groundwater and other water do point to gradual deterioration of important water sources.

Table 4.1. Basic directives for drinking water in Slovenia

PARAMETER	UNIT	SLOVENIAN DIRECTIVES MC*	EC RECOMMENDATIONS MC	EC RECOMMENDATIONS RC*
PH		6,5 - 9,0	9,5	6,5 - 8,5
Ammonium	mg NH4/l	0,14	0,5	0,05
Nitride	mg No2/l	0,016	0,1	-
Nitrate	mg NO3/l	44,3	50	25
Ortho-phosphate	mg PO4/l	0,45	-	-
Sodium	mg Na/l	150	150	20
Potassium	mg K/l	12	12	10
PCB	microg./l	0,1	0,1	-
Copper	microg./l	100	-	100
Zinc	microg./l	5000	-	100
Cadmium	microg./l	5	5	-
Six-valent chromium	microg./l	50	-	-
Mercury	microg./l	1	1	-
Atrazin	microg./l	0,1	0,1	-
Total of pesticides	microg./l	0,5	0,5	-

MC - maximum content
RC - recommended content
Source: Kakovost voda v Sloveniji v letu 1995, HMZ RS, 1997

In the middle of the 1990s, the groundwater areas were the most important as far as the drinking water supply of the population was concerned. They were followed by water, especially karstic sources. The majority of groundwater supply areas is densely settled, burdened with the traffic and intensive agriculture. In the Mura River basin, the groundwater areas were the only, and in the Drava and Sava River basins almost the prevailing drinking water source. The intake karstic sources were the additional drinking water source, with the exception of the Kolpa River basin, where they were the only source.

Unlike the surface water quality, the quality of the groundwater and sources deteriorated in the first half of the 1990s. The nitrates and pesticides content in groundwater were especially high. The water from the deeper wells in carbonaceous rocks is chemically and bacteriologically adequate. However, the water from the karstic sources is bacteriologically contaminated and unfit to be used as drinking water without previous treatment (disinfecting). Almost every sample contains bacteria, some even faecal bacteria. The sediments of some sources had a relatively high heavy metals content (Pb, Zn, Cu, Cd, Cr, Ni and Hg). Among the organic micropollutants in the sediments, esters of phtalic acid, phenol compounds and polyaromatic hydrocarbons were prominent. Toxic compounds should be more clearly defined in sources that are used for water supply of the population (Kakovost voda v ..., 1996, p. 46).

In the Mura River basin, the Prekmursko and Mursko polje had a regional drinking water supply value, since they supplied more than 100.000 of inhabitants in the Mura River basin, and the Apaško polje groundwater 20.000 of inhabitants. Due to great landscape vulnerability and mainly agricultural burdening, the groundwater quality was low, since the maximum content of nitrates, nitrides and pesticides was often exceeded, and occasionally also the AOX, organic solvents, phosphates and zinc content. In 1996, 37 % of samples in the Murska Sobota region were inadequate (especially nitrates and pesticides) according to physical and chemical indices (the Slovenian average is 7 %) (Poročilo o stanju okolja, 1996, 1998).

In the flatland area, the Dravsko polje (Maribor, Ptuj and its neighborhood – 270.000 inhabitants) and the Spodnja Savinja valley (Celje, Žalec – 100.000 inhabitants) are especially important as far as the drinking water supply is concerned, but also Ptujsko polje. Groundwater quality of Dravsko polje is poor due to intensive agriculture and industry, and the content of nitrates and pesticides remains are often exceeded, but also of mineral oils. Pesticides are the biggest problem, most often the atrazin content is exceeded (Kakovost voda v ..., 1997). The Ptujsko polje groundwater is polluted by agricultural activities, therefore nitrates and pesticides content is occasionally exceeded. The Spodnja Savinja valley groundwater is burdened by agriculture, urbanization and the traffic, water quality is poor due to excessive content of nitrates, pesticides, orthophosphates and chlorinated solvents. In the Celje region, macrobiological results of drinking water showed that in 1996 36 % of all samples were inadequate (Poroèilo o stanju okolja, 1996, 1998).

Groundwater, and dinaric-karstic areas with intake karstic sources, which are often bacteriologically inadequate, especially because of microorganisms, mainly supply the Sava River basin. The intake karstic source Malni (Postojna) was in 1994 characterized by high content of estres of phosphoric acid. The water was bacteriologically contaminated and it contained too many metals. Pollution of the intake sources is also due to high content of heavy metals in sediments. The Ljubljansko polje is extremely significant as far as water supply is concerned (great groundwater depth, Ljubljana – 300.000 inhabitants), but also Kranjsko (Kranj – 75.000 inhabitants) and Sorško polje (Škofja Loka, Medvode – 45.000 inhabitants) and the Kamnik Bistrica valley (Domžale – 45.000 inhabitants). The Krško-Brežiško (Krško – 30.000) and Čateško polje (Brežice – 25.000) are also very significant. The results of macrobiological analyses of drinking water in 1996 showed that the bacteriological drinking water quality was the worst in the Novo mesto area (karstic sources) in the Sava River basin. 32 % of all samples were biologically inadequate, but in the Ljubljana area (groundwater) only 2,6 % were.

In the case of pollution caused by an accident, the karstic water sources in the Sava River basin are potentially the most endangered (the Ljubljanica, Krka and Kolpa River basins). Taking past experience into account (approximately 100.000 inhabitants were left without drinking water supply for a while because of pollution by pesticides), a gradual but persistent deterioration of intake groundwater in the Drava and Mura River basins is just as hazardous. 5 % or approximately 90.000 inhabitants of the Danube River basin depended on water supply from a water supply system with an excessive nitrates content in 1995 (Poroèilo o stanju okolja 1996, 1998).

4.2. Population Affected by Health and Other Hazards Due to Inadequate River and Other Surface Water Courses Quality

There are no systematic analyses of health hazards for the population due to pollution of water sources and other surface water. Surface water is only exceptionally used as a source of water supply of the population, since most of the Danube River basin water in Slovenia is moderately or very to extremely polluted. From 1994 to 1996, only the river sections at the source of Alpine rivers of the Sava River basin fell into the 1st and 1st to 2nd quality class (the Tržiška Bistrica, Kokra, Kamniška Bistrica, Savinja) and the Meža in the Drava River basin. The Sava Dolinka, Sava Bohinjka, Sora, the upper section of the Ljubljanica, the middle section of the Kamnik Bistrica and Savinja, the upper section of Krka, and Kolpa as far as the confluence with Lahinja in the Sava River basin fell into the 2nd quality class (Kakovost voda v..., 1996, 1997). There are no major river sections in the Drava and Mura River basins that would fall into the 2nd quality class. Due to poor river quality and temperature only certain upper and/or middle river sections are suitable for bathing in the summer (for example: the Kolpa, Krka, Sora and Savinja rivers), however, few people also bathe in the rivers that fall into the 2nd or 3rd or an even lower quality class (for example: the section of the Krka before Novo mesto, the Kolpa after the confluence with the Lahinja, the Sava near Ljubljana).

The appearance of those water courses that fall into 3rd to 4th or 4th class is seriously affected: in the Sava basin especially the lower section of the Ljubljanica, the Kamnik Bistrica, the Rinža and the lower sections of the Paka, Voglajna and Sotla, whereas in the Mura the Šèavnica (Kakovost voda v ..., 1996, 1997).

Water courses quality was, due to lower discharge of industrial wastewater, improving in the period between 1989 and 1994. However, in 1995 and 1996 a minor regression is noticeable, especially as far as heavy metals and organic compounds are concerned (Poročilo o varstvu okolja 1996, 1998).

With the exception of some settlements in the Kolpa River basin (Vinica and near-by settlements), river water is not used as a source of drinking water in the Danube River basin. Slovenian and EU standards for “raw water quality for drinking water purposes” (1st and 1st – 2nd quality grade) were in the first half of the 1990s exceeded by all major rivers, with the exception of the following few kilometers mountain river stretches:

The Sava River basin: the **Sava Dolinka** to Kranjska Gora (the Kranjska Gora Commune - 5435 inhabitants (all data for 1997)), the **Tržiška Bistrica** to Tržiè (part of the Tržiè Commune - 15010), the **Kokra** approximately to Preddvor (the Preddvor Commune - 3634), the **Kamniška Bistrica** to Stahovica (the Kamnik Commune - 29836), the **Savinja** approximately to Luèe (the Luèe Commune - 2203), the **Paka** to Doliè (the Mislinja Commune - 4544). In those Sava River basin communes where the Slovenian and EU standards for “raw water quality for drinking water purposes” were not exceeded (1st and 1st – 2nd quality grade), 60,6 thousand or 5 % of inhabitants lived in the mid 1990s.

The Drava River basin: the **Meža** to Èrna (the Èrna Commune in Koroška - 3796), the **Mislinja** to Mislinja (the Mislinja Commune - 4544) and the **Dravinja** to Zreèe (the Zreèe Commune - 6234). In those Drava River basin communes where the standards for “raw water quality for drinking water purposes” were not exceeded (1st and 1st – 2nd quality grade), only 14,5 thousand or 3 % of inhabitants lived in the mid 1990s.

In the Mura River basin all major tributaries of the Mura belong to the group that exceeds the “raw water quality for drinking water purposes” standards (1st and 1st – 2nd quality grade), which signifies that in fact all inhabitants of the river basin live in settlements where the river water is not potable. The main reason is intensive agriculture and poor self-purification capacity of rivers with low runoffs (especially in the summer). It is estimated that the length of river stretches where the “raw water quality for drinking water purposes” standards are not exceeded totals to only about 90

- 100 km (which represents approximately 1 % of Slovenian rivers in the Danube River basin), the communes of the area are inhabited by approximately 75 thousand or 4 % of the Danube River basin population. In addition, approximately 4100 km of rivers in the Danube River basin comply with "bathing water quality" standards, an area which approximately 27 % of population inhabits, 22 % in the Sava River basin, 26 % in the Drava River basin and 22 % in the Mura River basin.

In the Sava River basin, the following major rivers exceeded EU or Slovenian standards for "bathing water quality" in the first half of the 1990s: the **Sava** in its entire flow after Radovljica (the Communes: Radovljica - 18055 inhabitants, Naklo - 4783, Kranj – 52.273 inhabitants, Medvode – 13.591, Ljubljana – 275.440, Dol pri Ljubljani - 4017, Litija – 19.006, Zagorje – 17.165, Trbovlje – 18.855, Hrastnik – 10.874, Radeèe - 4597, Sevnica – 17.597, Krško – 28.274, Brežice – 24.488); the **Tržiška Bistrica** after Tržiè (Tržiè – 15.010), the **Kokra** after Preddvor (Preddvor - 3634 and Kranj – 52.273), the **Sora** after Škofja Loka (Škofja Loka – 22.189, Medvode – 13.591), the **Kamniška Bistrica** after Kamnik (Kamnik – 29.836, Domžale – 31.535); the **Ljubljanica** after Vrhnika (Vrhnika – 16.377, Brezovica - 8600, Ljubljana – 275.440); the **Savinja** (including the **Paka**) after Braslovèe (Velenje – 34.392, Šoštanj - 8163, Šmartno ob Paki - 2824, Žalec – 39.386, Celje – 49.875, Štore - 4167, Laško – 14.136); the **Krka** after Novo mesto (Novo mesto – 51.494, Škocjan - 2969, Šentjernej - 6538); the **Sotla** after Rogatec (Rogatec - 3196, Rogaška Slatina – 10.653, Podèetrtek - 4804) and the **Kolpa** after Primostek (the Metlika Commune - 8096).

In the Drava River basin, the following major rivers exceeded EU or Slovenian standards for "bathing water quality" in the first half of the 1990s: the **Drava** in its entire flow on the Slovenian territory (Dravograd - 8689, Muta - 3778, Vuzenica - 2868, Radlje ob Dravi - 6235, Podvelka – Ribnica - 4213, Ruše - 15073, Maribor – 132.386, Duplek - 5774, Ptuj – 31.692, Dornava - 2636, Ormož – 17.781); the **Meža** after Mežica (Mežica - 4067, Ravne – Prevalje – 19.045), the **Mislinja** (Mislinja - 4544, Slovenj Gradec – 16.738) and the **Dravinja** after Videm (Ljutomer – 18.653).

In the Drava River basin, the following major rivers or river stretches exceeded EU or Slovenian standards for "bathing water quality" in the first half of the 1990s: the **Mura** in its entire flow on the Slovenian territory (Gornja Radgona – 12.746, Cankova - 6383, Murska Sobota – 20.730, Radenci - 5399, Beltinci - 8457, Ljutomer – 18.653, Èrenšovci - 6048, Lendava – 13.370).

In the Sava River basin communes where the EU and Slovenian "bathing water quality "standards are exceeded, 805,7 thousand or 67 % of inhabitants lived in the middle of the 1990s. In the Drava River basin communes where the EU and Slovenian "bathing water quality "standards are exceeded, 294,2 thousand or 71 % of inhabitants lived in the middle of the 1990s. In the Mura River basin communes where the EU and Slovenian "bathing water quality "standards are exceeded, 91,8 thousand or 78 % of inhabitants lived in the middle of the 1990s.

It is estimated that the number of population in the communes where the EU and Slovenian "raw water quality for drinking water purposes" standards (1st and 1st – 2nd quality grade) are exceeded will stagnate until 2020. Furthermore, the population in the communes with exceeding "bathing water quality " standards is estimated to increase for 10 % by 2020.

4.3. Description of Main Health Hazards through Water Pollution in the Danube River and Tributaries

In Slovenia, local water supply systems present the main problem. The majority have been built without adequate technical documents and maintenance is not expertly done or even non-existent. The result is a growing number of bacteriologically contaminated water samples.

Alongside with the systematic monitoring of drinking water, in 1996, there was also pesticides monitoring. The analysis of drinking water leads to the conclusion that there is only rarely the maximum content of pollutants (according to EC recommendations). The cumulative synergetic effect of all substances present in drinking water can, however, be stronger than it could be concluded by individual parameters. Chemically, the most frequent cause is the overdose of the pesticide atrazine. This affects those water supply systems, which use groundwater as their water source.

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

5.1. Actual Situation

5.1.1. Abstraction of Raw Water from the Danube River System

5.1.1.1. Domestic Raw Water Demand

Various sources state totally different quantities of abstracted and sold drinking water. The most realistic estimate of the quantity of abstracted water is probably 272 million m^3 (Environmental…; 1996), however, this datum is of no use for this research, since classification of river basins or activities is not possible as we go on. Therefore various sources have been used not only here, but also in the chapters 3.1.4. and 3.1.5. Which have sometimes caused seeming discrepancies. In 1995, public-municipal water supply systems abstracted 138,2 million m^3 of water from groundwater. They acquired from intake karstic sources 113,7 million m^3 and mere 7,8 million m^3 of water from surface water. Out of 259,6 million m^3 of assured drinking water, 152,4 million m^3 has reached the users and 107,2 m^3 or 41 % of water has been lost in the water supply network. 86 million m^3 or 33,3 % of abstracted water was spent for household supply and 56 million m^3 or 21,7 % for activities. After 1990, household water use is between 80 and 90 million m^3, and the use of water in service activities dropped from 80 to 56 million m^3 (Statistièni letopis, 1997). In 1995, those public water supply systems managed by municipal enterprises abstracted 172,6 million m^3 of drinking water from the Black Sea basin and sold to users 103,5 milijonov m^3 of water. 70 million m^3 or 40 % of water was lost in, which is less than the total of losses in the water supply network. The biggest quantity of abstracted drinking water was lost in the Sava - 42,5 % and Kolpa River basins - 40,5 %, the least in the Sotla - 23,5 % and Mura River basin - 29,3 % (Študija..., 1995; Sanacija...,1996).

Table 5.1. Basic indices of drinking water consumption in Slovenia

	Water abstracted in 1995 (m^3)	Water sold in 1995 (m^3)	Share of lost water	Total consumption/ Inhabitant in m^3
the Black Sea basin	172.635.493	103.401.801	40,1	73,59
the Sava basin *	133.977.397	76.984.972	42,5	77,54
the Drava basin **	28.730.580	19.925.014	30,6	65,44
the Mura basin	5.195.516	3.674.579	29,3	58,89
the Sotla basin	5.033.103	3.849.366	23,5	84,58
the Kolpa basin ***	4.732.000	2.817.236	40,5	62.09
Slovenia	259.687.000	152.400.000	41,3	71,3

Source: Študija o komunalni oskrbi in projektih varovanja okolja v Sloveniji, VGI, 1995; Sanacija komunalne infrastrukture in izhodišèa za urejanje prostora, VGI, 1996; Statistièni letopis, 1997

Note: * *a datum for Cerknica, Kamnik and Grosuplje missing*
** *a datum for Slovenj Gradec and Ormo missing*
*** *a datum for Metlika missing*

The average annual water consumption from the municipal water supply systems is in the Black Sea river basin 73,6 m^3 per capita, and in river basins from 58,9 m^3 in the Mura River basin to 77,4 in the Sava River basin (Študija..., 1995; Sanacija...,1996). The average daily consumption water consumption from the municipal water supply systems is 240 l per capita or 87,6 m^3 annually (Stanje..., 1996).

5.1.1.2. Industrial/Mining Raw Water Demand

In 1995, Slovenian industry and mining spent 113 million m^3 of fresh water, namely 76,6 million m^3 as industry water and 36,3 million m^3 as drinking water. For production, 48 million m^3 of water was spent and for cooling 50,7 million m^3. Coal mining spent 2,2 million m^3 of fresh water, 1,6 million m^3 of industry water and 0,7 million m^3 of drinking water. Industry water was mainly used for production, while drinking water was mainly used for sanitary purposes. 1,4 million m^3 of water was abstracted from rivers and the rest from other sources.

5.1.1.3. Agricultural Raw Water Demand for Irrigation

In the Slovenian part of the Danube River basin there is 93.680 ha of land (84 %), which is almost every year affected by drought and needs to be irrigated (Matièiè, 1993). Most part or 74 % of land is in the Mura and Drava River basins, where there are eight hydromeliorization systems (which also include drainage systems), and the rest or 26 % of land, which needs to be irrigated for intensive agricultural use, is in the Sava River basin.

The national irrigation plan (1994) states that 120 080 ha of cultivable surface can be irrigated, which would take 235,6 million m^3 of water. The plan furthermore states that only half of water needed for irrigation could be assured. 70 % of it would come from groundwater and rivers and 28 % from reservoirs (Lah, 1995).

In 1995, 4200 ha of land surface in Slovenia was prepared for irrigation (Letopis, 1997), of which 1592 ha were actually irrigated. It is estimated that approximately 80 % of Slovenian irrigated land is in the Danube basin. In 1995, 4785.000 m^3 of water was accumulated for irrigation, 6 % from groundwater, 29 % from rivers and 63 % from reservoirs (Statistièni Letopis, 1997).

5.1.2. Wastewater Discharge to the Danube River System

5.1.2.1. Municipal Discharge

In 1995, 131.816.000 m^3 of wastewater was collected in the municipal sewage systems, 118.958.000 m^3 in the Black Sea basin alone. 71.376.000 m^3 or 60,0 % of wastewater is cleaned in WWTPs.

In the Sava River basin, the untreated Wastewater discharge from the municipal sewage systems amount to 27.864.000 m^3, in the Kolpa River basin 439.000 m^3, in the Drava River basin 18.474.000 m^3 and in the Mura River basin 805.000 m^3. The amount of treated Wastewater is: in the Sava River basin 60.241.000 m^3, in the Kolpa River basin 2.010.000 m^3, in the Drava River basin 4.487.000 m^3 and in the Mura River basin 4.638.000 m^3 .

According to statistic data, 61,0 % of wastewater is mechanically treated, 0,1 % is only chemically treated, and 2,7 % only biologically treated. 36,2 % of all treated wastewater undergoes a combined treatment. According to the Ministry of Environment, there were the following shares of type of treatment in the municipal Wastewater treatment plants in the middle of the 1990s (Poroèilo o stanju okolja 1996, 1998): pretreatment 31 %, primary 5 %, secondary 64 % and tertiary 0 %.

There are 60 Wastewater treatment plants in the Sava River basin with the total capacity of 1.446.491 EE, and 46 Wastewater treatment plants with the capacity of 1000 EE, including the central Ljubljana Wastewater treatment plant with the capacity of 600.000 EE, which, however, can only treat Wastewater mechanically. Therefore more than a half of all Wastewater treatment plants is situated in the Sava River basin, but despite all that, only 226.536 or 19,1 % of inhabitants are connected to those 42 Wastewater treatment plants that treat municipal Wastewater. The majority is connected to the Wastewater treatment plant Domžale – Kamnik (50.000), Šoštanj

(27.000), Kranj (25.000) and Novo mesto (20.000). The most urgent problems in the basin are the incomplete municipal wastewater treatment plants in Ljubljana and Celje. Celje and more than 50.000 of its inhabitants severely pollute the Savinja River.

The situation in the Drava River basin with its 11 wastewater treatment plants is not so good, either. Only six of them have a capacity of more than 1000 EE. Merely 16.580 or 4 % of inhabitants are connected to a wastewater treatment plant. Only in Ptuj (10.000 of inhabitants connected), Èrna na Koroškem (2400 of inhabitants connected) and Ormož (1200 of inhabitants connected) is municipal wastewater treatment adequate. Maribor presents the most urgent problem. All of its wastewater is discharged directly into the polluted Drava. Among other big urban centers, Slovenj Gradec, Slovenska Bistrica and Slovenske Konjice are also without wastewater treatment system.

Municipal wastewater treatment in the Mura River basin is satisfactory, since 26.000 or 22,1 % of inhabitants are connected to a wastewater treatment plant. There are 6 wastewater treatment plants, of which 2 have the capacity of less than 1000 EE. Only four of them are designed for municipal wastewater treatment, however, they are overburdened. Murska Sobota has a big wastewater treatment plant with the capacity of 20.000 EE, and there are some small ones in Beltinci and the Radenci and Moravske Toplice health resorts. Gornja Radgona and Lendava are without wastewater treatment system.

Most of the operating treatment plants do not reach the planned effects. In comparison with the water supply the business of collecting, discharging and treating waste and rainwater is, as far as its scope is concerned, rather modest and limited mostly to urban and concentrated settlements. (Environmental report 1995, 1996)

5.1.2.2. Coal-mining and TPP Wastewater

Industrial, energy and mining activities discharged 765.728.000 m^3 of wastewater into environment, 88 % of which was cooling water. 2.606.000 m^3 of Wastewater was discharged directly into the ground, somewhat more than 30 million m^3 into the municipal sewage system, and 733.102.000 m^3 into the surface waters (Poročilo o stanju okolja, 1996, 1998). After 1980, there was a decrease of 60 % in industry and mining wastewater, however, a mere half of them is being treated (Poročilo o stanju okolja 1996, 1998). In the 1985 - 1995 period, a general tendency-trend of a decrease in industry and mining wastewater runs simultaneously with a decrease in industrial and mining activities.

The following activities discharge the biggest quantities of wastewater: paper production and manufacture (27.562.000 m^3), metal manufacture (6.827.000 m^3) and chemical manufacture (8.223.000 m^3). The industry and mining activities treat 46.775.000 m^3 or 50,8 % of wastewater, 17.319.000 m^3 only mechanically, and 26.128.000 m^3 mechanically, chemically and biologically.

There are two major coal-bearing regions in the Sava River basin: Zasavje and the Šaleška valley. In 1996, 839 000 t of brown coal and 3.938.000 t of lignite was abstracted there (Natek, Natek, 1998). In 1995, 2,22 million m^3 of water was spent for coal abstraction water, namely 1,56 million m^3 of industry water and 0,67 million m^3 of drinking water. (Statistični letopis Slovenije 1997). Two thirds of spent water were pumped from water streams, and a third came from the municipal water supply systems. Wastewater from coal abstraction amounted to 1,75 million m^3 in 1995, and 1,72 million m^3 of it was discharged into surface water (water sources - 1,47 million m^3), and only a minor part reached the municipal sewage network system. WWTPs treated 1,46 million of wastewater, but only mechanically (Statistični letopis Slovenije 1997, Poročilo o stanju okolja, 1996, 1998).

The lignite coalmine Velenje does not have a direct discharge of mining wastewater into the Paka and thus minimally burdens the running water. The neighboring thermo power plant Šoštanj, on the other hand, requires 0,4 m^3/s for full operation and due to great demand and low flow of the Paka (sQs - 2 m^3/s), cooling towers were built. In 1994, a closed stride of electrofiltered transport was built in the thermo power plant Šoštanj, which significantly lessened the burdening of the Velenje lake and the Paka, however, the Paka is now warming.

Since the beginning of the 1990s, brown coal separation in Zasavje has been burdening the Sava with tailings and coal ash suspension due to wet separation for decades. The average annual anthropogenous coal suspension into the Sava prior to the construction of dry separation was approximately 600.000 t (Bricelj, 1991). The thermo power plant Trbovlje is the second biggest user of the Sava water (after NPP Krško), which pollutes and warms the Sava water. TPP - TO Ljubljana Moste uses the Ljubljanica water for cooling and then discharges it and thus affects the river life forms.

5.1.2.3. Agricultural Discharge (major point sources)

Especially extensive pig farms present the most problematic, disperse form of stream and river pollution. In the Sava River basin there are the following huge pig farms with the average number of pigs (Leskošek, 1994): Ihan (at the Kamnik Bistrica, 53.700), Stièna (12.000) and Klinja vas near Koèevje (17.300) (in the karstic part of the Krka River basin) and Pristava near Leskovec (Krško polje, 15.000). In the Drava River basin there is a pig farm in Draženci near Ptuj (40.500), and in the Mura River basin Cven near Ljutomer (10.000), in Podgrad near Gornja Radgona (21.300) and the Nemšèak farm near Beltinci with the Jezera farm (56.300). Big pig farms with the average number of pigs of approximately 230.000 present a problem especially due to lack of agricultural land in the vicinity of the farms and only partial wastewater treatment. Pig farms in the karstic areas (e.g. Klinja vas), in groundwater areas (e.g. Pristava, Nemšak) and in the vicinity of low-flow watercourses (Ihan, Stièna), are a particular cause of problems. Inadequate and insufficient wastewater treatment from big pig farms in Slevenian par of DRB causes pollution of 450.550.000 PE (population Equivalent). There are not many detail data. All of the farms have yet to reach the required quality of wastewater before discharge into surface water (Stanje okolja, 1996, p. 74).

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

5.1.3.1. Municipal Solid Waste Disposal

Slovenia annually produces approximately 850 – 900.000 tons or 400 kg of municipal solid waste per capita. According to 1995 data, 75 % of the population's solid waste is regularly taken away, which is 10 % more than in the previous decade. Parallel with the more regular municipal solid waste disposal is the growth in the quantity of solid waste, and therefore also the growing problem of its disposal or solid waste management in general.

There are 53 solid waste dumpsites that are mostly designed for disposal of municipal solid waste. There are 43 or two good thirds of them in the Danube River basin. As many as 29 of them are illegal, which means they are not managed according to standards. The biggest of them, the Ljubljana, Novo mesto, Tržiè and Velenje dumpsites cover over 10 ha, but the rest of them are smaller. 72.900 tones of municipal solid waste or 86 % of all waste is annually disposed of in these more or less protected areas. In accordance with the number of inhabitants is the biggest quantity of

municipal solid waste disposed of in the dump sites of the central Slovenia (258.800 t), in the Drava River basin (115.900 t) and in the Savinja River region (109.800 t); (MOP, Environmental...,1996).

Municipal dumpsite locations are evenly arranged, disregarding the groundwork adequacy. Every pit was used a dump site in the past, many of them were in disused gravel-pits and clay pits e.t.c Such dump sites were started approximately 20 years ago, whereas the artificial groundwork sealing only appears in the late 1980s, hence such dump sites remain a potential hazard for the environment. It is estimated that between 31 % and 56 % of rainfall exfiltrates from improperly sealed dump sites into the ground, therefore approximately 1,3 million m^3 of polluted water from the dump sites drains into surface water or ground water. It is estimated that 3/4 (cca. 980.000 m^3) of it are in the Slovenian part of the Danube River basin (Ignjatoviè, 1996). The majority of existing dumpsites will be filled in the next ten years, in the Danube River basin as many as 36 or 83,5 % of all municipal dumpsites, including most of the major ones.

A closer survey of illegal dumpsites shows that 10.000 to 15.000 illegal dumpsites with 200.000 to 300.000 m^3 of rubbish cover approximately 6 km^2 or 0,03 % of the surface. (Šebenik, 1994).

5.1.3.2. Industrial/Mining/Hazardous Solid Waste Disposal

In 1995, manufacturing and the energy sector generated almost one quarter of total waste or some 2 million tones, of which approximately 41 % came from energy production, 29 % from manufacturing and 16 % from mining.

The quantities of generated waste are expected to grow till the year 2000, as the economy expands. A minor increase in energy waste is expected due to the introduction of further flue-gas desulphurization facilities in thermal power stations. In the municipal energy sector, especially in Ljubljana, a fuel switch is taking place to a type of coal, which will produce fewer residues after combustion.

Some factories produce and accumulate waste, including hazardous waste, on their premises, sometimes without any control. Soil has been contaminated in industrial areas because of the inappropriate storage of raw materials and wastes and because of spillage.

However, the bulks of industrial wastes are deposited sites destined to receive either single or mixed waste types. There are currently 13 such sites, including the landfill at Ljubljana for the disposal of slag and ash generated in the district heating and power plant of Ljubljana, and the landfill for selected hazardous wastes mainly from local industry (manufacturing, supply and use of coatings) in Metava-near Maribor in the Drava valley. Some of these waste repositories, as well as the abandoned landfills, have been inadequately managed. The technical solutions of the resulting problems require considerable investments.

Two incineration plants for special industrial wastes operated in 1995: Lek-Lendava (pharmaceutical wastes, capacity 7000 t/y) and Pinus-Raèe in Drava valley (phytopharmaceutical wastes, capacity 1000 t/y).

The recent expansion of the construction industry is reflected in its waste generation, currently reaching an annual 2,3 million tones. This equivalent to more than 25 % of waste generation in 1995. The new definition of construction waste includes excavation wastes, concrete and brick wastes, asphalt wastes and all demolition wastes.

Some 30 % of these wastes arise from excavations. This material is to a large extent reusable in surface construction. Problems are linked to construction wastes from new constructions and reconstruction, and discarded concrete, brick and gravel from the demolition of old structures in residential areas.

Farming, forestry and food processing generate 3,5 million tones of waste annually, measured as dry matter, while their actual mass is at least 4 to 6 times larger. The total amount is composed of animal tissue waste (approximately 0,05 million t/y), plant tissue waste (0,8 million t/y), animal faeces including spoiled straw collected separately and treated off site (about 1,57 million t/y) and forestry waste (1,1 million t/y).

Small-scale livestock farming is a major source of effluent waste biomass. Septic tank residues constitute a similar problem for the contamination of underground water reserves. At present, the average input of fertilizers and other chemical compounds to agricultural land amounts to 35,6 kg/ha nitrogen, 20,9 kg/ha phosphates, 23,3 kg/ha potassium, 1,1 kg/ha pesticides, up to 5,4 tones/ha of solid animal waste and 8 m^3/ha of slurry.

Radioactive wastes are generated by the NPP Krško, the Research Reactor, hospitals, research institutes and industry, and in the past also by the Žirovski vrh Uranium Mine.

NPP Krško - all low and intermediate radioactive wastes generated by the NPP Krško are packed into 200-litre drums. Altogether 10.541 drums (approximately 753 per year) with an average specific activity of 31 Gbq/m^3, had been stored by the end of 1995. Compaction and super compactium of standard drums was carried out in 1988/89 and in 1995. At the end of 1995 the amount of low and intermediate level radioactive wastes, stored at the Krško NPP was 1 873 m^3. In addition, 442 spent fuel assemblies are stored in the storage pool. The entire amount of disused nuclear fuel is stored in a water basin with boric acid on the NPP Krško premises, however, its capacities will only suffice until 2004.

Research Reactor-other low and intermediate radioactive wastes generated in Slovenia, mainly by research reactor and smaller users (hospitals, industry, research institutes) are stored in the Low and Intermediate Level Radioactive Waste Interim Storage, constructed in Podgorica-near Ljubljana. The wastes are currently stored in 145 drums with an activity ranging from 3 to 30 GBq. Another 97 bigger contaminated items, with a total activity of 5400 GBq, as well as 234 sealed sources with a total activity of 1000 GBq are also stored there.

Žirovski vrh Uranium Mine-there are two disposal sites for the radioactive waste from past uranium mining and milling.

Non-uranium mines, thermopower plants, aluminum and phosphate factories have also generated highly radioactive waste (Koèevje, Šoštanj, Trbovlje, Kidrièevo, Hrastnik). These contain up to 10 times more uranium and thorium than natural background levels.

The total of dangerous waste and specific substances annually produced in Slovenia is 445.350 ton (there are 94 % of the latter), 416.860 ton (or 93,6 %) only in the Danube River basin. The majority of such waste is contributed by the Zasavje region- the lower course of the Sava (98.386 ton per annum), followed by Koroška (the Drava River basin, after it flows into Slovenia) and central Slovenia and Gorenjska (the upper course of the Sava) with more than 50.000 tons of dangerous waste and specific substances.

Collection and disposal of dangerous waste takes place in accordance with regulations. The development of services in the field of handling waste or quantities of the disposed waste after 1991 is considerable. The quantity of the processed waste has grown, together with the number of enterprises dealing with the process of waste disposal-especially the waste from mineral oil production, old tires, electro-plating sludge and waste dilutants.

5.1.4. Hydro Power

11.510 GWh of electric energy was produced in Slovenia in 1996. Hydroelectric power station produced 30 %, thermo power stations 32 % and the nuclear power station 38 % of electric energy. All major hydroelectric power stations are run-off river power. In the Danube River basin the rivers and their electric potential produced as much as 2639 GWh of electric energy or 86,7 % of all energy produced in hydroelectric power stations (Ministrstvo za gospodarske dejavnosti, Statistièni...,1997).

Table 5.2. HEP on Slovene rivers of Danube river basin:

HEP	no. of el. generator sets	power MW	production GWh in 1996
Drava	22	542	2327
Dravograd	3	21	124
Vuzenica	3	45	194
Vuhred	3	60	269
Ožbalt	3	60	277
Fala	3	60	231
Mariborski otok	3	51	222
Zlatolièje	2	133	522
Formin	2	112	488
Sava	11	116	246
Moste	4	21	45
Mavèièe	2	38	57
Medvode	2	23	63
Vrhovo	3	34	81
Small HEP			66
Together	33	655	2639

Source:Ministrstvo za gospodarske dejavnosti, Statistièni...,1997)

The expert opinion is that the future increase of electric energy production in hydroelectric power stations will be made possible with the construction of new hydroelectric power stations on the Sava and Mura Rivers. Plans for the Mura River are not yet clearly defined, while the construction works on the Sava River are already in progress.

Table 5.3. The planned HEP on the Sava:

HEP	**(MW)**	**(GWh)**
Boštanj	33,7	135
Blanca	32,2	131
Brestanica	31,9	130
Krško	30,4	124
Bre□ice	32,7	136
Mokrice	31,7	151
Together	**192,6**	**807**

Source: Elektroprojekt Ljubljana, Tehnièni podatki za HE, 1990

5.1.5. River Fisheries

Fresh water fishing is rather insignificant from the economical point of view (estimation - a few hundredths of a percent of GNP). It is most developed in the Sava River basin. The biological river potential is decreasing due to pollution and river amelioration. There is a total of approximately 10.000 ha of fishing area, 93 species and subspecies (59 endangered).

The majority or rivers and streams contains fishes from the cypriniformes and other families, due to pollution there are less representatives of the salmoniformes family (Sladkovodno ribištvo, 1998). Because of the pollution of the majority of water courses only the upper river sections are suitable for fishing, and in summer, fish killings are frequent. The following rivers or river sections of the Danube River basin are the most suitable for sport fishing for fish from the salmoniformes family: the Krka, the Sava Bohinjka, and also the Sava Dolinka, the Kokra, the Sava (upper course) and the Savinja (upper course). The most suitable for sport fishing for fish from the cypriniformes family are the Drava, the Mura, the Savinja (middle section), the Sava (middle section), the Krka (middle and lower sections), the Kolpa and the Ljubljanica (upper and middle sections).

In the Slovenian part of the Danube River basin the fishermen caught 29.183 kg of fish from the salmoniformes family in 1996. The most frequent kinds were brown trout, šarenka and umber. More fish from the cypriniformes family was caught – 237.668 kg. The most frequent kinds were carp, podust and klen. 25.610 kg of salmonidae were caught in the Sava River basin in 1996. 100.603 kg of cyprinidae were caught.. In the Drava River basin, salmonidae were barely represented with 2853 kg in 1996. The catch of cyprinidae amounted to 93.556 kg. In the Mura River basin, the catch of salmonidae was minimal, not even 50 kg. However, 39.252 kg of cyprinidae ware caught.

Table 5.4. Fish caught in river basins of the Black Sea basin in Slovenia

Basin	Salmoniformes (kg)	Cypriniformes (kg)
the Sava basin	25.610	100.603
the Kolpa basin	670	4.465
the Drava basin	2.853	93.556
the Mura basin	49	40.672
the Black Sea basin	29.183	237.668
SLOVENIA	48.774	249.199

(Source: arhiv Zavoda za ribištvo, 1998)

5.1.6. River Shipping

There are no rivers suitable for shipping in Slovenia.

5.1.7. Water Related Recreation

Among the Danube's river basin tourist centers, the following are the biggest (according to the number of beds): 2. Bohinj - 3687, 4. Èatež ob Savi - 3527, 6. Bled - 3323, 7. Kranjska Gora - 3239, 8. Ljubljana - 2749 (Natek, Natek, 1998). Among tourist centers, those in the vicinity of lakes are the most popular, namely Bohinj and Bled.

Sport and recreational activities at riversides (angling, boating and rafting) are especially developed at the Sava Bohinjka, Sava Dolinka, Sava between Radovljica and Kranj, Kolpa, Krka and Savinja. The Drava and Mura Rivers are the most appropriate for rowing, and the Sava Bohinjka and the upper course of the Krka, Kolpa and Savinja for white water rafting (Žirovnik, 1996). Major regulated bathing places are at the Bohinj and Bled Lakes and Šobèev Bajer. In the summer of

1996, the Kolpa (to the confluence with the Lahinja), Krka (to Straža above Novo mesto), Sora (to Medvode) and the Savinja (to Braslovèe) were suitable for bathing, since the temperatures were high enough and the river water was of good quality (1st, 1st - 2nd, 2nd quality class) (Sladkovodno ribištvo, 1998). Because of the increase in quality of the Sora River after the closure of the pulp mill in Medvode, the river is almost clean enough to bathe in (2nd - 3rd quality class), and is occasionally suitable for bathing already. However, after the confluence with the Ljubljanica and the Kamnik Bistrica, her quality greatly deteriorates and is not suitable for bathing and that is true for the whole of her lower course. In the Drava and Mura River basins, none of the major rivers is suitable for bathing in the summer.

Water sources offer numerous opportunities for various forms of active riverside recreation, however, a significant improvement or river water quality is required (Plut, 1998). Only then can we expect a bigger recreational role (especially bathing) of the lower course of the Ljubljanica, Savinja, Sava, Drava and Mura. A variety of water sources signify environment-friendly developmental opportunity for tourist offer enrichment, especially as far as the more and more sought for and present active holiday-making is concerned.

5.2. Projection of Expected Economic Significance/Impacts

5.2.1. Projection of Abstraction of Raw Water

High average annual quantity of abstracted water is characteristic of Slovenia. At the same time, both industry and households are characterized by excessive use of water, while there are great losses of water in the water supply system (approximately 41 %). The water supply system is quite widely spread and no further increase in water consumption is expected, since there will be no significant population growth. It is estimated that realistic possibilities for more moderate consumption and decrease of losses in the water supply system do exist, and that could the demand for abstracted water for household supply. Considering the level of industrialization and the demand for abstracted water for the supply of industry, it is estimated that the demand of industry for fresh water will remain the same or decrease. Greater demand for abstracted water can be expected for the needs of irrigation, although not from groundwater areas, sources and municipal water supply network.

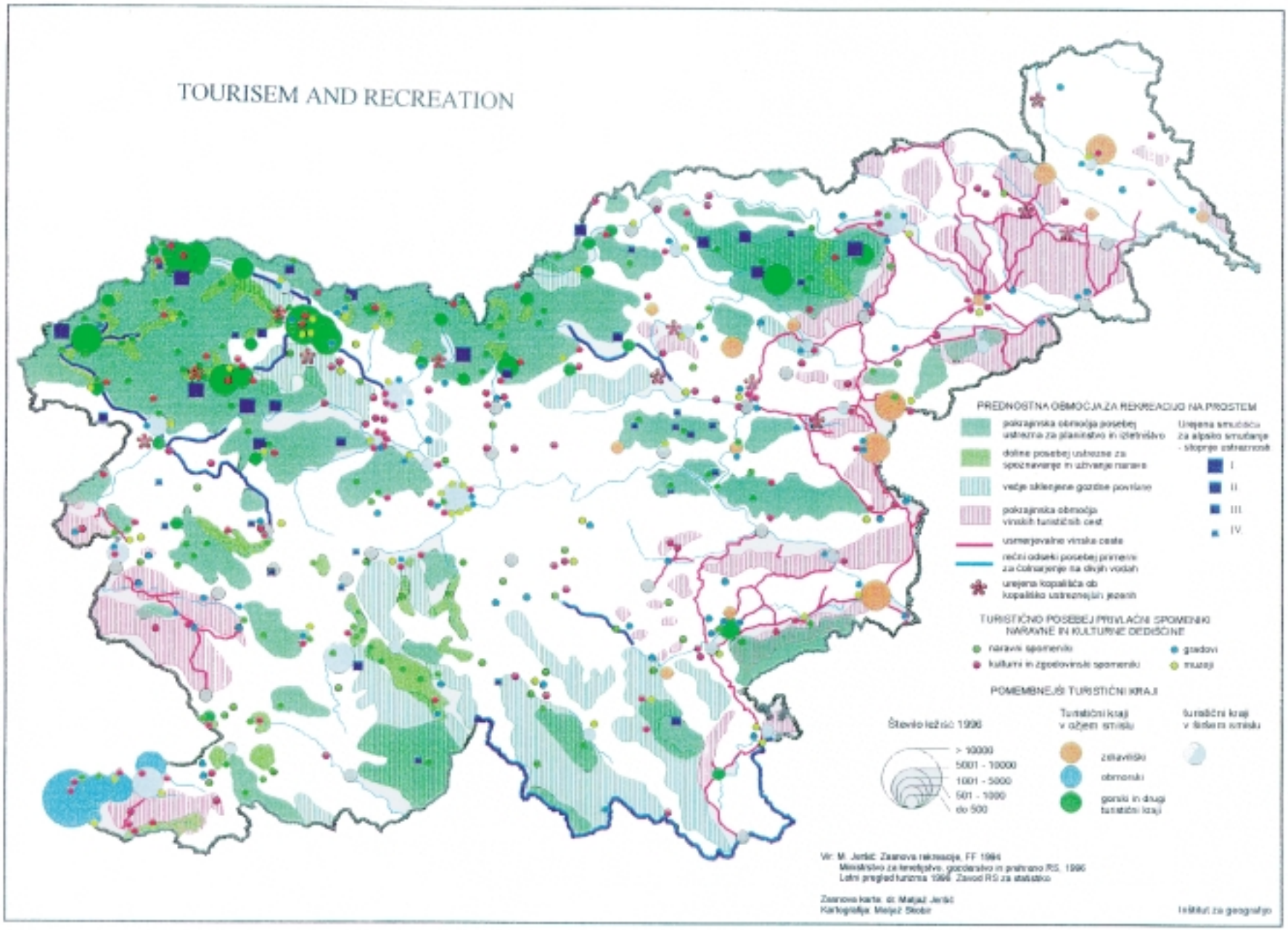
5.2.2. Projection of Wastewater Discharge

Wastewater discharge will have to be dealt with quickly and efficiently, since self-purification abilities of water sources are already lessened, especially in the flatland areas. Big industrial plants will have to pre-treat and then discharge their Wastewater through a separate sealed sewage to a central wastewater treatment plant. First the most urgent problem will have to be solved and that is an immediate construction of central WWTPs in three major cities: Ljubljana, Maribor and Celje.

5.2.3. Projection of Other Major Discharge

Construction of new hydroelectric power stations on the Mura and Sava Rivers is planned. The dynamics of the construction process is not yet clearly defined. In relation to that, there is a problem of increase in demand for water surfaces for the purpose of recreation.

TOURISEM AND RECREATION



Vir: M. Jerič: Zasnova rekreacije, FF 1994
Ministrstvo za kmetijstvo, gozdarstvo in prehrano RS, 1996
Letni pregled turizma 1996, Zavod RS za statistiko

Zasnova karte: dr. Matjaž Jerič
Kartografija: Matjaž Skobir

Inštitut za geografijo

6. Analysis of the Relevant Legal and Institutional Framework and its Adequacy for Sound Environmental Management of Water Resources and Eco-systems

6. 1. Documentation and Short Analysis of the Relevant Legal Framework[1]

Slovenia has no recent legislation on water. The new **Act on waters** will stipulate the organization structure, complete with composition, duties, liabilities, and obligations for the implementation of the programme. In accordance with general water improvement objectives the following programme fields are proposed in the draft:

- integrated development and water management
- judgement on the condition of water sources
- protection of water sources, water quality and water ecosystems
- drinking water supply, municipal Wastewater discharge and water treatment
- water and permanent development of urban settlements
- water for permanent food production and the development of countryside
- the effect of climate changes on water

6.2. Analysis of Relevant Institutional Framework[2]

For the implementation of the provisions of the water management programme, the suitable administrative bodies and organization of planning and decision-making will be organized at the national level. 5 river basins administrative units at the regional level will conduct the administrative procedure in cooperation with the Ministry of Environment. The implementation of the integral national policy of water management of river basins demands the development of the administrative structure for:

- acquisition of wetland status
- allotment of the concessions for water use
- execution of the “polluters pay” principle and putting into force of the preferential introduction of the best technology available and of the most successful environmental policy
- protection of water from actions from unknown polluters and from unrehabilitated sources of pollution
- development and improvement of monitoring and information system
- solving of international issues.

[1] povzeto po delovnem osnutku: "Nacionalnega programa varstva okolja"- Gospodarjenje z vodami, MOP, Ljubljana, 1998

[2] povzeto po delovnem osnutku: "Nacionalnega programa varstva okolja"- Gospodarjenje z vodami, MOP, Ljubljana, 1998.

7. Description and Analysis of Actual Policies and Strategies

7.1. Actual Policies and Strategies

The condition of waters in the Republic of Slovenia is analyzed in The report on the state of environment in 1996 and The programme for water management (PWW). The national programme for environment protection recapitulates the starting-points, which in view of the set objectives of water management support a programme of measures. A working draft is in the process of being completed: "The national programme for environment protection"- Water management, Ministry of environment, Ljubljana, 1998, from which the following problem identifications and priorities were taken:

Identification of problems in the field of adequate water quality assurance:

- resumed deterioration in quality of some water courses since 1995, especially with regard to heavy metals and organic compound content, e.g. mineral oils content is increased due to introduction of dangerous substances from dispersed industrial sources
- inadequate collection and treatment of municipal Wastewater (purification needed for bathing purposes)
- inefficient preventive measures for reduction of hazard of toxic spills in industrial plant sites, dangerous substance warehouses, illegal solid waste dump sites and transport of dangerous substances
- introduction of pollution from non-dispersed sources of agriculture, animal husbandry, dispersed settlements and illegal dump sites
- inadequate natural lake water quality
- intensive fish farms on small water courses
- purification of sewage system discharge, or WWTPs for the purpose of water for bathing
- problem of defining water for bathing

The problems of water supply in the Danube River basin are:

- great loss of water from badly maintained water supply systems - the lessening of losses usually means an additional water source
- protection of water sources: more than a half of municipal water supply systems lack any defined safety zones of water sources and does not monitor the water in the area
- quality of drinking water: groundwater and source water quality is not improving, the karstic sources are the most endangered ones. They are chemically and microbiologically contaminated.
- assurance of regular and adequate measurements in accumulation areas
- water supply is concentrated only on underground sources (groundwater, sources), it does not use surface water, which is in some areas, of much better quality and more appropriate for drinking water or use in other activities
- awareness-raising and education of the public that it is every citizen’s duty to take measures for clean water and that that can be done by behaving responsibly

The problems of wastewater treatment and collection and safeguarding from eutrophication in the Danube River basin are:

- less than half of the population is connected to the municipal sewage network
- sewage networks are not watertight - disperse groundwater pollution
- only approximately 15 % of Wastewater is treated biologically

- sewage systems have no needed antiflood protection in the case of water irruption from the outlet, inflow of other (hinterland) waters into the sewage system is a particular problem
- narrow and sectorial consideration of problems of Wastewater collection and treatment, which does not facilitate a realistic estimation of costs for the various possibilities of economic development of Slovenia
- presence of the acute eutrophication of natural and artificial lakes and of latent eutrophication of water courses, which threatens at accumulation construction on water courses
- third grade treatment will probably have to be introduced in the whole of Slovenia, considering the final outlet or defined eutrophication areas
- economic optimization of priorities and stages of investment in the municipal sector

Strategic directions of water management and measures for the protection of water sources in the Danube basin

the Drava River basin:

- Protection and provision of additional capacity of existing and perspective water sources for the entire Drava basin and the plain between Fala and Ptuj
- Protection and increase in capacity of water source of Ormož and Slovenske gorice water supply system
- Neutralization of pesticides from groundwater in Šikole, which is used as drinking water source for Slovenska Bistrica water supply system..

the Sava River basin:

- Integral protection and long-term supply of Ljubljana with drinking water with the use of active aquifer protection and artificial infiltration.

Municipal Wastewater collection and treatment measures, and safeguarding of water from eutrophication:

the Mura basin:

- Murska Sobota
- Ljutomer
- Lendava

the Drava basin:

- Maribor

the Sava basin:

- Celje
- Èrnomelj
- Krško
- Novo
- Vrhnika
- Sevnica
- Metlika
- Brežice
- Mesto

- Rogaška Slatina
- Ljubljana

Collection and treatment measures for industry:

- Pivovarna Union – Ljubljana
- Pivovarna Laško
- Tovarna papirja Paloma - Sladki vrh
- Tovarna papirja ICEC – Krško
- Papir – Radeèe
- Farma Ihan – Domžale
- Industrija usnja Vrhnika
- Ljubljanske mlekarne
- KG Rakièan
- Pomurka Murska Sobota
- Mariborske mlekarne

7.2. Sector Policies

Development planning on various sector levels is provided for with *national programmes*, which are crucial for water management. Several basic motions are defined there, for example, execution of an adequate system of spatial development; environment-friendly development and nature protection. 29 national programmes, resolutions, strategies and other documents have been prepared so far, of which 13 have been acceded to, 11 are still undergoing parliamentary procedures and 5 of them are either undergoing government procedures or are prepared to.

Annexes

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Part B

Financing Mechanisms

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1. Summary

The part B of Danube River Basin Pollution Reduction Program - Report of Slovenia starts with compilation of laws and regulations with financial relevance to water quality projects. The Environmental Protection Act lays legal basis for charges. The Government started levying its charges with emission charges on wastewater (Official Gazette No. 41/95 "Uredba o taksi za obremenjevanje vode") and a charge on water use (Official Gazette No. 41/95 with amendments in No. 8/96 "Uredba o vodnih povračilih"). Besides waste water charges and charges on water use the EPA includes also provisions for concessions. The concessions are granted for different types of water exploitation, i.e. fish farms, irrigation systems, small hydro plants and drinking-water exploitation.

Overall policy and funding strategy for water quality projects is outlined in a Strategy for Economic Development of Slovenia. The Strategy assumes that yearly 1,5% of GDP will be spent for environmental investments and programs. According to the Strategy 2/3 of funds will be public funds. At the beginning of nineties, 0,5% of GDP was used for environmental projects. The increase to 1,5% of GDP is therefore substantial. But new estimations, which were made recently, show that the implementation of EU synchronized environmental legislation will require more than 2% of GDP.

At the time of preparation of this report, the National Environmental Protection Program, which includes water sector development plans, has not been officially adopted, yet.

Available public funds for financing water sector programs and project are:

- funds of Ecofund,
- funds of Ministry of Environment and Physical Planing,
- funds of state budget,
- funds of municipal budgets.

The Slovenian Ecofund was established by the stipulations of the Environmental Protection Act (EPA) and began its operation in 1994. The Republic Slovenia is its sole founder and stockholder. The Ecofund is a public legal entity whose rights, obligations and responsibilities are determined by law and the Statute. The Ecofund is organized as a company limited by shares. Ecofund is a non-profit oriented financial organization, which provides loans for environmental protection investments at a favorable interest rate. The main area of operation of the Ecofund is the provision of loans to environmental investments defined by the EPA, from its own capital basis, at an interest rate which will ensure maintenance of the real value of the capital stock and the coverage of normal operating costs, with the proviso that the Ecofund shall not make additional profit. The Ecofund shall in its own name and on behalf of the others engage in the acquisition and channeling of assets for the crediting of ecological investments at an interest rate which ensures the covering of the acquired credit costs and of normal operating costs of the Ecofund.

The capital of the Ecofund at the end of 1997 was approximately 74 millions DM. The Ecofund provides loans on the basis of a public announcement - tendering procedures for individual purposes and in accordance with the priorities of the national environmental protection program.

Main water related projects of the Ecofund in the year 1997 were:

- Municipal infrastructure 97 (sewage/waste water treatment systems, solid waste disposals, city busses, drinking water…, tender in the amount of 13 million DEM- or 1.198 million SIT)
- Industry 97 A - reduction of pollution & new, environmentally friendly technologies & products (tender in the amount of 16 million DEM or 1.475 million SIT)

Other public funds for water sector projects are non-repayable grants from the Ministry of Environment and Physical Planning. In 1997, the available sum of grants for water sector projects was 360 million SIT.

Beside funds of the Ministry of Environment and Physical Planning and Ecofund, there are also funds provided directly from the state budget for selected projects. In the 1997 budget, there were 8 million SIT granted for Gornja Radgona water treatment plant. In the 1998 budget, there is 28,1 million SIT granted for Gornja Radgona and Libeliče water treatment plants.

Out of all private financing models leasing is the most commonly used in Slovenia. But most of leasing agreements is outside water sector. Lately, there are some BOT financed projects mainly in gas distribution. Use of private financing models in financing water sector project is in it's early stage. The City of Maribor is trying to build their wastewater treatment plant on BOT basis.

The Law on Prices regulates setting of water prices. According to this law setting of water and wastewater prices is under municipal authority. But at the end of 1991 the Government took over the authority to set water prices. Since then, setting of water and wastewater prices is under State control. In most of municipalities in Slovenia water and wastewater tariffs are set for four different type of customers. The customers are divided in households, industrial users, public users and other users. The average water and wastewater prices, which were charged by companies providing services for this four groups were as follows:

Average water prices (SIT/m^3)

Date	31.12. 1996	30.4. 1997
Households	55,89	60,05
Industries	104,57	109,66
Public users	81,43	83,38
Other	94,91	100,43

Average prices for collection and treatment of wastewater (SIT/m^3)

Date	31.12 .1996	30.4. 1997
Households	38,94	44,31
Industries	82,42	86,35
Public users	43,87	51,01
Other	72,67	61,23

The water and wastewater prices shown in tables above are prices without taxes and fees. On the average the price of water, charged by a company providing services, represents only 60 % of a price paid by a customer. The customer shall pay additional 3% of total water price for sales tax, 25% for fees charged by municipality and 12% for state fees.

The water users in Slovenia are obliged to pay charges on water use and on discharge of wastewater. The charges on water use are related to the type of water use and are charged if water is used for electricity production, in industries or agriculture, use of potable water and for extraction of gravel. In 1997, total revenues from water charges were 1 billion SIT. Wastewater discharges are charged as well. For industrial wastewater, the charge is calculated on the basis of substance concentrations. Communal wastewater charge depends on quantities discharged. Total revenues from wastewater charges in 1997 were 3 billion SIT. The charges are revised annually and will rise progressively.

Expenditure for environmental purposes can be deducted from corporate and personal income tax. The corporate income tax rate is 25%. Funds established for ecological and other non-profit purposes are exempted from this tax. Equipment imported for environmental projects has no overall facility of payment of import duties, but some types of equipment are partially or totally excused of import duties.

In Slovenia there are 30 commercial banks and at least 10 of them are capable of providing all services in funding water sector projects. All of 10 major commercial banks are in position of handling international funds.

All major international financial institutions as World Bank, European Bank for Reconstruction and Development (EBRD), European Investment Bank are present in Slovenia. These institutions have financed various projects in energy supply, transport and environmental projects. Slovenia has also bilateral arrangements with Austria, France, Germany and the United States and it is also a big beneficiary of PHARE assistance.

A summary list of planned water quality and water management programs and projects is given in the table. The list was derived from a draft of the National Environmental Protection Program and includes only the projects, which can be related to Danube river basin program.

Summary of planned water quality and water management programs and projects

No.	Type/name of project or programme	Total Capital Requirements			Remarks
		MSIT	MUS$		
I.	**Measures of collecting and treating municipal waste waters**				
	Total I.	**14.857,0**	**85,9**		**total 1,25 mio PE**
II.	**Measures of BAT implementation**				
	Total II.	**5.998,0**	**34,67**		
III.	**Measures for optimal use of water sources**				
	Total III.	**18.815,0**	**108,76**		
IV.	**Other measures**				
	Total IV.	**82.709,0**	**478,09**		
	Grand total	***122.379,0***	***707,39***		

2. Legal Basis

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

The Environmental Protection Act lays legal basis for fees and charges. The Ministry of Environment and Phisical Planning (MoEPP) is authorized to regulate the details for calculation of charges. However, if the pollution concerns only local population, local authorities may prescribe the charges. MoEPP may even exempt polluters from paying charges if they present a satisfactory rehabilitation program, which must be approved by the MoEPP. The Government started levying its charges with emission charges on wastewater (Official Gazette No. 41/95 "Uredba o taksi za obremenjevanje vode") and a charge on water use (Official Gazette No. 41/95 with amendments in No. 8/96 "Uredba o vodnih povračilih").

The EPA includes provisions for concessions. The State reserves rights to determine the price of a particular natural resource, which is the subject of the concession agreement. Concessions are granted for an indefinite time, and the Inspectorate for Environment supervises the activities of the concessionaire.

The following regulations on concessions are currently applied:

- Decree on concessions for economic exploitation of individual sections of the water courses of Prošček, Kneža, Bača, Ročica, Brusnik, Klavžarica, Radovna, Završnica and Vipava for electrical energy production
- Decree on concession for economic exploitation of spring drinking water from the spring by the Nemiljščica brook
- Decree on concession for economic exploitation of spring drinking water from the spring Prošček in Knežke Ravne
- Decree on concessions for economic exploitation of individual sections of water courses of Skopičnik, Tbina, Koritnica, Prodarjeva grapa, Sava Dolinka, Rupovščica, Bohinjska Bistrica, Tople,...
- Decree on concessions for economic exploitation of individual sections of water courses of Jezernica and Tržiška Bistrica for electrical energy production
- Decree on concession for economic exploitation of spring drinking water from the Karavanke tunnel
- Decree on concessions for economic exploitation of individual sections of the water courses of Mučka Bistrica, Studena and Brestanica (Topliški potok) for breeding of salmonid types of fish
- Decree on concessions for economic exploitation of individual sections of the water courses of Šujica, Mlinščica ob Besnici, Krka, Brložnica and Lobnica for breeding of salmonid types of fish
- Decree on concessions for economic exploitation of groundwater from the gravel pit Ivanci for irrigation of agricultural surfaces
- Decree on concessions for economic exploitation of individual sections of water courses Idrijca-na Mlinščici, Sava Bohinjka-na Mlinščici, Šošnarjev graben, Reka (Dobrunjica), Soriški potok and Črna for electrical energy production
- Decree on concessions for economic exploitation of HPP Zlatoličje headrace tunnel water for irrigation of agricultural surfaces
- Decree on concession for economic water power exploitation of Soča, Idrijca and Bača for electrical energy production

- Decree on concessions for economic exploitation of individual sections of water courses Hotoveljščica, Temenica, Briški potok, Brestrniški potok, Polskava, Ločnica and Hudičev graben, Trnavca, Blanščica, Petrovbrška grapa, Mišca, Bistrica,...
- Decree on concessions for economic exploitation of individual sections of the water courses of Rača, Prekopski potok (Lačni potok), Mlinščica ob Bistrici in Dolenjsko, Piroški potok, Lipovški graben, Ljubija, Polskava, Struga...
- Decree on concessions for economic exploitation of individual sections of the water courses Mašelj with Divji potok, Mlinščica ob Reki in Zavrstnik and Briški potok for bearing of salmonid types of fish
- Decree on concession for economic exploitation of the watercourse Kokra for additional snowing up of the ski slopes in Krvavec
- Decree on concessions for economic exploitation of water sources in the Republic of Slovenia for drinking water supply
- Decree on concessions for economic exploitation of individual sections of the water courses Gračnica, Mišičev graben, Savinja - Na strugi, Savinja - Kolenčeva struga, Dravinja and Jahodnica for electrical energy production
- Decree on concessions for economic exploitation of individual sections of the water courses Sopet-Strmec, Mlinščica ob Podlipščici, Drtijščica, Bistričica ob Kamniški Bistrici, Mlinščica ob Želimeljščici, Artišnica and Krka for breeding of salmonid type of fish
- Decree on concessions for economic exploitation of individual sections of the water courses Mirna, Nemiljščica, Hruševka, Temenica, Savinja - na strugi, Suha, Pretovka ob Mostnici and Sopota for electrical energy production
- Decree on concessions for economic exploitation of individual sections of the water courses Jezernice and Polskave for electrical energy production
- Decree on concessions for economic exploitation of individual sections of the water courses Milova, Mlečni potok with Zapajliška grapa, Plaščak, Mislinja, Plešiščica, Črni potok, Vuhredščica, Požarnica, Bistrica (Muta), Oplotnica, Dravinja,...
- Decree on concessions for economic exploitation of individual sections of the watercourses Mošenika and Trebuščice for breeding of salmonid type of fish
- Decree on concession for economic exploitation of the Dravinja water course section for production of electrical energy
- Decree on concessions for economic exploitation of individual sections of the water courses Črna (Dolenji Novaki), Dovžanka, Krka, Kazarska, Polskava and Sevniščica for electrical energy production
- Decree on concession for water power potential exploitation on the lower Sava river

2.2. Assessment of Main Deficiencies and Needs for Improvement

The independence of Slovenia and its clear intention to become a member of the European Union place great requirements in the legislation area. By adopting new legislation Slovenia pays great attention to the harmonization of its legislation with the EU one. In the recent years, several laws, regulations and decrees from the environmental protection sphere passed. At the moment, several regulations are being in course of preparation out of which the National Program of Environmental Protection is very important for the realization of projects. From the National Program it is to be expected that it will define achievable goals in the sphere of environmental protection, modes of their realization, projects and tasks of priority and that it will define, at least in general, financial sources for the implementation of priority tasks. Consequently, one of the priority tasks is to have the National Program of Environmental Protection passed.

Such a task like passing the National Program and other sub-laws referring to the environmental protection programs financing requires high coordination between ministries and individual offices as well as coordination on the level of local and central decision-making bodies. This is why more distinct distribution of competence and better coordination between all decision-makers represent a task of priority.

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

The Strategy of Economic Development of Slovenia assumes that yearly 1,5% of GDP will be spent for environmental investments and programs. According to the Strategy 2/3 of funds will be public funds. At the beginning of nineties 0,5% of GDP was used for environmental projects. The increase to 1,5% of GDP is therefore substantial. But new estimations that were made recently show that implementation of EU synchronized environmental legislation will require more than 2% of GDP.

The implementation of environmental legislation already adopted requires considerable investment in waste treatment and disposal and treatment of wastewater. Considerable investment in institutions, infrastructure and executive mechanisms will be needed. So it will be necessary to introduce additional financial schemes for the involvement of national budget, municipal, budgets, environmental taxes, the Ecofund, the new Phare program, international financial institutions and the capital from domestic banks and private sector. It will be particularly important in the years ahead and in the first decade of the next century to raise the share of public budget funds, principally the national budget, spent on promoting environmental investment in the public realm.

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

For funding of projects relevant to municipal and industrial wastewater treatment no financial sources are defined. This is why there is no standardized financing form defined for such investments, either. The only available standard source is the Ecofund of the Republic of Slovenia as well as funds provided by the Ministry of Environment and Physical Planing coming from the state budget of the Rep. of Slovenia and intended by both institutions for such investments through public tendering.

Ecofund of the Republic of Slovenia

The Slovenian Ecofund was established by the stipulations of the Environmental Protection Act (EPA) and began its operation in 1994. The Republic of Slovenia is its sole founder and stockholder. Ecofund is a public legal entity whose rights, obligations and responsibilities are determined by law and the Statute. Ecofund is organized as a company limited by shares (joint-stock company).

The official title of Ecofund is: Ekološko razvojni sklad Republike Slovenije, d.d., Ljubljana, (Ecological Development Fund of the Republic of Slovenia, joint stock company) and its abbreviated name is: Eko sklad, d.d., Ljubljana.

Ecofund is a non-profit oriented financial organization, which provides loans for environmental protection investments at a favorable interest rate. Ecofund is operating in its own name and on its own behalf, in its own name and on behalf of others and in the name of and on behalf of others.

The Ecofund main area of operation is provision of loans to environmental investments defined by EPA from its own capital basis and at an interest rate which ensures maintenance of the capital stock real value (real inflation rate) as well as coverage of normal operating costs, with the proviso Ecofund does not make additional profit.

Ecofund shall in its own name and on behalf of others engage in the acquisition and channeling of assets for the crediting of ecological investments at an interest rate which ensures covering of the costs of acquired credits and of normal Ecofund operating costs, with the proviso that Ecofund does not make additional profit. Ecofund shall, on the basis of a decision of the Government of the Republic of Slovenia, receive a guarantee from the Republic of Slovenia for those long-term loans from foreign financial institutions which Ecofund alone is not able to obtain under so favorable terms.

In individual environmental protection investment projects Ecofund shall in the name and on behalf of others carry out financial transactions and/or financial engineering services through which it shall, in accordance with the relevant decision of the Board, make a certain profit where this does not conflict with the activities from previous two paragraphs.

The Ecofund capital (end of 1997: approx. 74 mio DEM) consists of all the assets acquired or transferred to Ecofund: founding capital of Ecofund, claims to borrowers of ecological loans transferred to Ecofund from the Ministry of Environment, capital provided accordingly to some Acts of Republic of Slovenia (Ownership Transformation of Enterprises, Planning and Development of Settlements and other Encroachments on the Environment), capital gained from the concessions granted for the Republic waste management public services, capital assured by the National Budget and all other capital resources obtained by other legal means.

The right of other legal and physical entities to become shareholders of Ecofund is limited to 33 % of the Ecofund capital stock. Their shares shall be registered shares and do not entitle the holders to management of Ecofund.

The Ecofund assets shall be used for providing loans:

- to Republic public environmental protection services,
- to obligatory local environmental protection services,
- for equipment and technologies for environmental protection,
- for environmentally friendly technologies and products,
- for the implementation of rehabilitation programs of those responsible of provoking loads to the environment,
- to the Republic in association with obligatory measures,
- for the implementation of the national environmental protection program,
- for issuing guarantees and insurance for the above mentioned investments.

The main criteria for allocation of the Ecofund assets are:

- investments shall give major contribution to the preservation and improvement of the living and natural environment,
- investments shall in themselves be more environmentally sound,
- investments shall have a higher rate of effectiveness in comparison with costs,
- investments shall be financially viable plus the supplementary goals defined in the strategic program act of Ecofund.

Ecofund provides loans on the basis of a public announcement - tendering procedures for individual purposes and in accordance with the priorities of the national environmental protection program.

The Ecofund bodies are the Administrative Board (a chairman and four members, appointed by the Government of the Republic of Slovenia), the Supervisory Committee (a chairman and nine members, appointed by the National Assembly of the RS) and the Director (appointed by the Board and approved by the Government of the RS).

The internal organizational units of Ecofund are: Office of the Director, Project introduction sector, Project monitoring sector and Financial sector. At the moment, the Ecofund staff is comprised of 8 permanently and 3 temporarily employed people with experience in environmental projects, banking, financing, business and project management. The qualification and organization of Ecofund were favorably evaluated by the missions of the World bank and of the European Union (Phare).

Ecofund main projects in the years 1995, 1996 and 1997 were:

- Air pollution abatement Maribor 95 (conversion of heating systems, tender in the amount of 3 mio DEM)
- Municipal infrastructure (sewage/waste water treatment systems, solid waste disposals, drinking water …, tender in the amount of 8 mio DEM)
- Air pollution abatement 96 A (conversion of heating system in 43 communities, tender in the amount 5 mio DEM)
- Ozone Depleting Substances Phaseout (GEF grant to 6 companies, Ecofund-financial intermediary for procurement and disbursement, 9 mio DEM)
- PHARE technical assistance (institutional strengthening, grant to Ecofund in the amount of 0.85 mio DEM)

- WB (IBRD) load signed in June 1996 (evaluation and negotiation of a loan to Ecofund in the amount of 30 mio DEM)
- Industry 96 A - reduction of pollution (air, water, solid wastes, ODS, tender in the amount of 11 mio DEM)
- Air pollution abatement 96 B (conversion of heating systems in 55 communities, tender in the amount of 4.5 mio DEM)
- Municipal infrastructure 96 (sewage/waste water treatment systems, solid waste disposals, drinking water…, tender in the amount of 13 mio DEM)
- Industry 96 B - reduction of pollution (air, water, solid wastes, tender in the amount of 8 mio DEM)
- Air pollution abatement 97 A (conversion of heating systems in all Slovenian communities, tender in the amount of 17 mio DEM)
- Municipal infrastructure 97 (sewage/waste water treatment systems, solid waste disposals, city busses, drinking water…, tender in the amount of 13 mio DEM)
- Industry 97 A - reduction of pollution & new, environmentally friendly technologies & products (tender in the amount of 16 mio DEM)

Usually the requests for loans applying to the public tenders of Ecofund exceed the available amount of funds for several times. Additional pressure for receiving funds is to be expected because of the process of harmonization with the EU, which will require also environmental adaptation of Slovenian industry. Therefore, additional capitalization of Ecofund would be very helpful since borrowing money on financial markets is not the best solution; if the leverage between own and borrowed funds is not adequate, it is not possible to offer attractive long term loans (low interest rate). On March 5, the Government adopted the Ecofund investment policy for 1998. In this year, Ecofund will carry out two public tendering processes for loan provision. It will continue with the implementation of project of reducing air pollution which is being managed together with the World Bank and the Nova kreditna banka Maribor. The loans shall be assigned to individuals and to companies to finance the transmission to environment more friendly modes of heating. In 1998, disbursement of loans in the height of 1,4 milliard SIT is foreseen. For crediting of projects complying with the strategy of approaching to the EU legislation in the sphere of environmental protection Ecofund will publish a public invitation to bids in 1998 by which loans shall be awarded to industry in the height of 1,4 milliard SIT. Half of funds will be assured by an EU donation, program PHARE.

The implementation of the third tendering for crediting of municipal infrastructure shall depend on actual funds received from legal sources. The Ecofund qualifications to finance environmental projects are very good which has been written also in reports of international institutions monitoring the Ecofund operation. We are of the opinion that Ecofund could play an important role in the realization of projects in the sphere of water protection. This is also the reason why we make such a detailed description of the Ecofund operation. Its operation as well as processes of its funds allotment is given in the following item where standing orders for the procedures and conditions of the disbursement of funds are given.

Ecofund Standing Orders for the Procedures and Conditions of the Disbursement of Funds

Purposes

The Fund's funds can be used for purposes determined in paragraphs 1 and 2 of Article 88 of the Environmental Protection Act (Official Gazette of the Republic of Slovenia No. 31/93 and No. 1/96 (hereinafter: the EPA).

The Fund determines the amount of funds intended for an individual purpose according to the Fund's investment policy and financial plan.

Recipients of Funds

The Fund's funds can be acquired by:

- the Republic of Slovenia, i.e. ministries and other public legal entities;
- individuals having citizenship of the Republic of Slovenia; and
- legal entities with their registered office on the territory of the Republic of Slovenia, and independent entrepreneurs with their registered office on the territory of the Republic of Slovenia.

The provisions of the present Standing Orders applicable to legal entities also apply to independent entrepreneurs unless otherwise determined by the individual public tender.

Manner of Providing Funds

The Fund provides loans and issues guarantees on the basis of a public tender in a manner and under the procedure determined by these Standing Orders.

The Fund's funds intended for investments by the Republic of Slovenia referring to mandatory actions are - as a rule - not divided on the basis of a public tender. The Government of the Republic of Slovenia shall adopt the decision on the disbursement of funds referred to.

Public Tender

The public tender contents are adopted by the Administrative Board on the basis of considered EPA provisions, the environmental protection national program, the Statute of the Environmental Development Fund, joint-stock company (Official Gazette of the Republic of Slovenia No. 75/97 (hereinafter: the Statute), the Fund's investment policy and financial plan, and these Standing Orders.

The public tender must be published in the Official Gazette of the Republic of Slovenia, and if necessary, in other means of Public media.

Apart from one-phase public tender (hereinafter: the public tender), the Fund also issues the following types of public tenders:

- simplified public tenders,
- two-phase public tenders.

The Administrative Board of the Environmental Development Fund defines a simplified public tender provided that - due to technical or organizational simplicity of projects - the consideration of all public tender provisions does not appear reasonable. For simplified public tenders, the Fund’s Administrative Board regulates the required elements.

The Administrative Board issues two-phase public tenders when:

- characteristics of projects demand proper distribution of elements
- a reduced preparatory phase of the project is carried out;
- the public tender is performed on the basis of a preliminary evaluation of qualifications or similar.

Public Preparation and Implementation

For preparation and implementation of an individual public tender, the Fund's Administrative Board on the basis of adopted investment policy appoints a Committee for Public Tender Implementation (hereinafter: the Committee).

The Committee is composed of at least 3 members. In order to perform professional tasks in accordance with Article 95 of the EPA at least 1 representative of the Ministry of Environment and Physical Planning (hereinafter: the Ministry) should be appointed to participate in the Committee.

With regard to the impartiality and professional expertise of the Committee members the provisions of the Act on Public Orders (Official Gazette of the Republic of Slovenia No. 24/97) apply.

The Committee shall perform the following tasks:

- prepare contents of public tenders,
- accept applications and decide on formal suitability of an individual application,
- evaluate applications and prepare a priority list;
- approve funds available under the public tender.

In case of a simplified public tender the Fund's Administrative Board can authorize a competent Fund's agency to perform the activities of the Committee.

Documentation

A public tender procedure should be entirely documented. The documentation is kept by the Fund for at least 1 (one) year after an individual public tender has been terminated. Under the provisions of Article 14 of the EPA and Article 36 of the Statute, the documentation referred to be open to the public.

As a rule, the public tender contains the following elements:

- subject of the tender,
- amount of funds available under the tender,
- conditions for providing loans for investments,
- loan insurance,
- contents of the application submitted by an individual candidate,
- conferring information to candidates,
- time limit and manner of submitting applications,
- criteria for the evaluation of applications,
- procedures for opening, evaluation, and selection of applications,
- complaints procedure,
- time limit during which candidates shall be informed about the outcome,
- other.

The subject of public tender determines in greater detail the purpose for which the funds of the Environmental Development Fund are available under the public tender.

Amount of Funds Available under Public Tender

The total amount of funds available under the public tender is stated in the public tender. When the public tender involves several partial subjects, an orientation ratio is determined within the framework of the total amount of funds available under the public tender.

Contents of Application

The application for provision of funds, i.e. tender registration entry, should, as a rule, contain:

- for individuals: name and address of a candidate; for legal entities: corporate name and registered office of an applicant,
- investment title,
- attestations of fulfilling conditions of these Standing Orders,
- investment documentation,
- the environmental assessment report referred to in Article 55 of the EPA and/or a professional assessment the applicants should - according to other provisions - submit within the framework of basic data on the facility's purpose and capacity in their request to be provided permission to perform activities affecting the environment;
- the candidate's contact person.

The public tender determines place, date, time and name of the authorized employee from whom tender documentation may be obtained, as well as the manner of providing further information to candidates.

The deadline (date and time) for the acceptance of applications by the Fund is determined in the public tender.

Any application, received by the Fund within the time limit referred to in the preceding paragraph, is considered to have been submitted in due time.

The tender can determine that tendering for contracts is open until the Fund's funds available under the public tender are not distributed. In this case, the tender determines simultaneous or periodical opening, evaluation and approval of loans, while - as a rule - the time limit from the date of the public tender's publication to the 1st opening of applications cannot exceed 60 (sixty) days.

Candidates submit their applications along with all required documents as determined in the public tender.

Application Opening Procedure

The application opening procedure is to be held immediately, or not later than within 5 (five) days after the time limit referred to in paragraph 1 and paragraph 3 of the proceeding article expires.

If the Committee during the application opening procedure establishes the application does not contain all elements required by these Standing Orders, it refuses such an application, notifying the candidate within 8 (eight) days after the application opening procedure.

Any application received after the time limit referred to in paragraph 1 and paragraph 3 of the proceeding article expires is refused and returned, without having been opened, to the sender by the Committee.

When evaluating applications, the Committee considers the measures and criteria determined in Section V of these Standing Orders and in the Statute.

During the evaluation procedure the Committee can require from candidates additional information and explanations which candidates are obliged to submit within a determined time limit.

As a rule, the time limit referred to in the proceeding paragraph should not exceed 8 (eight) days. If the candidate fails to provide required data in due time, the Committee makes its decision based upon available data.

Based on the measures and criteria, the Committee adopts a decision on allocating funds.

The decision referred to in the preceding paragraph contains the name and address of an individual candidate, loan purpose, amount of funds, time limits for stipulating contracts, and other eventual conditions as well as a brief explanation of the individual decision.

The Committee notifies all candidates listed in the application evaluation procedure on its decision within the time limit determined in the public tender.

The Director of the Fund can hold up enforcement of the decision on allocating funds if he estimates the decision does not comply with the law, other provisions, or the public tender. The Administrative Board decides on the decision at issue.

If the candidate does not agree with the decision adopted by the Committee, his/her complaint can be submitted to the Fund's Administrative Board within 7 (seven) days from the date the decision was adopted.

The Fund's Administrative Board should decide upon the candidate's complaint within 10 (ten) days after the time limit.

Based on the decision on allocating loans, the Director of the Fund stipulates loan contracts.

Stipulating loan contracts can start immediately after the time limit. If one of the candidates submits his/her complaint, loan contracts can only be stipulated after the time limit.

If the candidate does not stipulate the loan contract within the time limit determined by the decision on allocating loans, he/she is considered to have withdrawn from his/her application.

Obligatory Conditions for Providing Loans

Apart from restrictions referred to in the Article 17 of the Statute[1] and the shareholders' right under Article 14 of the Statute, the Fund provides loans for approved investments under the following conditions:

- the loan repayment period should not exceed the life time of the investment subject,
- grace period for the repayment of principal can be approved for a period of up to 2 (two) years from the day of the loan disbursement,
- the interest rate which ensures that the real capital value is maintained and expenses resulting from the Fund's operations are covered is determined by the Administrative Board of the Environmental Development Fund in accordance with the Fund's investment policy and financial plan,
- suitable insurance in accordance with banking practice is provided.

Apart from obligatory conditions referred to in the proceeding paragraph, the Administrative Board can in an individual public tender also determine special conditions, which should be fulfilled by loan borrowers regarding:

a. required qualifications of a prospective candidate:
   - organizational qualifications,
   - qualifications to perform activities,
   - permissions or concessions granted for the implementation of activities,
   - financial capability,
   - other.

[1] Article 17 Loan restrictions
The highest possible individual loan that the Fund can approve to single borrower is up to 10% of the Funds capital. Joined individuals or legal entities are considered a single borrower. The total amount of all loans, other claims and guarantees to single borrower ought not to exceed 20% of the Fund’s capital.

b. financial conditions for providing loans:
   - share of crediting projects from the Fund's funds,
   - maximum amount of an individual loan,
   - manner of loan repayments,
   - repayment period,
   - annual interest rate,
   - suitability for insuring loans,
   - other.

c. other provisions:
   - time limit required for the beginning and termination of an investment,
   - date on which the investment value is calculated,
   - currency in which the investment value is stated,
   - penalties in the event of false statements given in an application, undermarked disbursement of loans, and/or penalties for failure to attain the anticipated results of an investment,
   - other

With reference to guarantee obtaining conditions, the Fund applies conditions for providing loans referred to in the preceding paragraph.

All expenses resulting from approving and maintaining loans and guarantees, preparing contracts, as well as other expenses with regard to the process of acquiring the loan or guarantee are covered by the recipient of funds in the amount and manner as previously determined by the Administrative Board in its standing orders on tariffs.

Besides expenses referred to in the preceding paragraph, the recipient also covers expenses resulting from ensuring the loan/guarantee as well as other actual expenses.

Priority Criteria

In accordance with the goals referred to in Article 19 of the Statute and on the basis of considered national environmental protection program the Fund shall provide its funds in order of preference to:

- projects with a higher rate of financial construction covered with proper funds,
- projects resulting from inter-state liabilities,
- projects with a higher rate of fulfilling the environmental criteria, defined in the public tender currently in force,
- projects which are appropriately co-financed by the Republic or a local community on the territory on which the project is being implemented.

For each public tender the Administrative Board can determine other criteria for the evaluation of applications submitted by potential recipients.

Monitoring of Investments' Implementation and Their Effects

The Fund monitors the implementation of investments referred to in Section II of these Standing Orders on the basis of stipulated contracts.

Regardless of the provisions determined by an individual contract, the Fund should monitor the implementation of the contract according to legal-administrative, technical-technological and financial aspects.

Monitoring of the contract's implementation must include:

- reviewing necessary submitted administrative permissions,
- supervising earmarked disbursement of funds,
- supervising the achievement of the anticipated results, and
- monitoring of the borrower's financial activities.

The Fund monitors and supervises the implementation of the contract on the basis of acquired documentation, which the loan borrower is obliged to submit, and field inspections. The Fund can - at the expense of the loan borrower - demand a professional evaluation.

The Fund can withdraw from the loan contract, cancel or postpone the loan disbursement or demand an immediate payment of the entire amount of the remaining debt if:

- the loan borrower uses the provided funds partially or completely for unauthorized intentions,
- data the loan borrower stated in its application entry for the provision of funds or while entering into the loan contract is false or incomplete,
- the loan borrower fails to achieve the anticipated results of the investment, or if it fails to observe the public tender provisions,
- other irregularities are determined during the loan disbursement process,
- the loan borrower fails to settle contractual liabilities,
- deviations from adopted contractual liabilities are established,
- the loan borrower carries out status modifications, transfers its activity or property to other legal entity or an individual,
- the loan borrower ceases to perform its regular operations or becomes, in the view of the Fund, insolvent, or if the loan borrower's property reduces considerably,
- bankruptcy, liquidation, executive, or any other proceedings, which could - in the Fund's opinion - considerably influence the possibilities for fulfilling liabilities under the loan contract, are instituted against the loan borrower or its property.

In the event of established deviations referred to in item 1 and 2 of the preceding paragraph, the Fund can immediately cancel the contract, while the loan borrower is obliged to pay the Fund the entire amount of the remaining debt from the loan, as well as a contractual penalty amounting to 30 % of the entire loan amount within 5 (five) days from the date of the Fund's demand.

Instead of Fund's withdrawing from the contract, the Director can in agreement with the Administrative Board settle each established deviation from the contract, except in instances referred to in item 1 and 2 of paragraph 1 of this article, with a new contract or amendments to the existing contract.

Funds of the Ministry of Environment and Physical Planning, Republic of Slovenia Administrative Board of Environmental Protection

The funds of the Ministry of Environment and Physical Planning represent the second institutional source of financing water protection programs. The procedures of funds allocation from this source are similar as in case of allocation of funds from Ecofund. Specific requirements are given in the conditions of public tendering for 1997.

Public tender for co-financing of facilities and structures of mandatory local public offices from the Republic of Slovenia budget in 1997.

The subject of the Public Tender is co-financing of facilities and structures of mandatory local public offices by a grant from the state budget in 1997 in the following areas:

1. municipal waste management - construction and rehabilitation of waste disposals and waste assorting facilities for further waste processing - in the height of app. 200 mil. SIT,
2. municipal wastewater and precipitation water treatment - in the height of app. 130 mil. SIT,
3. discharge of municipal waste water and precipitation water - in the height of app. 130 mil. SIT,
4. drinking water supply - protection of water sources - in the height of app. 100 mil. SIT.

The Administration Board reserves the right of modification of the given approximate amounts for individual spheres and of the total amount in accordance with the adopted State budget and with the funds affirmed in the period of temporary financing, resp.

Applicants

The applicants can be investors - local communities or executors of a relevant economic public body as their authorized representatives.

Conditions of Co-financing

The Board will co-finance selected investments up to 50 % of contractual values. The subject of co-financing excludes funds necessary to obtain Construction Permit, uniform permit or decree on application of works; costs of civil construction supervision and costs of raising loans.

Mode of Co-financing

A contract on co-financing between the Board and the selected investor (community or more communities in case of joint ventures) shall be made. The Board shall fulfill its contractual obligations on the basis of communities' claims with enclosed description of actual situation and invoices, confirmed by a supervisory body and an authorized representative of the community, in the approved share and according to the payment dynamics.

In order to ensure the fulfillment of contractual obligations the Board shall require two bank Letters of Credit that shall be submitted by the investor.

A contract sample is a constituent part of the Tender Documentation.

Documentation

The Investor shall submit the following documentation:

a. in the first phase:
   - application on a filled-in form of the Board being a constituent part of the Tender Documents,
   - feasibility study elaborated according to minimal methodology for elaboration of a feasibility study (Official Gazette of the RS, No. 9/77),
   - Site Permit or stipulation on application of works, or a copy of application to obtain Construction Permit,
   - decree of local community on the form of providing and mode of performing economic public service, and
   - approval of water management authorities.

   The applicants fulfilling all conditions of the first phase will be invited by the Board to submit a design for obtaining Construction Permit together with a cost evaluation;

b. in the second phase:
   - Construction Permit or a uniform permit to begin with construction,
   - time schedule and financial plan of the investment implementation,
   - report on tender opening procedure and decision regarding selection of the most suitable contractor on the basis of a Public Tender or an argumented explanation of signing a direct contract,
   - contract with the contractor together with the cost evaluation stated in the Offer.

The Contract shall encompass relevant stipulations regarding ensurance of contractual obligations in accordance with the regulations on public orders as well as a stipulation that an authorized representative of the Board can supervise the quality, scope and time schedule of the determined works.

The Board reserves the right, as per its own opinion and on the costs of the applicant, to order a revision of the feasibility study, technical-technological solutions of the project as well as the contract assessment with prior notice to the applicant. In case of the applicant's disagreement with the revision or assessment of the above it shall be deemed that he has resigned from the application to the public tender.

During the period of applications evaluation the commission for the public tender implementation can require, on the costs of the applicants, additional information or additional documentation from the applicants. In case the applicant does not submit the required information in due time, the commission makes decisions on the basis of the data already known.

Criteria

The Board shall consider with priority all applications for investment co-financing:

- resulting from inter-state obligations,
- protecting environmentally sensitive areas (lakes, sea, Karst area, water sources, natural parks),
- where own funds financial participation is relatively high.

In individual spheres the priority criteria are as follows:

1. municipal waste management (construction and rehabilitation of waste disposals):
   - separate collection and provision of further processing of so collected substances,
   - stated impact on the drinking water source,
   - life period of the investment and size of the region supplied
   - (the construction of new facilities shall encompass also the refurbishment of the existing ones);
2. municipal waste water treatment (municipal waste water treatment plants):
   - economy of the technological solutions,
   - achievement of at least biological level of treatment,
   - stated impact on the drinking water source;
3. municipal waste water discharge (sewage systems):
   - connection of a larger area to the existing waste water treatment plant with at least biological level of treatment,
   - imperilment of an urban area,
   - stated impact on the drinking water source;

4. drinking water supply:
   - unacceptable water sources and higher degree of imperilment of the existing water sources,
   - alternative drinking water supply due to environmental aggravation resulting from past environmental loads,
   - water deficiency in the area.

In case of continuation of the investment for which funds from the Republic of Slovenia budget were already approved in the past, the co-financing would only be possible if past contractual obligations were completely fulfilled.

Conditions for Submission of Applications

Written applications with complete documentation required under item V/a (first phase) shall be submitted in a sealed envelope marked with the project title, Public Tender for co-financing of facilities and structures of mandatory local public offices from the Republic of Slovenia budget in 1997" with clear indication of the subject under item I, name and address of the applicant and the indication "Not to be opened - Public Tender " to the address: Ministry of Environment and Physical Planning, Republic of Slovenia Board of Environmental Protection, Ljubljana, Vojkova 1b.

The applicants are obliged to submit individual applications for each investment separately, only the investment under items 2 and 3 can be applied for jointly. Consequently, the envelopes shall be marked only with one of the following indications:

1 - municipal waste management,

2 - treatment of municipal waste and precipitation waters,

3 - discharge of municipal and precipitation waters,

4 - drinking water supply,

(2+3) - treatment and discharge of municipal waste and precipitation waters.

Ministry of Environment and Physical Planning, RS Board of Environmental Protection

Funds from State and Municipal Budgets

Apart funds being awarded from the state budget by the Ministry of Environment and Physical Planning on the basis of public tenders the budget foresees also other intentional funds for individual projects. In the 1997 budget of the Republic of Slovenia 39,6 million SIT were intended for investments into municipal structures and water management. This amount encompassed 8 million SIT for the construction of the water treatment plant in Gornja Radgona. In 1998, the state budget foresees 143,8 million SIT for investments into municipal structures and water management, where 17 million SIT for the water treatment plant in Gornja Radgona and 11,1 million SIT for the water treatment plant in Libeliče are encompassed.

Individual municipalities co-finance water protection programs by awarding grants to public companies. It is unknown to us what is the scope of such financing.

4.2. Standardized Funding Mechanisms for Investments in Water Pollution Control

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

Typical sources for funding municipal wastewater treatment plants are:

- funds from state budget
- funds from Ecofund
- Funds of the Ministry of Environment and Physical Planning, Rep. of Slovenia Administrative Board of Environmental Protection
- funds from municipal budgets
- own funds of public companies
- bank loans and commercial credits

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

Typical sources for funding industrial and commercial wastewater treatment are:

- Funds from Ecofund
- Funds of the Ministry of Environment and Physical Planning, Rep. of Slovenia Administrative Board of Environmental Protection
- Own funds
- Bank loans and commercial credits

4.2.3. Patterns and Procedures for Municipal and Industrial Wastewater Treatment

There are no prescribed financial sources for financing municipal and industrial wastewater treatment. Ecofund and Ministry of Environment and Physical Planning, Rep. of Slovenia Administrative Board of Environmental Protection usually finance 50% of total project investment costs. Procedures to obtain funds from Ecofund and Ministry of Environment and Physical Planning are described in section 4.1 of this report.

4.2.4. Agricultural Pollution of Ground Water and Surface Water

At he moment Slovenia has no special funds or credit institutions to finance pollution control measures in agricultural sector. But the Ministry of Agriculture supports some programs that are environmentally oriented.

4.3. Private Financing Models in Use

The assessments of the necessary investments into water protection projects in the years to follow differ a lot. They move in the range from 0,4% GDP to 3,5% GDP. The evaluation of the available funds from public sources amounts to approximately 1% GDP. From this data it is clearly evident that private financing models shall be used for financing of such programs.

4.3.1. BOT (build-operate-transfer)

A much more important role in financing of these projects could have the so-called financing on BOT basis. In financing of public projects, especially in the sphere of gas pipelines construction, the BOT model has been used recently. In the sphere of water protection projects, activities are going on in Maribor with reference to water treatment plant construction on BOT basis. The activities on this project in Maribor began with a Decree on Concession of the Town Municipality of Maribor and the introduction of EBRD which financed the first research and acts as potential creditor.

4.3.2. Private Management of Services

Private management of services is still under developed. There are some minor involvement of private parties in this sphere such as emptying of septic pits etc.

4.3.3. Leasing Models

One of the most expanded models in Slovenia is leasing. This term was introduced into the Slovenian accounting legislation sphere by the Slovene Accounting Standards in 1994.

In the first years this financing mode was used in Slovenia especially in the sphere of vehicles, mostly cars, while recently, leasing companies provide financing of commercial vehicles, production and business equipment and immovable.

Leasing increased with the years to follow in spite the fact that its position, in comparison with other financing modes, is rather unfavorable. From year to year, the number of leasing offers increases In Slovenia and in the same time investments financed by leasing increase as well. In 1997, the members of Slovenian leasing companies association financed investments in total height of 408 million DEM, which represented more than 12% of all investments.

In comparison with other conventional financing modes leasing has been discriminated in Slovenia from its introduction in the market. The only advantage for the investor who would like to invest by leasing is in rather quick operation of the leasing company as well as in simplicity of procedures, however, he can not profit of any positive tax effects. The modifications in regulations in the last years in Slovenia deprived leasing of all attractiveness (with the exception of the above said). The introduction of Slovenian accounting standards represents for the users of leasing an additional disadvantage. Already prior to this year's increase of tax rate from the former 5 to present 6.5 % and the unchanged 3% tax rate for special cases the solutions in the law on sales tax resulted in a general impression that financial leasing resembles more and more to a taxed loan.

The Slovenian leasing companies tried to achieve by themselves and by their Association some modifications in Slovenian legislation, which would suppress tax discrimination of leasing in comparison with other financing modes, but unfortunately they didn't succeed in it. It is expected that the introduction of the value added tax would bring some modifications in this sphere on which further position of this activity will depend.

Present legislation does not prescribe any special measures to provide and carry on this financing mode. Leasing can be offered by any limited company fulfilling the conditions of operation according to the law on economic companies. Financial situation and general status of an offerer of such financial services is of course of great importance for any user of such services.

The foreseen modification in Slovenian legislation can improve essentially the present state of leasing. Its position will become normal in case tax legislation will enable the users to chose between all financing modes on the basis of positive tax effects.

Table 4.3.1. Leasing in Slovenia in 1997 (in million DEM)

Type of goods	Leasing	Sale on credit	Total	Share in %
MOVABLES				
Machines, equipment	23,08	21,21	44,29	12
Computers	8,69	0,31	9,00	12
Comm. Vehicles	46,11	67,41	113,52	30
Cars	90,27	107,90	198,17	53
Ships, planes	1,17		1,17	0
Other	7,16	2,66	9,82	3
Total	**176,36**	**199,49**	**375,85**	**100**
Share	47%	53%	100%	
IMMOVABLES				
Total	**31,54**	**1,58**	**33,12**	**100**
Share	95	5	100	

As it is evident from the Table the greatest share in leasing operations is covered by cars. The investments into water protection projects are of explicitly long-term character, this is why we assume leasing won't play an eminent role in financing of these projects.

4.3.4. Other Financing Models

All modes of private financing models of wastewater projects are still in their prime phase.

4.4. Actual Water and Wastewater Tariffs

4.4.1. Actual Tariff Policies and Systems

A legal basis for formation of prices of municipal activities where water supply and discharge as well as municipal waste and precipitation waters treatment are encompassed is represented by the Law on Prices (Official Gazette No. 1/91). Certain questions regarding prices are settled also by the Law on Economic Public Offices (Official Gazette of the RS No. 32/92) and the Law on Environmental Protection (Off. Gazette of the RS No. 32/92) with its sub-laws.

With the Law on Prices the competence regarding formation of prices in the sphere of municipal services passed to municipalities. However, already at the end of 1991, the Government deprived the municipalities of this competence with the explanation that they allowed a too big rise in prices. So the competence and the mode of prices bringing into force in the sphere of municipal products and services were transferred under state control. From 1992 on, the State has been settling modification of prices in the sphere of municipal activities by governmental decrees by which it allowed rise in prices lower than the inflation rate. This retention of prices of municipal services resulted in worsening of financial results of the public companies performing municipal services. Regarding the fact that public companies performing municipal services are mainly in the ownership of municipalities their financial operation has been solved by introduction of special contributions, taxes and fees included into prices. With such measures the majority of public companies succeeded in retaining their revenues on the level of costs. But in the same time this resulted in a price composed of two parts, i.e. of the official price and of the additions to the price, dictated by the municipalities.

4.4.2. Level and Structure of Tariffs

The Statistic Office of the Republic of Slovenia monitors prices of municipal services only in four towns in Slovenia. This is why for the review of prices of water supply and discharge of waste and precipitation waters data from Complete Analysis of Prices of Basic Municipal Products and Services for the period of 1991-1997 was used. This analysis gives prices of water supply as well as prices of discharge and treatment of wastewaters. The prices given in tables are average prices valid in 147 municipalities in Slovenia. The given prices do not encompass sales tax and republic or municipality taxes, either. The prices are given in four separated tables. The Table 4.4.1 shows average prices of water. In some public companies costs of water discharge and wastewater treatment are calculated together. Data of such companies are so given in Table 4.4.2. Data on costs of municipal and precipitation waters discharge are given in Table 4.4.3. Data on costs of municipal and precipitation waters treatment are given in Table 4.4.4.

Table 4.4.1. Average water prices (SIT/m^3)

Date	31.12. 1991	31.12. 1992	31.12. 1993	31.12. 1994	31.12. 1995	31.12. 1996	30.4. 1997
Households	15,51	28,05	35,28	45,43	51,80	55,89	60,05
Industries	31,37	55,63	69,20	85,81	98,58	104,57	109,66
Public users	24,28	40,15	49,89	64,94	84,31	81,43	83,38
Other	22,54	42,30	55,39	75,64	88,12	94,91	100,43

Table 4.4.2. Discharge and treatment of municipal and precipitation waters (SIT/m^3)

Date	31.12. 1991	31.12. 1992	31.12. 1993	31.12. 1994	31.12. 1995	31.12 .1996	30.4. 1997
Households	5,77	11,52	14,30	19,41	27,04	38,94	44,31
Industries	13,17	26,08	32,23	41,64	64,17	82,42	86,35
Public users	4,34	8,09	9,05	20,47	20,55	43,87	51,01
Other	2,10	3,80	4,00	37,27	40,59	72,67	61,23

Table 4.4.3. Discharge of municipal and precipitation waters (SIT/m^3)

Date	31.12. 1991	31.12. 1992	31.12. 1993	31.12. 1994	31.12. 1995	31.12. 1996	30.4. 1997
Households	4,44	7,77	9,84	12,97	16,87	19,11	20,37
Industries	9,17	15,17	19,47	25,92	31,91	35,19	36,64
Public users	7,62	11,71	14,55	17,59	26,85	29,48	31,44
Other	7,06	14,10	15,98	23,24	36,45	37,82	41,83

Table 4.4.4. Treatment of municipal and precipitation waters (SIT/m^3)

Treatment of municipal and precipitation waters

Date	31.12. 1991	31.12. 1992	31.12. 1993	31.12. 1994	31.12. 1995	31.12. 1996	30.4. 1997
Households	3,90	6,45	10,78	13,05	16,99	14,21	16,52
Industries	7,35	12,68	23,55	25,99	36,88	32,39	33,05
Public users	7,38	12,23	16,83	18,38	30,98	22,81	19,77
Other	6,84	11,49	19,70	27,30	44,19	31,83	27,70

Actual prices paid by a consumer in a household or in industry are given in tables 4.4.5 and 4.4.6 showing average water prices actually paid by a consumer.

Table 4.4.5. Average water price for Households

Water price 30.9.1997

Households	SIT/m^3
Base price	63,74
Sales tax	3,15
Republic fees	21,09
Local fees	38,29
Total	126,27

Figure 4.4.1. Water prices - households

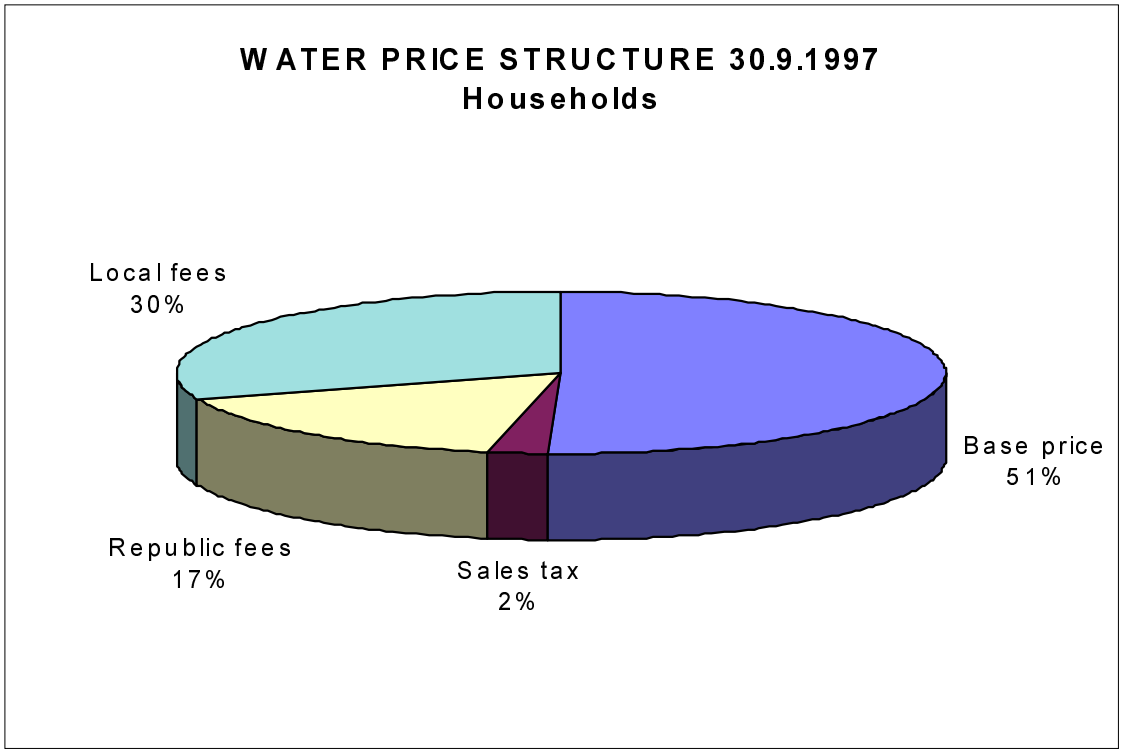
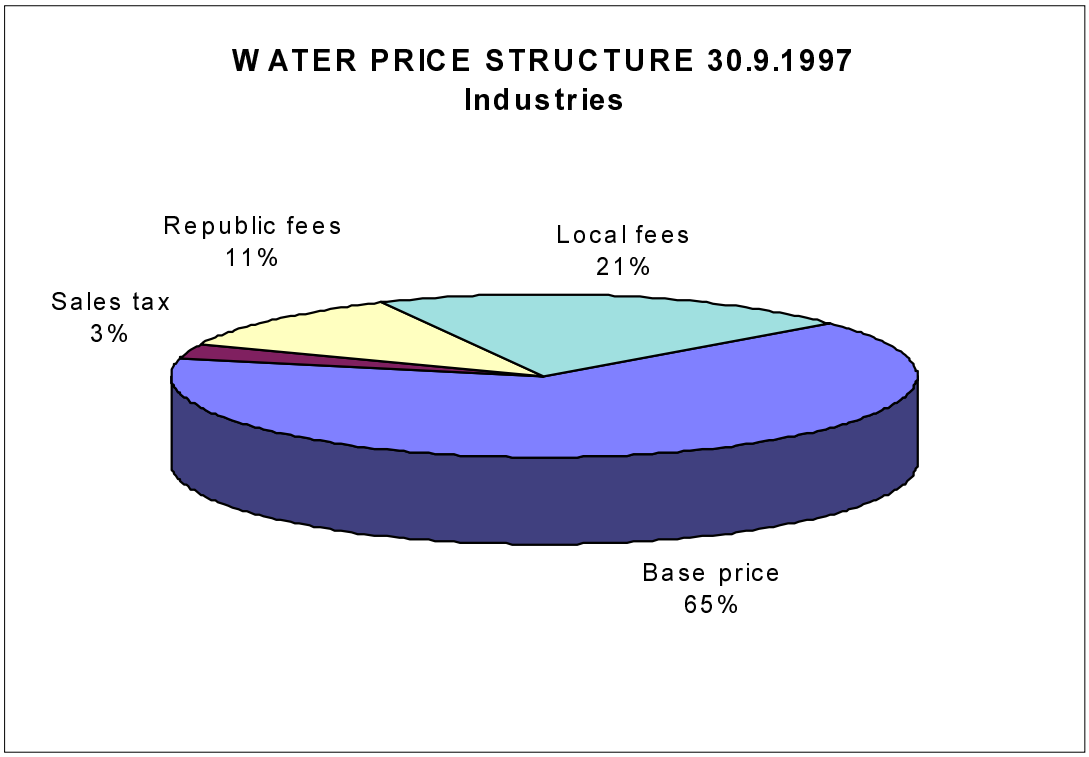


Table 4.4.6. Average water price for industries

Water price 30.9.1997

Industries	SIT/m^3
Base price	118,46
Sales tax	5,73
Republic fees	20,85
Local fees	38,59
Total	183,63

Figure 4.4.2. Water prices - industries



4.4.3. Level and Structure of Cost

The level of actual cost can be seen in profit and loss statement of water distribution companies, which submit their balance sheets to the Agency of the Republic of Slovenia for Payments. In 1997, there were 52 companies, which were distributing water and collecting or treating wastewater but there were only two specialized for treating wastewater. The summarized data of profit and loss statement is presented in Tables 4.4.7 and 4.4.8.

Table 4.4.7. Profit and loss statement of water distribution companies

Year	1996	1996	1997	1997
	mil SIT	%	mil SIT	%
No. of companies	48		52	
Total revenues	30.168	99%	30.368	97%
- sales revenues	26.574	87%	26.505	85%
- other revenues	3.594	12%	3.863	12%
Total costs	30.620	100%	31.181	100%
- material costs	14.133	46%	13.936	45%
- labour costs	9.041	30%	9.372	30%
- depreciation	5.154	17%	6.019	19%
- other costs	2.292	7%	1.854	6%
Profit (Loss)	-452	-1%	-813	-3%
- profit	354	1%	330	1%
- loss	-806	-3%	-1.143	-4%

Table 4.4.8. Profit and loss statement of wastewater treatment companies

Year	1996	1996	1997	1997
	mil SIT	%	mil SIT	%
No. of companies	1		2	
Total revenues	320	103%	368	102%
- sales revenues	293	95%	351	97%
- other revenues	26	9%	17	5%
Total costs	309	100%	362	100%
- material costs	146	47%	155	43%
- labour costs	55	18%	68	19%
- depreciation	92	30%	99	27%
- other costs	16	5%	41	11%
Profit (Loss)	11	3%	6	2%
- profit	11	3%	6	2%
- loss	0	0%	0	0%

4.4.4. Level of Actual Cost Coverage

Basic principle that shall be considered by the Slovenian legislation in the sphere of prices is the principle of all costs coverage adopted in the European countries. This means that everybody shall pay full price for consumed goods or for emissions into the environment. In the sphere of municipal services where water supply and wastewater discharge and treatment belong this principle has been lately quite neglected by the State. With a view of inflation decrease the prices were put under State control and rose slower than the inflation rates. This is why the problems of too low prices of water supply were solved in some municipalities by adopting municipal decrees introducing additional fees to cover costs of water supply and discharge. In those municipalities where the adoption of such decrees didn't pass the price of water didn't cover all costs. An example of such municipality is the town of Ljubljana where the income from the water sold in 1997 covered only about 70% of all costs. In water discharge and treatment the situation was even worse since the income covered only about 50% of costs of water discharge and treatment.

As we can see from the Table 4.3.8. sales revenues cover approximately 85% of costs for water supply. Therefore water and wastewater prices cover nearly 85% of actual costs. Twelve percent of actual costs are covered from budgetary compensation, subsidies and other revenues. In 1997, 41 companies completed their business year with 330 millions SIT of profit, but 10 companies generated 1.143 millions of losses. We can make an estimation of funds available for investments if we subtract losses from depreciation. The funds available for investments in 1996 amounted to 4,8 billions SIT and in 1997 to 5,2 billions SIT.

The two companies specialized in water treatment covered their costs and even made some profit. If we sum together profit and depreciation, the sum in 1996 and 1997 slightly exceeded 100 millions SIT. Therefore funds available for investments in past two years amounted to 100 millions SIT.

By rounding a figure a little bit we can say that own funds available to invest, for companies dealing with water distribution and waste water treatment, are 5 billion SIT per year. But we must bear in mind that the majority of these funds are used for replacements of the existing equipment and buildings.

4.5. Actual System and Practice of Pollution Charges, Penalties

4.5.1. Charges for Water Abstraction

Government of the Republic of Slovenia with its "Concessions Act on the exploration of water resources in the Republic of Slovenia for drinking water supply" started levying charges for water use. Concessionaire can use pumped water either for residential drinking water supply or for technological or any other purposes. Residential drinking water supply receives priority. The amount of concession compensation is calculated from the total pumped quantity in the amount of 1 per cent of average water price deducted by compensation for water use. Concession payment is split to 20 per cent for the budget of the Republic of Slovenia and 80 per cent for the budget of the community with water resource.

Water Compensations Act

Water compensations are paid monthly by water users who by the end of January of a current year submit all their compensation liabilities to the Ministry of Environment and Physical Planning – Office for Natural Environment. The issued billing for the previous year serves for the adjustment of accounts taking into account all settled average monthly payments, advance payments and reported annual quantities per individual unit.

Water compensations for definite quantity units paid by water users:

- energy potential exploration
- electric energy generation 14,70 SIT/MWh
- used water 4,20 SIT/m^3
- drinking water 6,30 SIT/m^3
- exploration of gravel deposits 125,00 SIT/m^3
- exploration of fine river sand deposits 624,00 SIT/m^3.

The amount of collected funds from water compensations is given in Table 4.5.1.

Table 4.5.1. Water compensation (millions SIT)

	year 1996	advance payments year 1997
Annual charges	996	1.000

4.5.2. Charges for wastewater discharge

Act on Wastewater discharge fees (Official Gazette of the Republic of Slovenia 41/95 with amendments) determines the amount and methods of payment for wastewater discharge fees.

Charges relate to drainage or discharge of technological, storm and municipal wastewater. Regardless of the provisions of the above paragraph, charge exemption is claimed as follows:

- for waste water in agriculture and used in rural areas,
- for waste water accumulating in water area during the removal of the river gravel deposits and used only for washing of gravel provided it is not discharged to other surface waters,
- for wastewater emerging during the protection measures against natural and other disasters,
- for storm water flowing over rail tracks to waters,
- for storm waters discharging from the non-operational - and as set by legislation - housed waste deposits and mineral tailing deposits respectively.

Rates are determined by the sum of payment liabilities in a calendar year. The government of the Republic of Slovenia regulates Price per charge unit by the 31 December of a current year for the following year.

Structure of charges per unit:

- 1996 800 SIT/charge unit
- 1997 1.200 SIT/charge unit
- 1998 2.100 SIT/charge unit

Ministry of Environment can waiver the exemption of charges or grant deduction if the beneficiary allocates the amount of charges for the implementation of rehabilitation or other water quality projects.

Ministry of Environment can extend waiver for the entire amount of the charges when on the basis of the rehabilitation program of the applicant it is its opinion that the grant would accelerate rehabilitation works, thus substantially lowering the environmental impairing. As a rule charge are annually reduced to the amount of means invested annually in the rehabilitation or other water quality projects.

Funds pooled through charges for water pollution are given in Table 4.5.2.

Table 4.5.2. Charge for water pollution (millions SIT)

	Year 1996 funds for the budget	Year 1996 funds for investments	Year 1997 advance payments
Paid by Municipalities	-	1.360	2.040
Paid by Industry	640	60	960

4.5.3. Other Relevant Charges/Penalties

There are no other charges or penalties for water abstraction or wastewater discharge.

4.6. Economic and Financial Incentives For Pollution Reduction Measures

Expenditure for environmental purposes can be deducted from corporate and personal income tax. The corporate income tax rate is 25%. Funds established for ecological and other non-profit purposes are exempted from this tax. The allowable deduction currently amounts to 40% (before 1 July 1996 it was 20%) of the financial means invested, but may not exceed the tax base. In addition, reserves for investments in Slovenia may be deducted up to the amount of 10% of the tax base. Such an allowance may be granted for a four-year term. Equipment imported for environmental projects has no overall facility of payment of import duties, but some types of equipment are partially or totally excused of import duties.

Practice of discounting assets for privatization with environmental commitments has had two consequences. Firstly, it allowed cheaper privatization of the company. Secondly, in the presence of shortages of working capital and relatively expensive bank loans, it made it possible to use company funds as working capital and relatively expensive bank loans. To ensure that commitments actually lead to environmental investments, a new regulation is before Parliament for approval. It stipulates that, should an enterprise not use the committed funds to improve the state of environment, the amount should be transferred to the Eco-Fund. It can be expected that this regulation, if enforced, will be sufficient to ensure that existing commitments are met.

United Nations' Economic Commission for Europe, Committee on Environmental Policy recommended in 1997 in their Environmental Performance Reviews, Slovenia, that a comprehensive tool-kit of economic and fiscal instruments for use in environmental management should be developed jointly by the MoEPP and the Ministry of Economic Affairs. This work should also enable an informed decision on the future of the Eco-fund, which should be assessed against other possible funding mechanisms for environmental protection.

4.7. Quality and Capacity of the National Banking System for Funding of Larger Infrastructure Projects

The Bank of Slovenia is the bank of issue and the central bank of the Republic of Slovenia. It was established on June 25, 1991 when the Parliament of the Republic of Slovenia promulgated the central bank act, the Law on the Bank of Slovenia.

The Bank's primary task is to take care of the stability of the domestic currency and to ensure the liquidity of payments within the country and with foreign countries. The Bank is a non-governmental independent institution; it is obliged to present a report on its operation to the Parliament once every six months. It is the bank of banks and the lender of last resort, it is the supervisor of the banking system (but not of other financial intermediaries non-banks). The Bank is the banker of the government and conducts no corporate business and none with natural persons. The Bank is not allowed to take up loans abroad for its own account, nor for the account of third persons.

The Governor chairs the Bank. He has a Deputy and three Vice Governors. The executive bodies of the bank are the Governor and the Governing Board. The Governor of the Bank of Slovenia is the chairman of the Governing Board. The latter is composed of eleven members, five of them internal (Governor, Deputy Governor and Vice Governors) and six of them external independent experts not tied to any institution under the control of the Bank.

Table 4.7.1. Analytical accounts of the Bank of Slovenia

Categories	March 31,1998 (Tolars in millions)
Assets	603.727
Gross foreign assets	561.476
Claims on the general government	15.221
Claims on domestic banks	19.814
Other assets	7.216
Liabilities	603.727
Notes issue	80.376
Deposits	75.540
Bank of Slovenia bills	377.425
Gross foreign liabilities	171
Capital and reserves	52.314
Other liabilities	17.901

Source: Bank of Slovenia

Table 4.7.2. Bank of Slovenia international monetary reserves

Category	March 31,1998 (in millions of US Dollars)
Gold	0,09
SDR's	0,14
Reserve position in IMF	17,38
Foreign exchange	3.281,72

Source: Bank of Slovenia

In Slovenia there are 30 commercial banks and 7 savings banks. Commercial banks operate under a strict regime in terms of available capital, which remains under the discretionary policy of the Bank of Slovenia as set by Law on Banks and Savings Banks. Operation of individual bank as set by the law depends on paid-in-capitalization of some 60 millions DEM in order to run all bank related services. It is to be mentioned that only 14 banks meet the paid-in-capitalization conditions, whereas the remaining banks perform a reduced scope of services or only some of them. Scope of bank services is set by Law on Banks and Savings banks (Official Gazette of the Republic of Slovenia no. 1/91) which defines a bank as a legal person engaged in banking business according to legal provisions. Article 2 of the law determines the following banking services:

1. money deposits by legal and natural persons;
2. borrowings and loans;
3. money transfers;
4. cheques and bills transactions;
5. foreign currency transactions;
6. issuing of securities and credit cards;
7. trading and control of securities of domestic and foreign drawers;
8. guarantees and warranties and other money obligations for its clients;
9. buying and collecting receivables;
10. deposits of securities and other valuables.

State secretary of finance can in compliance with the opinion of the Governor of the Bank of Slovenia stipulate other bank services to be run by a bank. Bank can run its operation in its own name and on its own account, in its own name and on the account of third persons and for third persons' name and account.

In annex B-2 there is alphabetical listing of top ten banks in Slovenia. Criterion for their size is the amount of assets in billions of SIT after the 1996 balance sheet.

All commercial banks in Slovenia providing banking services as set by the law, fall into the category of general, non-specialized banks. Previously, banks in Slovenia were specialized to a certain degree and the legal predecessor of the SKB bank was a specialized bank performing the savings and loan transactions as well as financial transactions for municipal activities. The change of the banking legislation prior to 1991 and the law on banks in 1991 made the division of banks void. It is estimated that all large banks in Slovenia are in position to finance large infrastructure projects.

Weakness of the banking system in Slovenia, according to the experts, lies in their number relative to the dimension of business. Consequently, Slovenian banks demonstrate substantially lower rates of cost-effectiveness, of rates of return and productivity if compared with those of the European banks. Also, bank commissions and charges for financial transactions are above those in the

neighboring countries, and last but not least, each bank provides and expands its own business network. Thus, in future more mergers are expected in this field aiming at the reduction of banks as well as at the increase of international competition of domestic commercial banks.

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

Slovenia cooperates with international financial institutions and benefits from very favorable international credit ratings and is the first country from the transition countries with a credit rating A awarded in 1996. Some renowned big financial organizations are present in Slovenia: World Bank, European Bank for Reconstruction and Development (EBRD), and European Investment Bank. In the past, foreign financial organizations were involved in financing of various energy and transport projects and some ecological programs. In addition, Slovenia has bilateral financial arrangements with Austria, Germany, France, Netherlands, Great Britain, Japan and United States of America.

From the Bank of Slovenia source it is evident that in 1997 there were new credit transactions totaling 1,350 millions US$, which is by 16,3 per cent lower than in 1996. After 1991, the scope of transactions in comparison to the previous year declined for the first time. At the same time, a drop by 11,2 per cent was noted in the case of recent loans, either borrowings or state guaranteed loans, in the total amount of 379,3 millions US$. Out of this sum, the amount of 231,2 millions dollars of borrowings represents bonds of the Republic of Slovenia issued in the DEM nomination. Also, current public borrowings dropped, and in 1997 they equalled 970,7 millions dollars, a drop by 18,1%. International institutions granted loans in the amount of 85,4 millions dollars in 1997, whereas 165.6 millions dollars were granted through syndicated loans, mostly for banks crediting.

In the water protection area PHARE remains financially most engaged entity. Within PHARE programme for Slovenia the following water projects are anticipated:

- ongoing investment for drainage system in Gornja Radgona.
- construction of pollution control equipment in Gornja Radgona and in Libeliče. For these two projects the 1998 budget funds of the Republic of Slovenia were reserved.

Also, in 1999 certain water protection projects should be financed partly within the PHARE program, but the selection of projects is still underway.

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

In Slovenia there is no centralized national institution with exclusive right to run transactions with international means. All financial services in connection with international funds can be done by commercial banks. In the field of environmental care projects the Eco-fund of the Republic of Slovenia has gained experience in international financing of the projects.

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

Selection of investments for Water Quality and Water Management Programs and Projects is taken from the draft of National Environmental Protection Act. Out of the program only those programs were chosen which are directly or indirectly connected with the Danube river basin.

Measures for Wastewater Accumulation and Drainage and Protection against Eutrofication of Waters

U1 elaboration of strategies for optimal wastewater accumulation and treatment of individual water zones (5)

U2 installation of technical parameters of pollutants for register control

U3 education of systems and facilities operators in municipality

U4 municipal WTP and WTP of livestock farms and organic industrial waste respectively

The Mura river basin:

U4.1 Murska Sobota (Ledava, Mura) expansion for 70.000 PE

U4.2 Ljutomer (Ščavnica, Mura)

The Drava river basin:

U4.3 Slovenske Konjice (Dravinja) 38.000 PE

U4.4 Slovenj Gradec (Mislinja, Drava) 45.000 PE

U4.5 Slovenska Bistrica (Ložnica, Dravinja) 25.100 PE

U4.6 Maribor (drainage channel HE Zlatoličje, Drava) – to be built per phases in 10-15 years for the needs of the next 30 years, 300.000 PE

The Sava river basin:

U4.7 Novo Mesto (reconstruction of municipal and industrial WWTP) (Krka)

U4.8 Ivančna Gorica (Višnjica, Krka) 15.000 PE

U4.9 farm Stična (Višnjica, Krka)

U4.10 Grosuplje (Bičje, Krka) 15.000 PE

U4.11 Trebnje (Temenica, Krka) 6000 PE

U4.12 farm Kočevje (Rinža, Krka)

U4.13 Rogaška Slatina (Sotla) 37.500 PE

U4.14 Vrhnika (Ljubljanica, Sava)

U4.15 Ljubljana (Ljubljanica, Sava) 700.000 PE - to be built per phases in 10-15 years for the needs of the next 30 years.

Measures for the Introduction of BAT (prevention of water environment pollution by hazardous waste)

U1 Development of methodology for integral evaluation of waste impact on the water environment (classification to classes); based on the European union legislation (Directive 93/21/EEC, 1993, p.p. 46-70) as an efficient tool for the assessment of potential waste danger and harmful effects

U2 Toxicity Reduction in Effluents, TRE; increasing concentration of toxic and hazardous substances in some industrial waste waters requires the development of new and the introduction of best available technologies for clean water actions and waste reduction.

U3 Expert guidelines for management and control of municipal biological treatment facilities; elaboration of guidelines for seminars management targeted at heads and operators of municipal and mixed biological treatment equipment.

U4 Development of persistent toxic tests; together with an overall environmental impact assessment of hazardous waste, a methodology is to be developed for an overall waste impact assessment on the water environment with a supplement on persistent toxic tests and additional tests for the appraisal of biodecomposition in specific conditions.

U5 Balances of organic pollution and nutrients according to individual water basins and a scenario for the waste waters management (options for the water protection with regard to the drainage system network development and waste waters treatment); water environment can deteriorate not only due to organic substances but also due to harmful nutrients found not only in different production processes, but also in rural areas; consequently a survey of carbon, nitrogen and phosphorus compounds for individual river basins is to be made; the subject survey should serve as a base for the elaboration of options for the water protection action with respect to the drainage network system development and waste water treatment (municipal as well as technological).

U6 Integrated Pollution Prevention and Control; (IPPC); in view of the present technological development, IPPC can be classified into the following categories:

- new procedure with respect to the reaction technique,
- new procedure with respect to the process technique,
- IPPC.

The first two categories require large periods for their scientific and technical development as well as higher investment costs than those for the "end of pipe" protection. The third category is beyond the prevention of the environmental pollution and means the protection of the environment through recycling and selective supply of useless waste respectively.

U7 Development of new treatment technologies for municipal and industrial (technological) wastewater and the introduction of best available technologies (BAT) for individual industries into our environment.

Protection Measures and Optimal Use of Water Resources (underground and surface waters)

The Drava river basin:

U1 Protection and supply of additional capacities for the existing and prospective water sources for the regional water supply project in the Maribor area with the suburbs:

U1.1 studies

U1.2 sewage and drainage

U1.3 WWTP of waste waters (without WWTP Maribor)

U1.4 WTP drinking water (nitrogens, pesticides)

U2 Protection and assurance of additional prospective water sources for the entire Drava basin and the level region from Fala to Ptuj

U2.1 studies

U2.2 sewage and drainage

U2.3 WTP waste waters

U2.4 WTP drinking water (nitrogens, pesticides)

U3 Protection and expansion of the water source supply capacity Ormož and Slovenske gorice

U4 Purification of pesticides from the underground water in Šikole used as a drinking water source for the water supply Slovenska Bistrica. Procedure with active charcoal.

The Sava river basin:

U5 Integral protection and long-term supply of Ljubljana with drinking water by means of active aquifer protection and artificial infiltration.

Measures of BEP Introduction into Rural Production (prevention of pollution from non-point sources – sustainable rural practice)

U1 Identification of the existing condition, assessment and control of non-point sources of underground waters pollution, application of the existing studies and elaboration of clear charts of endangered underground waters

U2 exchange of information and education of staff at all levels (rural acceleration service, rural producers)

U3 production of fundamental and application research for determination of putrefied zones and fitoremedial measures (catch-crops, plants as large consumers of nitrogen compounds), organization of demonstration farms above all in Karst, water protection areas and irrigation regions

U4 restoration of monitoring for the underground waters pollution in irrigation areas with vegetable intensive production (emphasis on water protection areas) and introduction of regular control of prevention protection measures especially in irrigation zones and water protection areas

U5 Abatement of stockbreeding pollution (endorsement of the Act) and implementation of good rural practice and introduction of economic incentives

U6 reactivation of melioration and production communities which beside rural acceleration services assume the responsibility for the operation of systems (irrigation, drainage, monitoring)

U7 efficient appliance of the principle “polluter pays” combined with other measures for pollution control from points sources in agriculture

Measures for Proper Water Quality (assurance to provide for quality bathing waters, fishing, ...)

U1 Studies on optimal dynamics of water protection in waters areas (construction of drainage system, construction WTP, protection measures, restoration etc.)

U2 rehabilitation of manure hills and septic pits across Slovenia, with priority paid to the underground drinking water sources, and in Karst

U3 with economic analysis to search for the best septic pits restoration alternative for small settlements across Slovenia, with priority paid to the underground drinking water sources, and in Karst. Septic pits are to equipped with sink holes or to be turned into Imhoff tanks (putrefying areas) and if suggested by the analysis, to build a drainage network with a small WWTP.

U4 restoration of endangered biotypes and restoration of the anticipated biocoenoses according to the priority listing of endangered species.

<u>The Sava river basin:</u>

U5 Prevention of eutrofication and the rehabilitation of the lake Bled

U6 Reinstatement of the Vonarsko jezero and restoration of the natural biotopes with interface buffer zones

U7 Rehabilitation of the Krka river along its waterway (WWTP already stated, further action relates to the reinstatement of dams, coastal buildings, buffer zones in the lower river course etc.)

6.2. Inventory of Actual and Planned Investment Portfolio

Point gives measures in the water management field, whereas this point includes Table 6.2.1 with listing of all those measures, which represent investments into facilities and installations for the embetterment of water management. Investments also include costs for the investment and programs support studies and documents. Table 6.2.1 gives the investments sum for individual programs without the expected financial sources, since the financial sources have not been determined yet.

Table 6.2.1. Summary of planned water quality and water management programmes and projects

No.	Type/name of Project or Programme	Total Capital Requirements			Remarks
		MSIT	MUS$		
I.	**Measures of collecting and treating municipal waste waters**				
	Total I.	**14.857,0**	**85,9**		**total 1,25 mio PE**
II.	**Measures of BAT implementation**				
	Total II.	**5.998,0**	**34,67**		
III.	**Measures for optimal use of water sources**				
	Total III.	**18.815,0**	**108,76**		
IV.	**Other measures**				
	Total IV.	**82.709,0**	**478,09**		
	Grand total	***122.379,0***	***707,39***		

6.3. Assessment of Main Weaknesses, Problems, Delay in Project Implementation

Materialization of investments covering environmental protection is a complex issue, demanding proper legal basis, clear authorization and responsibilities, cooperation of a great number of parties concerned from public and private sector and in the end sufficient financial means. The main task is the selection of projects and identification of contractors. Production of “Project Files” within this program can be instrumental during the implementation. In addition, all potential financial providers should become familiar with the findings of this report, just to name some Ecofund, commercial banks and other financial institutions.

Annexes

Annex B-1

Bibliography

Bank of Slovenia " Introduction Page"

Bank of Slovenia "Alphabetical List of Banks in Slovenia"

Newspaper "Finance" no. 34/98

Ministry of Environment and Physical Planning, Office of the Republic of Slovenia for Natural Environment Protection – "Invitation to bid for cofinancing of facilities and installations of compulsory public services from the budget of the Republic of Slovenia in 1997"

Official Gazette No. 41/95 "Charge for water discharge"

Official Gazette No. 41/95 with amendments in No. 8/96 " Charge for water compensations"

Counseling center - "Development strategy of municipal economy in the Republic of Slovenia"

Counseling center - "Overall Survey of Prices for basic municipal products and services in the period 1991-1997"

Counseling center - "Expert conference on current issues of construction sites and financing of public infrastructure schemes"

UN - Economic Commission for Europe "ENVIRONMENTAL PERFORMANCE REVIEWS SLOVENIA"

Annex B-2

List of Commercial Banks

- **ABANKA d.d. Ljubljana**
  Slovenska 58
  1517 LJUBLJANA
  telephone: 386 (61) 1718100
  fax: 386 (61) 1325165, 386 (61) 1329322
  www: http://www.abanka.si/
  E-mail: infoŽabanka.si
  assets as at December 31, 1996: 88,3 billions SIT

- **BANK AUSTRIA d.d. Ljubljana**
  Wolfova 1
  1000 LJUBLJANA
  telephone: 386 (61) 1777600
  fax: 386 (61) 211217, 386 (61) 212977
  www: http://www.bankaustria.si/
  E-mail: infoŽbankaustria.si
  assets as at December 31, 1996: 39,9 billions SIT

- **BANKA CELJE d.d.**
  Vodnikova 2
  3000 CELJE
  telephone: 386 (63) 431000
  fax: 386 (63) 483511
  www: http://www.banka-celje.si
  E-mail: infoŽbanka-celje.si
  assets as at December 31, 1996: 93,2 billions SIT

- **BANKA KOPER d.d.**
  Pristaniška 14
  6502 KOPER
  telephone: 386 (66) 451100
  fax: 386 (66) 37842
  www: http://www.banka-koper.si/
  E-mail: --
  assets as at December 31, 1996: 99,6 billions SIT

- **DOLENJSKA BANKA d.d.**
  Seidlova cesta 3
  8000 NOVO MESTO
  telephone: 386 (68) 316500
  fax: 386 (68) 231113
  www: http://www.db-nm.si/
  E-mail: infoŽdb-nm.si
  assets as at December 31, 1996: 53,2 billions SIT

- **GORENJSKA BANKA, d.d., Kranj**
  Bleiweisova 1
  4000 KRANJ
  telephone: 386 (64) 2840
  fax: 386 (64) 221503, 386 (61) 221613, 386 (64) 221625, 386 (61) 221718, 386 (61) 221713, 386 (61) 222365
  www: (under construction) http://www. gbkr.si
  E-mail: infoŽgbkr.si
  assets as at December 31, 1996: 71,8 billions SIT

- **NOVA KREDITNA BANKA MARIBOR d.d.**
  Vita Kraigherja 4
  2505 MARIBOR
  telephone: 386 (62) 229229
  fax: 386 (62) 224333, 386 (62) 224371
  www: http://www.nkbm.si/
  E-mail: infoŽnkbm.si
  assets as at December 31, 1996: 197,2 billions SIT

- **NOVA LJUBLJANSKA BANKA d.d., Ljubljana**
  Trg republike 2
  1520 LJUBLJANA
  telephone: 386 (61) 1250155
  fax: 386 (61) 222422, 386 (61) 1250331
  www: http://www.n-lb.si
  E-mail: infoŽn-lb.si
  assets as at December 31, 1996: 490,2 billions SIT

- **POMURSKA BANKA d.d., Murska Sobota**
  Bank Group of Nova Ljubljanska banka
  Trg zmage 7
  9000 MURSKA SOBOTA
  telephone: 386 (69) 32710
  fax: 386 (69) 31301, 386 (69) 31296, 386 (69) 32416, 386 (69) 27530
  www: --
  E-mail: --
  assets as at December 31, 1996: 48,1 millions SIT

- **SKB BANKA d.d. Ljubljana**
  Ajdovščina 4
  1513 LJUBLJANA
  telephone: 386 (61) 1332132, 386 (61) 1715100
  fax: 386 (61) 314549
  www: http://www.skb.si
  E-mail: skb.netŽskb.si
  assets as at December 31, 1996: 206,5 billions SIT

Annex B-3

List of Programmes/Projects

No.	Type/name of Project or Programme	Total Capital Requirements		Funding Period	National Funding Sources											International Funding		
					Equity	Envir. Fund	Water Manag Fund	Public Loans Cent. Budg.	Public Loans Reg. Budg.	Public Loans Local Budg.	Public Grants Central Budg.	Public Grants Reg. Budg.	Public Grants Local Budg.	Comm Bank Loans	Others	Organisation	Grant	Loan
		MSIT	MUS$	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT		MUS$	MUS$
I.	**Measures for wastewater accumulation and drainage and protection against eutrofication of waters**																	
U1	Strategies for treatment of water zones	30,0	0,17	til 2000														
U2	Rgister of polluters	10,0	0,06	til 2001														
U3	Education in municipalities	30,0	0,17	permanently														
U4.1	WTP Murska Sobota	1.550,0	8,96	10-15 years														
U4.2	WTP Ljutomer	620,0	3,58															
U4.3	WTP Slovenske Konjice	800,0	4,62															
U4.4	WTP Slovenj Gradec	880,0	5,09															
U4.5	WTP Slovenska Bistrica	620,0	3,58															
U4.6	Maribor	2.800,0	16,18	10-15 years														
U4.7	WTP Novo Mesto	684,0	3,95															
U4.8	WTP Ivančna	143,0	0,83															

No.	Type/name of Project or Programme	Total Capital Requirements		Funding Period	National Funding Sources											International Funding		
					Equity	Envir. Fund	Water Manag Fund	Public Loans			Public Grants			Comm Bank Loans	Others	Organisation	Grant	Loan
								Cent. Budg.	Reg. Budg.	Local Budg.	Central Budg.	Reg. Budg.	Local Budg.					
		MSIT	MUS$	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT		MUS$	MUS$
	Gorica																	
U4.9	WTP farma Stična	200,0	1,16															
U4.10	WTP Grosuplje	240,0	1,39															
U4.11	WTP Trebnje	240,0	1,39															
U4.12	WTP farma Kočevje	180,0	1,04															
U4.13	WTP Rogaška Slatina	800,0	4,62															
U4.14	WTP Vrhnika	430,0	2,49															
U4.15	WTP Ljubljana	4.600,0	26,59	10-15 years														
	Total I.	**14.857,0**	**85,9**															
II.	**Measures for introduction of BAT**																	
U1	Methodology	30,0	0,17	til 2000														
U2	Toxicity Reduction in Effluents	4.550,0	26,30	til 2010														
U3	Expert guidelines	18,0	0,10	til 2000														

No.	Type/name of Project or Programme	Total Capital Requirements		Funding Period	National Funding Sources											International Funding		
					Equity	Envir. Fund	Water Manag Fund	Public Loans Cent. Budg.	Public Loans Reg. Budg.	Public Loans Local Budg.	Public Grants Central Budg.	Public Grants Reg. Budg.	Public Grants Local Budg.	Comm Bank Loans	Others	Organisation	Grant	Loan
		MSIT	MUS$	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT		MUS$	MUS$
U4	Toxic tests	200,0	1,16	til 2001														
U5	Balances of organic pollution	1.000,0	5,78	til 2003														
U6	IPPC	200,0	1,16	til 2000														
U7	New technologies		0,00															
	Total II.	**5.998,0**	**34,67**															
III.	**Protection measures and optimal use of water resources**																	
U1	Water supply of Maribora area																	
U1.1	studies	20,0	0,12	til 2000														
U1.2	sewage and drainage	5.700,0	32,95															
U1.3	WWTP	1.900,0	10,98															
U1.4	WTP drinking water	475,0	2,75															

No.	Type/name of Project or Programme	Total Capital Requirements		Funding Period	National Funding Sources											International Funding		
					Equity	Envir. Fund	Water Manag Fund	Public Loans Cent. Budg.	Public Loans Reg. Budg.	Public Loans Local Budg.	Public Grants Central Budg.	Public Grants Reg. Budg.	Public Grants Local Budg.	Comm Bank Loans	Others	Organisation	Grant	Loan
		MSIT	MUS$	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT		MUS$	MUS$
U2	Protection of water sources in Drava basin																	
U2.1	studies	20,0	0,12															
U2.2	sewage and drainage	0,0	0,00	til2005														
U2.3	WWTP	2.000,0	11,56	til 2015														
U2.4	WTP drinking water	6.000,0	34,68	til2005														
U3	Water supply of Ormož	800,0	4,62	til 2005														
U4	Purification of pesticides Šikole	900,0	5,20	til 10 let														
U5	Water supply of Ljubljana	1.000,0	5,78	10-15 let														
	Total III.	**18.815,0**	**108,76**															
IV.	**Other measures**																	
U3.1	Septic pits restoration I.	21.749,0	125,72	til2020														
U3.2	Septic pits restoration II.	45.000,0	260,12	til2020														

No.	Type/name of	Total Capital		Funding	National Funding Sources											International Funding		
	Project or Programme	Requirements		Period	Equity	Envir.	Water	Public Loans			Public Grants			Comm	Others	Organisation	Grant	Loan
						Fund	Manag	Cent.	Reg.	Local	Central	Reg.	Local	Bank				
							Fund	Budg.	Budg.	Budg.	Budg.	Budg.	Budg.	Loans				
		MSIT	MUS$	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT	MSIT		MUS$	MUS$
U7	Remediation of manure pads	15.960,0	92,25	til 2015														
	Total IV.	**82.709,0**	**478,09**															
	Grand total	***122.379,0***	***707,39***															

Annex B-4

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

Proposed projects:

MUNICIPAL WWTP

No.	Wastewater Treatment Plant
1	Wastewater Treatment Plant Ljubljana (3rd phase)
2	Wastewater Treatment Plant Maribor (3rd phase))
3	Wastewater Treatment Plant Celje (3rd phase)
4	Wastewater Treatment Plant Murska Sobota (3rd phase)
5	Wastewater Treatment Plant Lendava
6	Wastewater Treatment Plant Rogaška Slatina
7	Wastewater Treatment Plant Sevnica
8	Wastewater Treatment Plant Krško
9	Wastewater Treatment Plant Brežice
10	Wastewater Treatment Plant Črnomelj (3rd phase)
11	Wastewater Treatment Plant Metlika
12	Wastewater Treatment Plant Novo Mesto
13	Wastewater Treatment Plant Ljutomer
14	Wastewater Treatment Plant Vrhnika

INDUSTRIAL WWTP

No.	Wastewater Treatment Plant
1	Pivovarna Union Ljubljana Brewery Union Ljubljana
2	Pivovarna Laško Brewery Laško
3	Tovarna papirja Paloma Pulp and paper plant Paloma
4	Tovarna papirja AICE Krško Paper Factory AICE Krško
5	Farma Ihan Farm Ihan
6	Industrija usnja Vrhnika Leather Industry Vrhnika
7	Ljubljanske mlekarne Dairy Factory Ljubljana
8	Farma Rakičan - Ižakovci Farm Rakičan - Ižakovci
9	Radeče papir Paper Radeče
10	Pomurka Murska Sobota
11	Mariborske mlekarne Dairy Factory Maribor

Common Annexes

Table of Contents

List of Abbreviations on Water Quality

Abbreviation & Acronyms	Unabbreviated Expression
A	anum, year
AC	Activated Carbon
AEWS	Accident Emergency Warning System
AOX	Absorbable (on AC) Organic Halogenated compounds
BAT	Best Available Technologies
BATNEEC	Best Available Technologies Not Entailing Excessive Costs
BAP	Best Agricultural Practice
BEP	Best Environmental Practice
BOD	Biochemical Oxygen Demand
BOD_5	Biological Oxygen Demand in 5 days
Bq	Becquerel
cap	Capita
CBO	Citizen Based Organization
CEE	Central and Eastern Europe
CEEC	Central and Eastern European Countries
CEFTA	Central European Free Trade Agreement
CFC	Chlorofluorocarbon
CITES	Convention on International Trade in Endangered Species of Wild Flora and fauna
COD	Chemical Oxygen Demand
CPC	Country Program Coordinator
CPI	Consumer Price Index
CSO	Combined Sewer Overflow
CVAAS	Cold Vapor Atomic Absorption Spectrometry
DANIS	Danube Information System
DBAM	Danube Basin Alarm Model
DDT	Dichlorodipheniltrichloroethane, insecticide
DEA	Desethyl Atrazine (Metabolite of pesticide Atrazine (Triazine))
DEF	Danube Environmental Forum
DEM	Deutsche Mark = German Mark
DG	Directorate General of the European Commission
DIA	Desisopropyl Atrazine (Metabolite of pesticide Atrazine (Triazine)
DIN	Deutsche Industry Norm = German Industry Norm
DISAE	Development of Implementation Strategies for Approximation in Environment
DMSG	Data Management Sub-Group
DRBPRP	Danube River Basin Pollution Reduction Program
DRPC	Danube River Protection Convention (= Convention for the Protection and Sustainable Use of the Danube River Basin)
DWQM	Danube Water Quality Model
EAP	Environmental Action Plan

EBRD	European Bank for Reconstruction and Development
EC	European Community
ECE	UN Economic Commission for Europe
ECU	European Currency Unit = XEU
EEC	European Economic Community
EECONET	European Ecological Network
EFTA	European Free Trade Association
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMAS	European Management and Audit Scheme
EMEP	Cooperative program for Monitoring and Evaluation of the long-range transmission of air Pollutants in Europe
EMIS	Emission group
EOX	Extractable Organic Halogenated compounds
EPA	Environmental Protection Act for Slovenia, 1993
EPA	Environmental Protection Agency
EPDRB	Environmental Program for the Danube River Basin
EPR	Environmental Performance Review for Slovenia, 1997
ETAAS	Extraction (Graphite) Tube Atomic Absorption Spectrometry
EU	European Union
EU EPA	European Union Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectrometry
FDI	Foreign Direct Investment
FGD	Flue-Gas Desulphurization
FPSG	Financing Partners Sub-Group
g	gram = 0.001 kg
g/l	grams per liter
G-24	the Group of 24 industrialized nations (members of the OECD)
GC/MS	Gas Chromatography and Mass Spectrometry
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GEF-DRBPRP	GEF - Danube River Basin Pollution Reduction Program
GEMS	Global Environmental Monitoring System
GIS	Geographical Information System
GJ	gigajoule = 10^9 J
GNP	Gross National Product
GW	Ground-Water
h	hour
ha	hectare = 10,000 m^2 = 0.01 km^2
HCH	Hexachlorocyclohexane = □-HCH=Lindane (insecticide)
HEPP	Hydro-Electric Power-Plant
HMI	Hydrometeorological Institute of Slovenia
HP	Heating Plant
HS	Hot Spot
IBA	Important Bird Areas

IBRD	International Bank for Reconstruction and Development (The World Bank)
IC	International Commission of the DRPC
IEA	International Energy Agency
IFI	International Financial Institution(s)
inh.	inhabitants
kinh	kilo inhabitants = 1000 inh. = 1k inh.
IPCC	International Panel on Climate Change
IPPC	Integrated Pollution Prevention and Control
ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature and Natural Resources (= World conservation union)
J	joule
kg	kilogram = 1000 g
km	kilometer = 1000 m
km^2	square kilometer
kW	kilowatt = 1000 W
kWh	kilowatt hour
l	liter = 0.001 m^3
LPG	Liquefied Petroleum Gas
LU	Livestock Unit = equivalent to 500 kg live weight
m	meter
m^2	square meter
m^3	cubic meter
m^3/s	cubic meters per second
MAC	Maximal Allowable Concentration
MAP	Mediterranean Action Plan
MARPOL	International Convention for the Prevention of Pollution from Ships (=Marine Pollution)
MCPP	Acryloxy alcanic acid (herbicide)
MECU	Millions of ECU
MEPP	Ministry of Environment and Physical Planning (of Slovenia)
MoEPP	Ministry of Environment and Physical Planning (of Slovenia)
mg	milligram
µg	microgram = 10^{-6} g
mg/l	milligrams per liter
min	minute = 1/60 hour
ml	milliliter = 0.001 l
MLIM	Monitoring, Laboratory and Information Management sub-group
MPN	Most Probable Number of bacteria in a 100 ml sample
MW	megawatt = 10^6 W
MWh	megawatt hour
N/A	Not Available
NAP	National Action Plan
NEAP	National Environmental Action Plan

ng	nanogram = 10^{-9} g
NGO	Non-governmental Organization
NMVOC	Non-Methane Volatile Organic Compound
NPEP	National Plan of Environmental Protection = NEAP
NPP	Nuclear Power-Plant
NRP	National Research Program
OECD	Organization for Economic Co-operation and Development
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl(s)
PCDD	(Polychlorinated Dibenzo) Dioxin
PCU	(Danube) Program Coordination Unit
PE	Population equivalent
pH	negative log10 of concentration of H^+ (measure of acidity)
PHARE	EU program of assistance for economic restructuring in CEEC
PIAC	Principal International Alert Centers
PJ	petajoule = 10^{15} J
PPC	Project Preparation Committee of the Environmental Action Prog
REC	Regional Environmental Center for Central and Eastern Europe
RSE	Report on the State of the Environment (Slovenia)
s	second = 1/60 min = 1/3600 h
SANC	State Authority for Nature Conservation (within MoEPP)
SAP	Strategic Action Plan (for the Danube River basin)
SIT	Slovenian national currency Tolar
SITC	Standard International Trade Classification
SME	Small- and medium-size enterprise(s)
t	Metric ton = 1000 kg
TACIS	EU program of Transfer of know-how to the New Independent States and Mongolia
TAIEX	EU program of Technical Assistance Information Exchange Office of the European Commission
TNMN	Trans-National Monitoring Network
TOC	Total Organic Carbon
toe	Ton oil equivalent
TOR	Terms Of Reference
TPES	Total Primary Energy Supply
TPP	Thermal Power Plant
TW	TeraWatt = 10^{12} W
UAA	Unit of Agricultural Area
UN	United Nations
UNDP	UN Development Program
UNECE	UN Economic Commission for Europe
UNEP	UN Environmental Program
UNESCO	UN Educational, Scientific and Cultural Organization
UNIDO	UN Industrial Development Organization
UNOPS	UN Office of Project Services

US	United States (of America)
USA	United States of America
USD	United States (of America) Dollars
USAID	Agency for International Development
USEPA	US EPA
VAT	Value-Added Tax
VOC	Volatile Organic Compound
WHO	World Health Organization
WMO	World Meteorological Organization
WTO	World Trade Organization
WW	Wastewater
WWF	World-Wide Fund (for Nature)
WWTP	Waste-Water Treatment Plant
XEU	European Union Currency Unit = ECU
y	year = a = anum

Glossary on Water Quality

Term	Definition
AC	Activated Carbon
AOX	Absorbable (on AC) Organic Halogenated compounds
BOD	Biological Oxygen Demand
BOD_5	Biological Oxygen Demand in 5 days
CFC	Chlorofluorocarbon
Cd	Cadmium
COD	Chemical Oxygen Demand
COD(Cr)	Chemical Oxygen Demand (Dicromate)
COD(Mn)	Chemical Oxygen Demand (Permanganate)
CSO	Combined Sewer Overflow
Cu	Copper
CVAAS	Cold Vapor Atomic Absorption Spectrometry
DEA	Desethyl Atrazine (Metabolite of pesticide Atrazine (Triazine)
DIA	Desisopropyl Atrazine (Metabolite of pesticide Atrazine (Triazine)
DO	Dissolved Oxygen
EOX	Extractable Organic Halogenated compounds
ETAAS	Extraction (Graphite) Tube Atomic Absorption Spectrometry
FAAS	Flame Atomic Absorption Spectrometry
FGD	Flue-Gas Desulphurization
GC/MS	Gas Chromatography and Mass Spectrometry
HCH	Hexachlorocyclohexane = g-HCH=Lindane (insecticide)
Hg	Mercury (Quicksilver)
HS	Hot Spot
LPG	Liquefied Petroleum Gas
MAC	Maximal Allowable Concentration
MCPP	Acryloxy alcanic acid (herbicide)
MPN	Most Probable Number of bacteria in a 100 ml sample
N	Nitrogen
NH_3	Ammonia
NH_3-N	Ammonia Nitrogen
NH_4	Ammonium ion
NH_4-N	Ammonium Nitrogen
NMVOC	Non-Methane Volatile Organic Compound
NO_2	Nitrite
NO_2-N	Nitrite Nitrogen
NO_3	Nitrate
NO_3-N	Nitrate Nitrogen
NOx	Different forms of gaseous nitrogen oxides
Ntot	Total Nitrogen, expressed as N
P	Phosphorus
PAH	Polycyclic Aromatic Hydrocarbons

Pb	Lead
PCB	Polychlorinated Biphenyl(s)
PCDD	(Polychlorinated Dibenzo) Dioxin
PE	Population equivalent
pH	negative log10 of concentration of H^+ (measure of acidity)
PO_4	Orthophosphate
PO_4-P	Ortophosphate Phosphorus
Ptot	Total Phosphorus
TKN	Total Kjeldahl Nitrogen, expressed as N
TOC	Total Organic Carbon
VOC	Volatile Organic Compound
WHO	World Health Organization
WMO	World Meteorological Organization
WW	Wastewater
WWTP	Wastewater Treatment Plant

Glossary on Measures and Units

Measure	Definition
a	anum, year
Bq	Becquerel
cap	capita
g	gram = 0.001 kg
GJ	gigajoule = 10^9 J
g/l	grams per liter
h	hour
ha	hectare = 10,000 m^2 = 0.01 km^2
inh.	inhabitants
J	joule
kg	kilogram = 1000 g
kinh	kilo inhabitants = 1000 inh. = 1k inh.
km	kilometer = 1000 m
km^2	square kilometer
kW	kilowatt = 1000 W
kWh	kilowatt hour
l	liter = 0.001 m^3
LU	Livestock Unit = 500 kg of live weight
m	meter
m^2	square meter
m^3	cubic meter
m^3/s	cubic meters per second
mg	milligram
µg	microgram = 10^{-6} g
mg/l	milligrams per liter
min	minute = 1/60 hour
ml	milliliter = 0.001 l
MW	megawatt = 10^6 W
MWh	megawatt hour
ng	nanogram = 10^{-9} g
PE	population equivalent (in terms of pollution = 60 g BOD_5/day/inh.)
PJ	petajoule = 10^{15} J
s	second = 1/60 min = 1/3600 h
t	metric ton = 1000 kg
toe	ton oil equivalent
TW	TeraWatt = 10^{12} W
y	year = a = anum

Legislative Framework

The complete list of relevant legislation on power is given in the following table (copied from MEPP, 1997, 10.3 Annex 3: Transportation timetable of the Slovenian environmental legislation to the EU):

Transposition timetable of the Slovenian Environmental Legislation to the EU

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
A. HORIZONTAL		
1. Non-White Paper legislation		
Directives		
Environmental impact assessment, 85/337/EEC, amended by 97/11/EC	1. Uredba o vrstah posegov v okolje, za katere je obvezna presoja vplivov na okolje Ur.l.RS, št. 66/96 Regulations on the types of activity for which an environmental impact assessment is mandatory *1. Uredba o spremembah in dopolnitvah uredbe o vrstah posegov v okolje, za katere je obvezna presoja vplivov na okolje* *Regulation on Amendments and Additions to the Regulation on the types of activity for which an environmental impact assessment is mandatory*	*1.1 - Mar. 99*
Environmental information, 90/313/EEC	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96 *1. Spremembe zakona o varstvu okolja* *Amendments to the Environmental Protection Act* *2. Odredba o dostopnosti do okoljevarstvenih informacij* *Decree on the freedom of access to information on the environment (conditions under which information are available and refused, right to appeal, definition of bodies with public respontibilities)*	*1.2 - Aug. 99*
Reporting, 91/692/EEC	*1. Navodilo o pripravi poročila o vplivih na okolje - interno navodilo* *Instructions on the methodology for preparing a report on environmental impact - internal instructions*	
Council Directive 93/76/EC to limit Carbon dioxide emissions by improving energy efficiency (SAVE)	*Uredba o ukrepih za učinkovito izrabo energije* *Regulation on energy efficiency measures*	*1.3 - Feb. 99*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Regulations		
European Environment Agency, EEC/1210/90		
LIFE, EEC/1836/93	*Uredba o industrijskih sektorjih* *Regulation on industrial sectors eco-management and audit scheme*	*1.4 - Nov. 98*
2. White Paper legislation		
none		
B. AIR QUALITY		
1. Non-White Paper legislation		
Directives		
Air Quality Framework, 96/62/EC, including 3 older directives to be replaced by new requirements under the framework directive:	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96; 2. Uredba o mejnih, opozorilnih in kritičnih imisijskih vrednosti snovi v zraku Decree on limit values, alert thresholds and critical emission values for substances emitted into the atmosphere, OJ 73/94;	
SO_2 and particulate, 80/779/EEC, amended by 81/857/EEC, 89/427/EEC, 90/656/EEC and 91/692/EEC Lead, 82/884/EEC amended by 90/656/EEC and 91/692/EEC Nitrogen oxide, 85/203/EEC amended by 85/580/EEC, 90/656/EEC and 91/692/EEC and 92/72/EEC tropospheric ozone pollution	*1. Uredba o spremembi uredbe o mejnih, opozorilnih in kritičnih imisijskih vrednosti snovi v zraku* *Decree on the change to the Decree on limit values, alert thresholds and critical emission values for substances emitted into the atmosphere* *2. Uredba o opozorilnih imisijskih vrednostih v zraku ter z njimi povezanimi ukrepi* *Decree on alert emission thresholds for substances in the atmospheric pollution* *3. Pravilnik o monitoringu onesnaženosti zraka* *Regulations on monitoring of the emission of substances into the atmosphere*	*2.1 – Aug. 98*
	Odredba o kakovosti trdnih goriv glede vsebnosti žvepla *Decree on the quality of solid fuels with regard to their sulphur content*	*2.2 - May 98*
Regulations		
none		

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
2. White Paper legislation		
Directives		
Emissions from motor vehicles, 70/220/EEC amended by 74/270/EEC, 77/102/EEC, 78/665/EEC, 83/351/EEC, 88/76/EEC, 88/436/EEC, 89/458/EEC, 89/491/EEC, 91/441/EEC, 93/59/EEC, 94/12/EEC, 96/44/EEC and 96/69/EEC - *"Auto-Oil" proposal COM(96) 0163 (COD)* Emissions from diesel engines - soot, 72/306/EEC amended by 89/491/EEC and 97/20/EC Emissions from diesel engines 88/77/EEC amended by 91/542/EEC and 96/1/EEC Emissions from motor vehicles - roadworthiness test for emissions, 92/55/EEC		
VOC emissions from storage and transport of petrol, 94/63/EC	*Uredba o emisiji snovi v zrak iz naprav za prečrpavanje goriv* *Decree on the emission of substances into the air from storage of petrol and its distribution from terminals to service stations*	*2.3 - Sep. 98*
Lead content of petrol, 85/210/EEC amended by 85/581/EEC and 87/416/EEC *Sulphur content of liquid fuels, 93/12/EEC* replacing 75/716/EEC *Proposal: on the quality of petrol and diesel fuel, COM(96) 0163(COD) - "Auto-Oil".* ** The proposed directive on the quality of petrol and diesel fuel, COM(96) 0163 (COD) will replace 85/210/EEC and the limit values for sulphur content in diesel fuel for road vehicles found in 93/12/EEC.*	Odredba o kakovosti tekočih goriv glede vsebnosti žvepla, svinca, in benzena Decree on the quality of liquid fuels with regard to their sulphur, lead and benzene content, OJ 8/95 *Odredba o spremembi odredbe o kakovosti tekočih goriv glede vsebnosti žvepla, svinca in benzena Decree on the change to the Decree on the quality of liquid fuel with regard to their sulphur, lead and benzene content*	*2.4 - Jun. 98*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Regulations		
none		
C. WASTE MANAGEMENT		
1. Non-White Paper legislation		
Directives		
Waste from the titanium dioxide industry, 78/176/EEC amended by 91/692/EEC, and related directives: Procedures for the surveillance of titanium dioxide industry, 82/883/EEC Harmonization of reduction programs, 92/112/EEC	*Odredba o ravnanju z odpadki pri proizvodnji titanovega dioksida* *Decree on the management of wastes which appear in the production of titanium dioxide*	*3.1 - Oct. 98*
Municipal waste incineration for existing installations, 89/429/EEC and for new installations, 89/369/EEC	*Uredba o emisiji snovi v zrak iz sežigalnic komunalnih odpadkov* *Decree on the emission of substances into the atmosphere from the municipal waste incineration*	*3.2 - Apr. 98*
	Pravilnik o uporabi biološko razgradljivih olj/Regulations on use of biodegradable oils	*3.3 - Aug. 98*
Hazardous waste incineration, 94/67/EEC	Uredba o emisiji snovi v zrak iz sežigalnic nevarnih odpadkov/Decree on the emission of substances into atmosphere from the incineration of hazardous waste *Uredba o spremembi uredbe o emisiji snovi v zrak iz sežigalnic odpadkov* *Decree on change to the Decree on the emission of substances into atmosphere from the incineration of hazardous waste*	*3.4 - Jun. 98*
Proposal for a directive on Landfill of waste, (COM(97)105)-final	*Odredba o odlagališčih odpadkov* *Decree on landfill of waste*	*3.5*
	Pravilnik o ravnanju s fitofarmacevtskimi odpadki/Regulations on the management with phytopharmaceutical waste *Uredba o načinu opravljanja javne službe ravnanja s fitofarmacevtskimi odpadki v RS* *Decree on the public service on phytopharmaceutical waste management*	*3.6*
	Uredba o načinu opravljanja javne službe ravnanja z živalskimi trupli, deli živalskih trupel in živalskimi proizvodi v RS *Decree on the public service on animal carcases management*	*3.7*
Regulations		
none		

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
2. White Paper legislation		
Directives		
Disposal of waste oils, 75/439/EEC amended by 87/101/EEC and 91/692/EEC	Zakon o varstvu okolja Environmental Protection Act ,OJ. 32/93, 1/96; Pravilnik o ravnanju z odpadnimi olji Regulations on waste oil management, OJ 4/80; Uredba o emisiji snovi v zrak iz kurilnih naprav Decree on the emission of substances into the atmosphere from heating plants, OJ 78/94; *Odredba o ravnanju z odpadnimi olji* *Decree on the management with waste oils*	*3.8*
Waste Framework directive 75/442/EEC amended by 90/656/ECC, 91/156/EEC and 91/692/EEC, 94/3/EC, 96/350/EEC Hazardous waste, 91/689/EEC replacing 78/319/EEC amended by 94/31/EC, 96/302/EC, 94/904/EC	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96; 2. Pravilnik o ravnanju s posebnimi odpadki, ki vsebujejo nevarne snovi Regulations on the management of wastes which contain toxic substances, OJ 20/86, 4/89, 39/96; *1. Odredba o ravnanju z odpadki* *Decree on waste management*	*3.9*
Disposal of PCBs and PCTs, 76/403/EEC replaced by 96/59/EC from 16.03.98	*Odredba o odlaganju polikloriranih bifenilov polikloriranih terfenilov* *Decree on the disposal of polychlorinated biphenyls and polychlorinated terphenyls*	*3.10 - Mar. 99*
Sewage sludge and soil, 86/278/EEC amended by 91/692/EEC	Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96; 1. Uredba o vnosu nevarnih snovi in rastlinskih hranil v tla Decree on input of toxic substances and plant nutrients into th e Soil, OJ 68/96; 1.1. Pravilnik o obratovalnem monitoringu pri vnosu nevarnih snovi in rastlinskih hranil v tla Regulations on operational monitoring on input of toxic substances and plant nutrients into the soil, OJ 55/97 Uredba o mejnih, opozorilnih in kritičnih imisijskih vrednosti nevarnih snovi v tleh Decree on the limit, warning and critical emission values of toxic substances in soil, OJ 68/96	3.11 3.12

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Batteries, 91/157/EEC amended by 93/86/EEC	*Odredba o ravnanju z odpadnimi galvanskimi členi* *Decree on the management of spent galvanic cells*	*3.13 -Apr. 99*
Packaging waste, 94/62/EC	*Pravilnik o ravnanju z embalažo* *Regulations on packaging waste*	*3.14 - Dec. 98*
Regulations		
Regulation on Supervision shipment of waste, EEC/259/93 amended by 120/97/EC, 94/575/EC, 94/721/EC, 94/774/EC, 96/660/EC	1. Zakon o varstvu okolja Environmetal Protection Act, OJ 32/93, 1/96; 2. Zakon o ratifikaciji Baselske konvencije Act on Ratification of the Basel Convention, OJ 48/93; 3. Odredba o izvozu, uvozu in tranzitu odpadkov Decree on the export, import and transit of wastes, OJ 39/96, 45/96, 1/97 *1. Odredba o spremembi odredbe o izvozu, uvozu in tranzitu odpadkov/Decree on the change to the Decree on export, import and transit of wastes*	*3.15 – Oct. 98*
D. WATER QUALITY		
1. Non-White Paper legislation		
Directives		
Proposed Water Quality Framework Directive, (COM(97)49 -final	*Zakon o vodah* *Water Law*	*4.0 - Mar. 98*
Urban wastewater, 91/271/EEC	1. Uredba o emisiji snovi pri odvajanju odpadnih vod iz komunalnih čistilnih naprav (Ur.l. RS, št. 35/96) Decree on the emission of substances in the drainage of wastewater from municipal waste-water treatment plants *1. Odredba o načinu določanja evtrofikacijskih območij zaradi obremenjevanja voda z komunalnimi odpadnimi vodami* *Decree on criteria of special protection for areas designated for eutrophicaly sensitive areas*	*4.1 - Oct. 98*
Nitrates, 91/676/EEC	*Odredba o načinu določanja evtrofikacijskih območij zaradi uporabe dušičnih spojin v kmetijstvu* *Decree on criteria of special protection for areas designated for nutrient sensitive areas*	*4.2 – Sep. 98*

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
*Surface water for the abstraction of drinking water, 75/440/EEC amended by 79/869/EEC, 90/656/FEEC and 91/692/EEC related decision 77/795/EEC on common procedures for exchange of information *Fish water, 78/659/EEC amended by 90/656/EEC and 91/692/EEC *Shellfish water, 79/923/EEC amended by 91/692/EEC *Bathing water, 76/160/EEC amended by 90/656/EEC Drinking water, 80/778/EEC amended by 81/858/EEC, 90/656/EEC and 91/692/EEC ** will be incorporated in the proposed Water Quality Framework Directive (COM(97)49)*	1.Uredba o klasifikaciji voda medrepubliških vodnih tokov, meddržavnih voda in voda obalnega morja, Ur.l. SFRJ 6/1978 Decree on water quality standards of ..... *1. Uredba o imisijskih mejnih vrednostih fizikalnih, kemijskih in bioloških parametrov kakovostnih razredov površinskih voda* *Decree on water quality standards of surface fresh water and undergroundwater*	*4.4 Dec. 98*
*Surface water for the abstraction of drinking water, 75/440/EEC amended by 79/869/EEC, 90/656/EEC and 91/692/EEC related decision 77/795/EEC on common procedures for exchange of information (Drinking water, 80/778/EEC amended by 81/858/EEC, 90/656/EEC and 91/692/EEC)	*1. Pravilnik o monitoringu onesnaženosti površinskih voda* *Regulations on the monitoring requirements regard to the quality of surface water*	*4.5 - Jan. 99*
Measurement and sampling of drinking water, 79/869/EEC amended by 81/855/EEC		
	1. Odredba o določitvi vodovarstvenih območij	*4.6 - Feb. 99*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
*Ground water 80/68/EEC amended by 90/656/ECC and 91/692/EEC * will be incorporated in the proposed Water Quality Framework Directive (COM(97)49)	*za vodne vire namanjene oskrbi s pitno vodo* *Decree on criteria of special protection for areas designated for the abstraction of water intended for human consumption*	
Proposal for a Council Directive on the ecological quality of water (COM(93)680) (to be incorporated into Water Framework Directive)	*1. Uredba o klasifikaciji voda v kakovostne in trofične razrede (zakon o vodah)* *Decree on the ecological quality standards of water*	*4.7 -Aug. 99*
Regulations		
none		
2. White Paper legislation		
none		
E. NATURE PROTECTION		
1. Non-White Paper legislation		
Directives		
Habitats, 92/43/EEC	*Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o varstvu rastlinskih in živalskih vrst* *Decree on conservation of species of wild flora and fauna* *2. Uredba o varstvu ogroženih rastlinskih in živalskih vrst* *Decree on conservation of endangered species of wild flora and fauna* *3. Uredba o ekološkem omrežju* *Decree on ecological network* *- prepovedani načini lova in ribolova ter prepovedana sredstva so vključena v zakone s področja lova in ribolova* *- prohibited methods and means of capture and killing are included into the laws of hunting and fishing*	*8.0 - Apr.98* *8.1 - Oct. 98* *8.2 - Oct 98* *8.3. - Oct.99*
Wild birds, 79/409/EEC amended by 81/854/EEC, 85/411/EEC, 86/122/EEC, 91/244/EEC and 94/24/EC	*Zakon o ratifikaciji Bonnske konvencije o varstvu migracijskih prostoživečih vrst živali* *Law on Ratification of the Convention on the conservation of migratory species of wild animals*	*8.4 - Apr. 98*

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
	Zakon o ratifikaciji Bernske konvencije o varstvu flore, favne in habitatov *Law on Ratification of the Bern Convention on the conservation of European wildlife and natural habitats* *Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o varstvu rastlinskih in živalskih vrst* *Decree on conservation of species of wild flora and fauna* *2. Uredba o varstvu ogroženih rastlinskih in živalskih vrst* *Decree on conservation of endangered species of wild flora and fauna* *3. Uredba o ekološkem omrežju* *Decree on ecological network* *- prepovedani načini lova in ribolova ter prepovedana sredstva so vključena v zakone s področja lova in ribolova* *- prohibited methods and means of capture and killing are included into the laws of hunting and fishing*	*8.5 - Jun 98*
Skins of seal pups, 83/129/EEC amended by 85/444/EEC, 89/370/EEC	*Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o uvozu, izvozu in tranzitu rastlinskih in živalskih vrst* *Decree on import, export and transit of species of wid fauna and flora*	*8.6 - Oct.99*
Regulations		
Endangered species, 338/97/EC repeals EEC/3626/82	*Zakon o ratifikaciji Washingtonske konvencije o mednarodni trgovini z ogroženimi vrstami samonikle favne in flore (CITES)* *Law on Ratification of the Washington Convention on international trade in endangered species of wild fauna and flora (CITES)* *Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o uvozu, izvozu in tranzitu rastlinskih in živalskih vrst* *Decree on import, export and transit of species of wid fauna and flora*	*8.7 - Sept. 98*

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
Import of whales, 348/81/EEC	*Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o uvozu, izvozu in tranzitu rastlinskih in živalskih vrst* *Decree on import, export and transit of species of wid fauna and flora*	
Protection of the Antarctic 90/3943/EEC		
Leghold traps, EEC/3254/91 amended by 35/97/EC	*Zakon o ohranjanju narave* *Nature Conservation Law* *1. Uredba o uvozu, izvozu in tranzitu rastlinskih in živalskih vrst* *Decree on import, export and transit of species of wid fauna and flora* *- prepovedani načini lova in ribolova ter prepovedana sredstva so vključena v zakone s področja lova in ribolova* *- prohibited methods and means of capture and killing are included into the laws of hunting and fishing*	
Protection of forests against atmospheric pollution, EEC/3528/86 amended by EEC/1696/87, EEC/2157/92, EEC/926/93, EEC/836/94, EC/1091/94, EC/690/95, EC/1398/95 and 307/97/EC	Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96 Zakon o gozdovih Law on forests, OJ 30/93 *1. Uredba o imisijskem monitoringu v gozdovih* *Decree on emissions' monitoring*	*8.8 - Sept.99*
Protection of forests against fire, EEC/2158/92 amended by EEC/1170/93, EC/804/94 and 308/97/EC	*Zakon o ohranjanju narave* *Nature Conservation Law* Zakon o gozdovih Law on forests, OJ 30/93	

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
2. White Paper legislation		
none		
F. INDUSTRIAL POLLUTION CONTROL AND RISK MANAGEMENT		
1. Non-White Paper legislation		
Directives		
*Air pollution from industrial plants, 84/360/EEC amended by 90/656/ECC and 91/692/EEC *will be replaced by the IPPC Directive	1. Uredba o emisiji snovi v zrak iz nepremičnih virov onesnaževanja (Ur.l.RS, št. 73/94) Decree on the emission of substances into the atmosphere form stationary sources of pollution	5.0
Large combustion plants, 88/609/EEC amended by 90/656/ECC and 94/66/EC	1. Uredba o emisiji snovi v zrak iz kurilnih naprav (Ur.l. 1RS, št. 73/94) Decree on the emission of substances into the atmosphere from heating plants *1. Uredba o spremembah in dopolnitvah uredbe o emisiji snovi v zrak iz kurilnih naprav* *Decree on changes and additions to the Decree on the emission of substances into the atmosphere from heating plants*	*5.1 - Oct. 98*
IPPC, 96/61/EC		
Seveso - Control of major accident hazards, 96/82/EC replacing 82/501/EEC	*vključeno naj bi bilo v Zakon o kemikalijah* *included into the Law on chemicals* *Uredba o monitoringu dajavnosti nadzora tveganja na industrijskih objektih* *Decree on monitoring of industrial site risk management activities*	*5.2 - Oct. 98*
Proposed Directive on industrial emissions of VOC-solvents , COM(96) 538-final.	*1. Uredba o emisiji VOC v zrak iz virov onesnaževanja* *Decree on the emission of VOCs into air from certain processes and industrial installation*	*5.3 - Apr. 99*
Proposal for Council Directive on the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery (95/C328/01)	1. Uredba o emisiji snovi v zrak iz nepremičnih motorjev z notranjim izgorevanjem in nepremičnih plinskih turbin, Ur.l. RS,št. 73/94 Decree on the emission of substances into the atmosphere from stationary internal combustion engines and stationary gas turbines 2. Uredba o spremembi uredbe o emisiji snovi v zrak iz neprmičnih motorjev z notranjim izgorevanjem in nepremičnih plinskih turbin *Decree on change to the Decree on the emission*	*5.4 - Aug. 98*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
	of substances into the atmosphere from stationary internal combustion engines and stationary gas turbines	
Directive 86/280/EEC on the limit values and quality objectives for discharges of certain dangerous substances included in List 1 of the annex to Directive 76/464/EEC, subsequently amended by Directives 88/347/EEC and 90/41/EEC amending Annex II to Directive 86/280/EEC and Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into aquatic environment: List on substances, 86/280/EEC, amended by 88/347/EEC and 90/415/EEC	*1. Uredba o emisiji snovi pri odvajanju odpadnih vod iz virov onesnaževanja:* *Decree on the emission of substances and heat in the drainage of wastewater from pollution sources:* *- proizvodnja rastlinskih in zivalskih olj in maščob / production of vegetal and animal oils and fats* *- predelava mleka in proizvodnja mlečnih izdelkov / reproduction of milk* *- proizvodnja piva in slada / beer and malt production* *- proizvodnja mesa in mesnih izdelkov / meat production* *- bolnišnic / hospitals* *- pralnic in kemičnih čistilnic / washhouses and chemical refinery* *- objektov za vzdrževanje in popravila motornih vozil in trgovin na drobno z motornimi gorivi / maintenance of vehicles* *- proizvodnja papirnih vlaknin/manufacture of pulp, paper and paper products* *- kafilerij / disposal of animal carcasses* *- odlagališča odpadkov/landfill*	*5.5 - Mar. 98*
Directive 86/280/EEC on the limit values and quality objectives for discharges of certain dangerous substances included in List 1 of the annex to Directive 76/464/EEC, subsequently amended by Directives 88/347/EEC and 90/41/EEC amending Annex II to Directive 86/280/EEC and Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into aquatic environment: 7 daughter directives, all amended by 90/656/EEC and 91/692/EEC: Mercury discharges from chlor-alkali industries, 82/1767EEC Cadium discharges,	*1. Uredba o emisiji snovi pri odvajanju odpadnih vod iz virov onesnaževanja:* *Decree on the emission of substances and heat in the drainage of wastewater from pollution sources:* *- rudarjenje in predelava mineralnih surovin / mining, quarrying and processing at the mining site* *- obdelava lesa / manufacture of wood and of products of wood* *- predelava goriv / manufacture of coke, refined petroleum products* *- proizvodnja izdelkov iz nekovinskih mineralov / manufacture of nonmetallic mineral products* *- oskrba z energijo/ electricity, gas, steam and hot water supply* *- mercury discharges from chlor-alkali industries/ kloralkalna proizvodnja z izpusti živega srebra*	*5.6 - Aug. 98*

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
83/513/EEC Other mercury discharges, 84/156/EEC HCH discharges, 84/491/EEC List on substances, 86/280/EEC, amended by 88/347/EEC and 90/415/EEC	*- cadium discharges/ industrija z izpusti kadmija* *- other mercury discharges/drugi živosrebrni izpusti* *- izpusti iz proizvodnje sredstev za zaščito rastlin in zatiranje škodljivcev /discharges from production of biocides* *- ribogojnice* *- odplake iz obratov za predelavo sadja ter zelenjave in iz proizvodnje globodko zamrznjene hrane in sladoleda /manufacture of fruit and vegetable products* *- odplake iz proizvodnje osvežilnih pijač ter polnilnic le-teh/ manufacture and bottling of soft drinks* *- odplake iz predelave krompirja/potato-processing* *- odplake iz proizvodnje alkohola za potje in alkoholnih pijač /jproduction of alcohol and alcoholic beverages* *- odplake iz sušenja rastlinskih proizvodov za pripravo krmil/manufacture of animal feed from plant products* *- odplake iz proizvodnje kožnjega in kostnega kleja ter želatine/manufacture of gelatine an d of glue from hides, skin and bones* *- odplake iz naprav za proizvodnjo ribjih izdelkov /fish processing industry*	*Jan. 99*
	1. Pravilnik o imisijksem obratovalnem monitoringu virov onesnaževanja zraka *Regulations on operational monitoring of the emission of substances form air-pollution sources*	*5.7 - Oct. 98*
	1. Uredba o emisiji vonjav *Decree on emission of fragrances* *2. Pravilnik o monitoringu vonjav* *Regulations on monitoring of fragrances*	*5.8 - Jul. 99*
Regulations		
Regulation on Eco-Label, EEC/880/92 related Commission Decisions on Eco-Label criteria for: Dishwashers, 93/431/EEC Soil improvers, 94/923/EEC Toilet paper, 94/924/EEC Paper kitchen rolls, 94/925/EEC Laundry detergents, 95/365/EEC Single-ended lightbulbs,	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96 1. Uredba o ekološki znamki *Regulation on Eco Label*	*5.9 - Jun. 99*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
95/533/EEC Indoor paints and varnishes, 96/13/EEC Bed-linen and T-shirts, 96/304/EEC Double-ended lightbulbs, 96/337/EEC Washing machines, 96/461/EEC Copying paper, 96/467/EEC Refrigerators, 96/703/EEC		
Regulation on EMAS, EEC/1836/93	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96 1. Uredba o EMAS *Regulation on EMAS*	 *5.10 - Jun. 99*
2. White Paper legislation		
none		
G. CHEMICALS AND GENETICALLY MODIFIED ORGANISMS		
1. Non-White Paper legislation		
Directives		
Animal experiments, 86/609/EEC		
Good laboratory practice, 87/18/EEC related directive 88/320/EEC on inspection		
GMOs, contained use, 90/219/EEC amended by 94/51/EC	*Zakon o gensko spremenjenih organizmih - GMO Law on genetically modified organisms - GMO*	*6.1 - Sep. 98*
GMOs deliberate release 90/220/EEC amended by 94/15/EC and 97/35/EC	*Zakon o gensko spremenjenih organizmih GMO Law on genetically modified organisms - GMO*	*6.2 - Dec. 98*
Asbestos, 87/217/EEC	*Uredba o emisiji snovi iz azbestnih postopkov Regulation on emission of substances from asbestos processes*	*6.3*
Regulations		
none		
2. White Paper legislation		
Directives		
Classification, packaging and labeling of dangerous substances, 67/548/EEC amended by 69/81/EEC, 70/189/ECC, 71/144/EEC, 73/146/EEC, 75/409/EEC, 76/907/EEC, 79/370/EEC,		

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
79/831/EEC, 80/1189/EEC, 81/957/EEC, 82/232/EEC, 83/467/EEC, 84/449/EEC, 86/431/EEC, 87/432/EEC, 88/302/EEC, 88/490/EEC, 90/517/EEC, 91/325/EEC, 91/326/EEC, 91/410/EEC, 91/632/EEC, 92/32/EEC, 92/37/EEC, 92/69/EEC, 93/21/EEC, 93/67/EEC, 93/72/EEC, 93/90/EEC, 93/101/EEC, 93/105/EEC, 94/69/EC, 96/54/EC, 96/56/EC		
Classification, labeling and packaging of dangerous preparations, 88/379/EEC amended by 89/178/EEC, 90/492/EEC, 91/155/EEC, 93/18/EEC, 93/112/EEC, 91/442/EEC, 95/65/EEC		
Restrictions on the marketing and use of certain dangerous substances and preparations, 76/769/EEC amended by 79/663/EEC, 82/806/EEC, 82/828/EEC, 83/264/EEC, 83/478/EEC, 85/467/EEC, 85/610/EEC, 89/677/EEC, 89/678/EEC, 91/173/EEC, 91/338/EEC, 91/339/EEC, 91/659/EEC, 94/27/EC, 94/48/EC, 94/60/EC, 96/55/EC and 97/10/EC, 97/16/EC		
Detergents, 73/404/EEC amended by 82/242/EEC and 86/94/EEC related directive on testing the biodegradability, 73/405/EEC		
Transport of dangerous goods by road 94/55/EC		
Regulations		
Regulation on Existing substances, EEC/793/93		
Regulation laying dawn the Principles for the Evaluation of Risks, EC/1488/94		

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Regulation concerning the first list of priority substances, EC/1179/94		
Regulation concerning the second list of priority substances, EC/2268/95,		
Regulation concerning the third list of priority substances,142/97/EC and 143/97/EC,		
Regulation on Import and export of dangerous chemicals, EEC/2455/92		
Regulation on Ozone depleting substances, EC/3093/94	1. Zakon o varstvu okolja Environmental Protection Act, OJ 32/93, 1/96; 2. Zakon o ratifikaciji Dunajske konvencije o zaščiti ozonskega plašča Act on ratification of the Vienna convention on the protection of the ozone layer, OJ 9/92, 35/92; 3. Zakon o ratifikaciji Montrealskega protokola o substancah, ki škodljivo delujejo na ozonski plašč Act on ratification of the Montreal protocol on substances that deplete the ozone layer, OJ 9/92, 35/92; 4. Uredba o ratifikaciji Londonskega amandmaja Decree on ratification of the London amendment to the Montreal protocol, OJ 61/92; 5. Uredba o ratifikaciji Kopenhagenskih amandmajev Decree on ratification of the Copenhagen amendment to the Montreal protocol; 1. Odredba o snoveh, ki povzrocajo tanjšanje ozonskega plašča Decree on substances that deplete the ozone layer	6.4

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
H. NOISE FROM VEHICLES AND MACHINERY		
1. Non-White Paper legislation		
none		
2. White Paper legislation		
Directives		
Motor Vehicles 70/157/EEC amended by 73/350/EEC, 77/212/EEC, 81/334/EEC, 84/372/EEC, 84/424/EEC, 87/354/EEC, 89/491/EEC, 92/97/EEC and 96/20/EC		
Motor cycles 78/1015/EEC amended by 87/56/EEC and 89/235/EEC		
Construction plant equipment (framework), 79/113/EEC amended by 81/1051/EEC and 85/405/EEC	*Uredba o določitvi emisije hrupa gradbene proizvodnje in opreme* *Decree on the determination of the noise emission of construction plant and equipment*	*7.1 - Dec. 97*
Subsonic aircraft, 80/51/EEC amended by 83/206/EEC	*Uredba o dovoljenih stopnjah hrupa podzvočnih letal* *Decree on the permissible sound power levels of subsonic aircraft*	*7.1 - Dec. 97*
Subsonic jet airplanes, 89/629/EEC Limitation of the operations of airplanes, 92/14/EEC	*Uredba o dovoljenih stipnjah hrupa podzvočnih reaktivnih letal* *Decree on the permissible sound power levels of subsonic jet aeroplanfes*	*7.1 - Dec. 97*
EEC type approval for construction plant and equipment, 84/532/EEC	*Uredba o splošnih določilih za gradbena podjetja in opremo* *Decree on the common provisions for construction plant and equipment*	*7.2 - May 98*
Compressors, 84/533/EEC amended by 85/406/EEC	*Uredba o dopustni stopnji hrupa za kompresorje* *Decree on the permissible sound power level of compressors*	*7.2 - May 98*
Tower cranes, 84/534/EEC amended by 85/405/EEC	*Uredba o dopustni stopnji stopnji hrupa na stolpnih žerjavih* *Decree on the permissible sound power level on tower cranes*	*7.2 - May 98*
Welding generators, 84/535/EEC amended by 85/407/EEC	*Uredba o dopustni stopnji hrupa električnih generatorjev varjenja* *Decree on the permissible sound power level of welding generators*	*7.3 - Aug. 98*
Power generators, 84/536/EEC amended by 85/408/EEC	*Uredba o dopustn stopnji hrupa električnih generatorjev* *Decree on the permissible sound power level of power generators*	*7.3 - Aug. 98*

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Concrete breakers, 84/537/EEC amended by 85/409/EEC	*Uredba o dopustni stopnji hrupa električih ročnih pnevmatičnih svedrov za drobljenje betona* *Decree on the permissible sound power level of powered hand-held concrete breaker sand picks*	*7.3 - Aug. 98*
Lawn mowers, 84/538/EEC amended by 87/252/EEC, 88/180/EEC and 88/181/EEC	*Uredba o dopustnih stopnjah hrupa kosilnic* *Decree on the permissible sound power levels of lawnmowers*	*7.4 - Nov. 98*
Hydraulic excavators, 86/662/EEC amended by 89/514/EEC and 95/27/EC	*Uredba o omejevanju hrupa, ki ga proizvajajo hidravlični bagerji, kabelski bagerji, buldožerji, nakladalniki in bagerji nakladalniki* *Decree on the limitation of noise emitted by hidraulic excavators, rope-operated excavators, dozers, loaders and excavator- loaders.*	*7.4 - Nov. 98*
Household appliances, 86/594/EEC	*Uredba o dopustni stopnji hrupa gospodinjskih pripomočkov* *Decree on the permissible sound power sound levels of household appliances*	*7.4 - Nov. 98*
Regulations		
I. NUCLEAR SAFETY AND RADIATION PROTECTION		
1. Non-White Paper legislation		
Directives		
Radiation protection of patients, 84/466/EURATOM	*Pravilnik o pogojih za uporabo ionizirajočih virov v medicini (Z7)* *Regulations on the conditions for the use of sources of ionising radiation in medicine (OJ 40/86, amended 10/87)*	
Radiation protection of patients, 84/466/EURATOM		Ministry of Health and SNSA
Early exchange of information in case of a radiological emergency, 87/600/EURATOM	1. Uredba o ratifikaciji konvencije o zgodnjem obveščanju o jedrskih nesrečah Ratification of the Conventionon on Early Notification of a Nuclear incident (OJ.15/89) 2. Zakon o ratifikaciji sporazuma med RS in Avstrijo in RS in Madžarsko Ratification of bilateral Agreement between Slovenia and Austria (OJ.15/96) and Hungary (OJ. 2/96) on Early exchange of information in the Event of a Radiological Emergency	
Information of the public, 89/618/EURATOM		SNSA and Ministry of Health
Radiation protection of outside workers, 90/641/EURATOM		SNSA and Ministry of labor...

ZAKONODAJA EU **EU Legislation**	**NACIONALNI PREDPIS** **National Reference**	**Št.projekta./** **Project Number** **Rok/Term** **Governmental** **Procedure**
Regulations		
none		
2. White Paper legislation		
Directives		
Shipments of radioactive waste, 92/3/EURATOM supplemented by 93/552/EURATOM	1. *Zakon o varstvu pred ionizirajočimi sevanji in o posebnih varnostnih ukrepih pri uporabi jedrske enrgije* *Act on Radiation Protection and the Safe Use of Nuclear Energy (OJ. 62/84)* 2. Pravilnik o dajanju v promet in uporabi radioaktivne snovi, katerih aktivnosti presegajo določeno mejo, rentgenskih in drugih aparatov, ki proizvajajo ionizirajoča sevanja ter o ukrepih za varstvo pred sevanjem ter virov Regulation on Trade of Radioactive Materials or Sources (OJ. 40/86, 45/89) 3. *Pravilnik o načinu zbiranja, evidentiranja, obdelave, hrambe, dokončne odložitve in izpuščanja radioaktivnih odpadnih snovi v človekovo okolje* *Regulation on Radioactive Wastes (OJ. 40/86)* *4. Uredba o določitvi režima izvoza in uvoza določenega blaga* *Decree on Establishment of Regime for Export and Import of Specific Goods (OJ. 75/95)*	
Basic Safety Standards, 96/29/EURATOM		
Regulations		
Maximum permitted levels of radioactive contamination of foodstuffs following a radiological emergency, 87/3954/EURATOM supplemented by 770/90/EURATOM, 219/89/EURATOM, 944/89/EURATOM.		SNSA and Ministry of Health and Ministry of Agriculture
Imports of agricultural products following the Chernobyl Accident, 90/737/CEE amended by 94/3034/EEC and 95/686/EC		SNSA and Ministry of Health and Ministry of Agriculture

ZAKONODAJA EU EU Legislation	NACIONALNI PREDPIS National Reference	Št.projekta./ Project Number Rok/Term Governmental Procedure
Shipments of radioactive substances, 93/1493/EURATOM	Zakon o varstvu pred ionizirajočimi sevanji in o posebnih varnostnih ukrepih pri uporabi jedrske energije Act on Protection Against Ionizing radiation and on special Safety Measures in the use of Nuclear Energy	

First Overview of the Costs of Implementation and the Timetable for Meeting EU Environmental Acquis

investments in infrastructure

PROJECT	INVESTMENT COSTS (M DEM)		IMPLEMENTATION TIME	
A/ GENERAL LEGISLATION	no special investments needed		2000	
B/ AIR QUALITY				
1/ coal to gas conversion (household heating) [2]	50		cont. to 2005	
2/ desulphurisation of Šoštanj V thermal power plant [2]	200		2004	
3/ industrial waste gas purification [3]	150		2005	
4/ road to rail shift of cargo transit [9]	40		2010	
5/ GHG abatement[4]	25 (next 10 years)		8% decreasing from 1990	
6/ ODS phaseout [2]	20		according to MP and Amend	
7/ NOx, Ammonia, VOCs abatement [5]	250		according to future protocols	
8/ POP, abatement [3]	5		according to future protocols	
9/ Heavy Metals abatement [3]	5		according to future protocols	
10/ complying of existing installations:				
a/ small, medium, large combustion installations [3]	20		2000, 2002, 2004	
b/ waste incineration [3]	5		2000	
c/ aluminium electrolysis [3]	7		2004	
d/ gas turbines [3]	1		2002	
e/ wood processing [3]	15		2000	
f/ other installations [3]	100		1997	
Total B	**1003**			
C/ WASTE MANAGEMENT				
1/ landfills (reconstruction and enlargement in conformity with EU standards) [1]	550		2000-2025	
2/ technical systems (collection, reprocessing, material utilization, reuse) [1]	330		2000-2005	
3/ incineration (2 installations) [1]	550		2005-2010	
4/ disposal of special wastes from industry, energy and building sector (slags, construction wastes) [1]	620		2010	
5/ disposal of wastes from agriculture and forestry [1]	90		2010	
6/ disposal of radioactive wastes [7]	150		2010	
Total C	**2290**			

PROJECT	INVESTMENT COSTS (M DEM)		IMPLEMENTATION TIME	
D/ WATER QUALITY				
1/ municipal wastewater treatment plants [2]	400		70% by 2010, 100% by 2020 (60% of	
sewage system enlargement [3]	250		pop. connected on sewage system, 50%	
2/ industrial wastewater treatment plants[3]	200		on WTP)	
3/ complying of existing installations:			2010	
a/ municipal wastewater[3]	20		2001 (over 15000 PE), 2006	
			(10000-15000 PE)	
b/ textile industry [3]	10			
c/ metal industry [3]	30		1998	
d/ leather industry [3]	15		1998	
e/ other [3]	150		1998	
Total D	**1075**		1998	
E/ NATURE PROTECTION				
1/ protected areas and species [6]	250 (25 yearly)		2005-2010	
Total E	**250**			
F/ INDUSTRIAL POLLUTION AND RISK MANAGEMENT				
1/ Institutional strengthening [3]	1		2000	
2/ Improvements in industrial safety[3]	50		2005	
Total F	**51**			
G/ CHEMICALS AND GENETICALLY MODIFIED ORGANISMS	no special investments needed		1999	
H/ NOISE ABATEMENT	no larger investments of existing installations needed		1998	
I/ NUCLEAR SAFETY[8]				
1/ early exchange of information in case of emergency				
2/ information of the public	0,5		2000	
3/ radiation protection of outside workers	1		2002	
4/ basic safety standards	2		2002	
5/ shipment of radioactive wastes	10		2005	
6/ shipment of radioactive substances	1		2001	
Total E	0,5		2002	
	15			

PROJECT	INVESTMENT COSTS (M DEM)		IMPLEMENTATION TIME	
J/ EM-RADIATION	no special investments of existing installations needed		implemented	
K/ IONISING RADIATION 1/ improvements on existing installations **Total K**	10 **10**		2002	
Total A+B+C+D+E+F+G+H+I+J+K	**4584**			

Annotations

1. Waste Management Strategy
2. Investment Program
3. Estimation
4. Strategy on Effective Use of Energy
5. Denitrification of flue gases in energy sector, ammonia abatement in agriculture, surface painting in industry
6. Subsidies for restrictive land use, budgeting of protected areas, inst. strengthening for biodiversity preservation
7. Projection of Agency for Radioactive Wastes
8. Projection of Nuclear Safety Authority
9. National Program for Development of Railway Infrastructure (Ministry of Transport and Communications)